SAMPLE NOTES FOR GS PRELIMS
ASIA

- Asia accounts for one-third of world’s land area and about **60% of its population**
- Asia—**Largest continent** both in **area** and in **population**.

**PHYSICAL FEATURES**

**NORTHERN LOWLANDS (SIBERIAN PLAINS)**

- Plains between Ural Mountains in the West and Lena River in the east are called as **Siberian Plains**
- Drained by Rivers Ob, Yenisei and Lena.
- **Lake Baikal**—deepest lake of the world is located here

**MOUNTAINS**

- **Pamir Knot (Plateau)** is the meeting place of several ranges of Asia
- This Plateau is highest in the world and known as “**Roof of the world**”
- **Hindu Kush** extends to the west, Tien Shan towards N. East, Kunlun to east and the Karakoram and Himalayas to the S-E.
- To the west of Hindu Kush, two ranges of Mountain ranges diverge. In North **Elburz** (extend along south of Caspian Sea) and in South **Zagros** Mountains (extend along Arabian Sea and Overlooks Persian Gulf).
- **Elburz** and **Zagros** Mountains enclose the **Plateau of Iran**
- These two ranges converge in the west at the knot of **Mount Ararat**
- Again two groups of Mountain ranges diverge westward from Mount Ararat, **Pontic** in the north and **Taurus** in the south.
- **Plateau of Anatolia** is enclosed between Pontic and Taurus.
- South Eastward of Pamir lies Karakoram Range and Himalayan range.
- **K2** (Godwin Austin in POK) is the highest Peak of Karakoram, whereas Mt. Everest is highest peak in the Great Himalayas.
- Between these two ranges in south and **Kunlun** in the north, is the **Tibetan** Plateau.
- Further north, **Tarim basin** is located between **Kunlun in south and Tien Shan** in north.

**THE SOUTHERN PLATEAUS**

- Having **older rocks** than that of Mountains ranges
- Plateau of Arabia, Deccan Plateau and Plateau of Yunnan are its parts

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THE GREAT RIVER VALLEYS

- Tigris & Euphrates (Iraq).
- **Baghdad** is located on river Tigris. Both of these fall into Persian Gulf.
- Ancient Mesopotamian culture flourished between these two rivers.
- Indus (Pakistan)
- Ganga-Brahmaputra (India and Bangladesh)
- Ayeyarwaddy or Irrawaddy (Myanmar)
- Mekong (South-East Asian countries)
- Sikiang, Chang Jiang (Yang-Tse-Kiang) and Huang He (Hwang-Ho) in China

THE ISLAND GROUPS

- Indonesia, Philippines and Japan.
- Most of these islands have Mountains core surrounded by narrow coastal plains, have extremely fertile soil (basically volcanic ash)

CLIMATE

WINTERS

- Interior part of Asia becomes extremely cold, temperature decreases, air contracts forming high pressure area over Mongolia. Dry winds blow outward. Therefore most of the parts of Asia do not get rain though while blowing over the sea, winds pick up moisture and cause rainfall in some areas.
- **Oymyakon** in N-E Siberia is the **coldest place** in the **Northern Hemisphere** [Mean January Temperature (~ 45°)].

SUMMERS

- Temperature rises in the interior parts of Asia, air expands, create low pressure areas. Now High Pressure areas are located over oceans and winds starts blowing towards low pressure areas, causing rainfall in most of the areas.
- **Mawsynram** in Meghalaya (India) is the **wettest place** in the world; however **Mt Waialeale in Hawaii Island (USA)** recorded highest annual average rainfall (11,680 mm) in the world in 2007.

NATURAL VEGETATION & WILD LIFE

TUNDRA BELT

- Lies along northern coast of Asia, covered with snow for major part of the year. Precipitation is about **30 cm annually**. Vegetation – Mosses and Lichens.

TAIGA

- To the south of Tundra, belt of **coniferous forests** (softwood-used for paper industry)
- Found in Russia, Japan (also in Himalayan region)
- Precipitation – Between 25 and 50 cm
- Vegetation – **Pine, Fir and Spruce**. Used as timber and for making pulp and rayon
Animals – Fur bearing e.g. fore, sable, mink

**STEPPES**
- Temperate grasslands, next to taiga. Winters cold, summers hot.
- Rainfall – Between 20–40 cm
- Animals – Grass eating e.g. antelopes

**DESERTS**
- Large parts of South West and Central Asia
- **Hot desert**– Arabia and Thar.
- **Cold desert** – Gobi and Tibet.

**MONSOON REGIONS**
- South, S-E and East Asia
- Summers hot and humid
- Rainfall – Between 60 and 250 cm, mostly in summers
- **Vegetation** – Teak, sal and sandal wood
- In N-E Asia, the climate is generally cooler and hence monsoon forests give way to temperate woodlands.
- Extreme Southern portions, closer to the equator have equatorial rainforests, dense and contain variety of trees, plants and bushes.

**MAJOR CROPS**
- Cultivation of **rice** is mainly confined to Monsoon Asia as it require warm and humid climate
- **Wheat** is the main crop of sub-tropical and temperate parts of the continent. W-Siberia, Kazakhstan, China, North India, Pakistan and countries of S-W Asia are the main producers of the wheat.
- **Sugarcane** requires hot and moist climate and well-drained fertile soils. Grown in Pakistan, India, China, Thailand and Indonesia.
- **Tea** is grown in India, Sri Lanka, China, Japan and Indonesia
- **Cotton** is grown in dry areas. Major producers are China, countries of Central Asia, India and Pakistan.
- **Jute** is grown in fertile soil of the floodplains in Ganga-Brahmaputra delta
- **Rubber** is grown mainly in Malaysia and Indonesia, Thailand, India, China and Sri Lanka.

**DESERTS**
- **Gobi**: World’s greatest temperate desert lying in China and Mongolia. Inhabited by Mongol nomads
- **Lopnor**: Temperate desert lying in China, where China’s nuclear test centre is located.
- **Taklamakan**: Temperate desert lying in Tarim basin, a center for Buddhist culture
- **Rub-Al-Khali**: hot desert situated South of S. Arabia, rich in petroleum deposits
- **Dast-E-Lut**: A hot desert in E. Iran, rich in petroleum deposits
- **Dast-E-Kabir**: A hot and saline desert in N. Iran, rich in petroleum deposits.
- **Kyzilkum**: A temperate desert extended in Uzbekistan and Kazakhstan
- **Karakum**: Temperate desert in Turkmenistan, transversed by Trans-Caspian railway

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**FEW IMPORTANT RIVERS OF ASIA**

<table>
<thead>
<tr>
<th>RIVER</th>
<th>DRAINS INTO</th>
<th>SIGNIFICANCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hwang He</td>
<td>Gulf of Pohai</td>
<td><strong>Sorrow of China</strong> (owing to frequent floods), Carries loess from Gobi desert</td>
</tr>
</tbody>
</table>
| Yangtze Kiang | E. China Sea      | • World’s largest **3-gorges dam** on it, also city of Wuhan & Shanghai on its banks  
• The Three Gorges Dam Project was completed in **2009**.  
• Located in the middle section of **Xiling Gorge**, one of the three gorges (the other two are Wu Gorge and Qutang Gorge)  
• A **Yangtze Cruise** passes the Three Gorges Dam.  
• **Tanzi Ridge** is located in the surveying point for the Three Gorges Dam Project.  
• The long-term ecological effects of the Three Gorges Dam have been described as ‘possibly catastrophic’. |
| Mekong        | South China Sea   | Passes through China, Myanmar, Thailand, Laos, Cambodia & Vietnam; Makes **boundary between** Myanmar & Laos, Thailand & Laos.                                                                                                                                                                                                                                                                                                                                                                           |
| Amu Darya     | Aral Sea          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Syr Darya     | Aral Sea          | **Toshkent** located on it                                                                                                                                                                                                                                                                                                                                                                                                             |
| Tigris        | Persian Gulf      | **Baghdad** is located on it; Passes through **Turkey & Iraq**                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Euphrates     | Persian Gulf      | **Mesopotamian** located between Tigris & Euphrates. Passes through Turkey, Syria & Iraq                                                                                                                                                                                                                                                                                                                                                                           |

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![Map of Rivers of Asia](image.png)

- **Yenisey**
- **Ob**
- **Volga**
- **Ural**
- **Tigris**
- **Hwang He**
- **Yangtze Kiang**
- **Mekong**


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SEAS & LAKES

- **Okhotsk Sea**: An extension of Pacific Ocean, situated west of Kamchatka and frozen for 8 months
- **Sea of Japan**: Separates Japan from Mainland with rich petroleum deposits, with Vladivostok as ice-free port
- **Yellow Sea**: Named for its colour, at the mouth of Hwang He, separating Korea from China. Hwang He brings huge amount of sand to this sea.

![Map of SEAS & LAKES](map.png)

PENINSULAS

- **Kamchatka**: Part of Russia with inhospitable climate and earthquakes, famous for petroleum deposits
- **Kola**: Part of Russia with Murmansk as ice free port throughout the year (washed by warm North Atlantic drift), rich in minerals
- **Kanin**: Part of Russia with rich mineral deposits
- **Malaya**: Part of Malaysia with rich tropical rainforest, and tin, rubber and oil deposits
- **Arabian**: Largest peninsula in the world, mostly desert and famous for oil reserves
- **Sinai**: Part of Egypt with rich petroleum deposits mostly covered by desert. Captured by Israel in 1967 and returned in 1979
- **Crimean**: Part of Ukraine with mineral resources and important port on Black Sea
## MAJOR INFRASTRUCTURE PROJECTS IN ASIA

### TRANS-ASIAN RAILWAY (TAR)
- It is a project to create an integrated freight railway network across Europe and Asia.
- The Trans-Asian Railway Network Agreement is an agreement signed by seventeen Asian nations as part of a United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) effort to build a transcontinental railway network between Europe and Pacific ports in China.
- The plan has sometimes been called the "Iron Silk Road" in reference to the historical Silk Road trade routes.
- The Trans-Asian Railway network now comprises 117,500 km of railway lines serving 28 member countries.

### ASIAN HIGHWAY (AH) PROJECT
- It is also known as the Great Asian Highway
- It is a cooperative project among countries in Asia and Europe and the United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), to improve the highway systems in Asia.
- Agreements have been signed by 32 countries to allow the highway to cross the continent and also reach to Europe.

### SILK ROAD
- China has launched a massive $79.8 billion infrastructure project in the northwest province of Gansu, which will facilitate trade and people exchanges between China and central Asia as part of its ambitious Silk Road plan.
- The Silk Road projects involved a maze of roads and ports connecting Asia, Europe and Africa.
- Also known as the “One Belt, One Road,” project.
### SUNDA STRAIGHT BRIDGE – INDONESIA
- The Sunda Straight Bridge is a planned road and railway mega project between the two large Indonesian islands of Sumatra and Java.
- It includes several of the world’s longest suspension bridges, across the 27 km (17 mi) Sunda Strait.

### KUNMING – SINGAPORE RAILWAY
- The Kunming–Singapore Railway refers to a network of railways, under planning and construction that would connect China, Singapore and all the countries of mainland Southeast Asia.
- The idea was formally revived in 2006 when 18 Asian and Eurasian countries signed the Trans-Asian Railway Network Agreement, which designates the Kunming-Singapore Railway as one of the Trans Asian Railways.
- The proposed network consists of three main routes from Kunming, China to Bangkok, Thailand.

### ARAB MASHREQ INTERNATIONAL ROAD NETWORK
- It is an international road network between the Arab countries of Syria, Iraq, Jordan, Palestine (Israel included), Lebanon, Kuwait, Egypt, Saudi Arabia, Bahrain, Qatar, UAE, Oman and Yemen.
- The network is a result of the 2001 Agreement on International Roads in the Arab Mashreq, a United Nations multilateral treaty that entered into force in 2003 and has been ratified by the 13 countries for which the network serves.

### JAPAN–KOREA UNDERSEA TUNNEL
- It is a proposed tunnel project to connect Japan with South Korea via an undersea tunnel crossing the Korea Strait using the strait islands of Iki and Tsushima.
CONFLICT ZONES IN ASIA

SYRIA

- Syria borders Turkey, Iraq, Jordan, Israel and Lebanon.
- The highest point in Syria is Mount Hermon (9,232 ft; 2,814 m) on the Lebanese border.
- Lake Assad is the largest lake in Syria.
- Al Lādhiqīyah along with Tartus are Syria’s main ports on the Mediterranean Sea.
- The longest and most important river is the Euphrates, which represents more than 80 percent of Syria’s water resources.
- Syria’s population is about 90 percent Muslim, mostly Sunni—but the Alawite minority (12 percent of Syrians) is politically dominant.
- The Syrian Civil War is an ongoing-armed conflict-taking place in Syria. The unrest began in the early spring of 2011 within the context of Arab Spring protests, with nationwide protests against President Bashar al-Assad’s government, whose forces responded with violent crackdowns. The conflict gradually morphed from prominent protests to an armed rebellion after months of military sieges.
- There are four main factions of fighting groups throughout the country: Kurdish forces, ISIS, other opposition and Assad regime.
- The majority of Syrian refugees are living in Jordan and Lebanon.

IRAQ

- Iraq borders Turkey to the north, Iran to the east, Kuwait to the southeast, Saudi Arabia to the south, Jordan to the southwest, and Syria to the west.
- Population: Arab 75%-80%, Kurdish 15%-20%, Turkoman, Assyrian, or other 5%
- Two major rivers, the Tigris and Euphrates, run south through the center of Iraq and flow into the Shatt al-Arab near the Persian Gulf. The fertile region between these rivers has had many names throughout history like Al-Jazirah.
• The **desert zone** is a part of the Syrian Desert and Arabian Desert, which covers sections of Syria, Jordan, and Saudi Arabia and most of the Arabian Peninsula.

• **Iraqi coastal waters** boast a living coral reef, covering an area of 28 km² in the Persian Gulf, at the mouth of the Shatt al-Arab river.

• Iraq is second only to Saudi Arabia in rich oil reserves.

• **Iraq War**, also called Second Persian Gulf War, (2003–11), conflict in Iraq that consisted of two phases. The first of these was a brief, conventionally fought war in March–April 2003, in which a combined force of troops from the United States and Great Britain invaded Iraq and rapidly defeated Iraqi military and paramilitary forces. It was followed by a longer second phase in which a U.S.-led occupation of Iraq was opposed by an insurgency.

**AFGHANISTAN**

• A **landlocked mountainous country**, It is bordered on the north by Turkmenistan, Uzbekistan, and Tajikistan, on the extreme northeast by China, on the east and south by Pakistan, and by Iran on the west.

• Its **longest border** is the poorly marked **Durand Line** and the shortest one, bordering China's Xinjiang province at the end of the **Wakhan Corridor**.

• **Important passes** include the Unai Pass across the Safed Koh, the Kushan and Salang Passes through the Hindu Kush, and the Khyber Pass that connects Afghanistan with Pakistan.

• The **Amu Darya** on the northern border, the country's other major river, has the next largest drainage area.

• The **northeastern Hindu Kush Mountain range**, in and around the Badakhshan Province of Afghanistan, is in a geologically active area where earthquakes may occur almost every year.

• Afghanistan is a country of **ethnic minorities**: Pashtun (38 percent), Tajik (25 percent), Hazara (19 percent), and Uzbek (6 percent).

• After the **9/11 terrorist attacks**, the United States invaded Afghanistan, removed the Taliban and chased bin Laden into the mountainous region on the border of Afghanistan and Pakistan.

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YEMEN

- Yemen is an Arab country in Southwest Asia, occupying the southwestern to southern end of the Arabian Peninsula.
- It is bordered by Saudi Arabia to the north, the Red Sea to the west, the Gulf of Aden and Arabian Sea to the south, and Oman to the east.
- Yemen's territory includes more than 200 islands; the largest of these is Socotra. A number of Red Sea islands, including the Hanish Islands, Kamaran, and Perim belong to Yemen.
- Following years of dispute between Yemen and Eritrea over ownership of the Hanish Islands and fishing rights in the Red Sea, in 1999 an international arbitration panel awarded sovereignty of the islands to Yemen.
- Yemen is strategically important because it sits on the Bab al-Mandab strait, a narrow waterway linking the Red Sea with the Gulf of Aden, through which much of the world's oil shipments pass.
- Yemen is one of the poorest countries in the Arab world, due to declining oil resources.
- Ethnic Groups: Predominantly Arab, also Afro-Arab, South Asian, European
- Yemen has been in a state of political crisis since 2011. The Yemeni Civil War is an ongoing conflict that began in 2015 between two factions claiming to constitute the Yemeni government, along with their supporters and allies.
Some other list of territorial disputes over lands in Asia are as below:

<table>
<thead>
<tr>
<th>Territory</th>
<th>Claimants</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Several areas in the Fergana Valley</td>
<td>Kyrgyzstan, Tajikistan, Uzbekistan</td>
<td>Disputed areas located between Aksai Chin and Nepal, all administered by the PRC.</td>
</tr>
<tr>
<td>Demchok, Chumar, Kaurik, Shipki Pass, Jadh, and Lapthal</td>
<td>India, People’s Republic of China, People’s Republic of China (Taiwan)</td>
<td>Temple complex awarded to Cambodia by an International Court of Justice ruling in 1962; “promontory” measuring 0.3 km² immediately adjacent to temple awarded to Cambodia by ICJ ruling in 2013; both countries acknowledge continuing dispute over an additional 4.3 km² immediately northwest of the 2013 ruling’s area.</td>
</tr>
<tr>
<td>Preah Vihear Temple area (Khao Phra Wihan)</td>
<td>Thailand, Cambodia</td>
<td>Temple complex awarded to Cambodia by an International Court of Justice ruling in 1962; “promontory” measuring 0.3 km² immediately adjacent to temple awarded to Cambodia by ICJ ruling in 2013; both countries acknowledge continuing dispute over an additional 4.3 km² immediately northwest of the 2013 ruling’s area.</td>
</tr>
<tr>
<td>Paracel Islands</td>
<td>People’s Republic of China, People’s Republic of China (Taiwan), Vietnam</td>
<td>Entirely controlled by China but claimed by Vietnam and Taiwan</td>
</tr>
<tr>
<td>Pratly Islands</td>
<td>Republic of China (Taiwan), People’s Republic of China, Vietnam, Philippines (part), Malaysia (part)</td>
<td>Each of the claimant countries except Brunei controls one or more of the individual islands.</td>
</tr>
</tbody>
</table>
REGIONAL GEOGRAPHY OF SOUTH-EAST ASIA

- Southeast Asia extends for more than 4,830 km from Myanmar on the west to New Guinea on the east.
- Although this region lies near the Equator, it stretches to almost 30° N in northern Burma, and a sizable part extends as far as 20° N.
- There are 2 main divisions of Southeast Asia.
  1. The mainland: Myanmar, Thailand and Indochina (comprising Laos, Kampuchea or Cambodia and Vietnam).
  2. Insular archipelago- Philippines, Malaysia, Singapore, Indonesia, and Brunei.
- Between these two parts are shallow waters that lie over the Sunda Shelf.
- For most of mainland Southeast Asia, the dominant physical features are the rugged cordilleras that splay out from the Himalayas to the north and are to the south. These mountains are underlain by an ancient crystalline mass of stable granite material.
- The north-south Mountains of mainland Southeast Asia, although physically related to the Himalayas in the north, have been heavily weathered and rounded in the tropical, rainy climate. The ranges run parallel to one another and separate the major river basins that form the core-lands of the 5 countries of mainland Southeast Asia.
- From west to east, the main ranges are the Arakan Yoma of western Burma, the Shan Highlands of eastern Myanmar and western Thailand, which extend to length of the Malay Peninsula; and the Annamite Chain of Vietnam.
- Archipelagic Southeast Asia: A string of volcanic islands stretches from Sumatra and Java, towards east to Sulawesi & the Moluccas & towards north to the Philippines. Not only is this area one of the most geologically active regions on Earth, but it is also a highly diverse land surface. A good reflection of the newer processes of landscape formation is found in the circum-Pacific belt of volcanism known as the Pacific Ring of Fire.
RIVERS OF SE-ASIA

1. Irrawaddy and its largest tributary, the Chindwin is a major river of Myanmar. Rangoon and Mandalay, the largest cities in Myanmar, are located on the banks of the Irrawaddy.

2. Salween River originates on the Plateau of Tibet and flows for about 1200 km through China before entering Myanmar. The delta and the flood plains of the Irrawaddy are much more extensive than those for the Salween, leaving room for the core of the country to develop.

3. The Mekong River flows in a valley to the east and parallel of the Salween. After leaving China, the Mekong makes the boundary between Thailand and Laos and then continues through the heart of Cambodia. It cuts across the southern tip of Vietnam, and finally empties into the South China Sea. The capital cities of Vientiane (Laos) & Phnom Penh (Cambodia) are located along bank of Mekong River.

4. Hanoi is on the banks of the Red River, and Bangkok (Thailand) is divided by the Chao Phraya River. The political cores and cultural hearths of all the mainland countries have developed along the rivers.

VOLCANIC MOUNTAINS

- Volcanic action created most of the islands, and many individual peaks heights of many of the volcanoes are active today. Southeast Asia is the most active volcanic region of the “Ring of Fire” that surrounds the Pacific Ocean. Examples of some volcanic eruptions are Enchanting Islands of Bali and Karakota. The Younger active belt of volcanism is associated with the islands of Southeast.
- The seas between the islands of Southeast Asia generally are quite shallow; most are 150 to 200 feet deep.
- At the opposite extreme are the great ocean trenches to the outside of the island region. The Philippine Trench, east of the Philippines, is a 965 km long canyon on the bottom of the ocean.
- The Java Trench borders the region on the south off the coasts of Sumatra and Java and another ocean deep has been recorded on the east of the Banda Sea.
- Active Volcanoes in this area are as below
  - Sakurajima, Japan - A major eruption could have deadly consequences for the 700,000 residents of Kagoshima, who live just miles from the Volcano.
  - Mt. Merapi, Indonesia - Mt. Merapi has erupted regularly since 1548 and has been active for the last 10,000 years. Experts believe that its activity led to the demise of the Hindu Kingdom of Mataram.
  - Ulawun, Papua New Guinea - Ulawun is one of the most active volcanoes in Papua New Guinea. Eruptions from Ulawun originate from its central crater. There have been 22 eruptions recorded at Ulawun since the 1700s.
  - Taal Volcano, Philippines - The Taal Volcano is a cinder cone volcano. It is located on the island of Luzon, Philippines where it lies at the middle of Lake Taal. It lies just 31 miles from Manila – the capital of the Philippines.

DEMOGRAPHY OF SE ASIA

- Most of Southeast Asia’s people live, often in extremely dense clusters, in scattered areas of permanent sedentary agriculture.
- Such area form the core regions of the various countries and stand in striking contrast to the relatively empty spaces of the adjoining districts.
A superior degree of soil fertility appears to have been the main locational factor in most instances.

South East Asian countries in ascending order of population.
1 Brunei 2 Singapore 3 Laos 4 Kampuchean

South East Asian countries in descending order of population
1 Indonesia 2 Philippines 3 Vietnam 4 Thailand

SE Asian country with highest growth rate: 1. Philippines 2. Malaysia
SE Asian country with least growth rate: 1. Thialand 2. Vietnam
Country with highest population density: Singapore
Country with least population density: Laos

Ethnicity

The Malays are the most prominent ethnic group in Southeast Asia. Regional isolation and racial mixing have created differences among the countries of the region, but the people are basically Malay in origin.

The most conspicuous ethnic minority is the Chinese. The sizable minorities of “overseas Chinese” are concentrated in the urban areas of nearly every country of Southeast Asia. These are colonists from China who live in the region, and sometimes they do not even become citizens of the countries where they settle.

Indigenous hill people: Most of the indigenous tribal people of Southeast Asia are minorities within their own countries. These are the “hill people,” various tribes of which are found in each country.

In Myanmar live the Karens, the Shans, the Kachins and the Chins.

MINERAL RESOURCES

Tin

It is found in Myanmar, Indonesia, Laos, Malaysia and Thailand.

China is the world’s leading producer of tin while Malaysia is second leadin producer of world. All the tin fields are in Peninsular Malaysia and the Kinta valley alone accounts for half the annual output. Tin is smelted in Penang and Singapore and ingots are exported.

Thailand’s tin is mined in the south, in the Kra Peninsula and on off shore islands such as Phuket.

Indonesia’s tin comes from islands off the northern coast of Sumatra including Bangka, Billiton and Singkep.

Petroleum

Vast supplies of petroleum also are found in Southeast Asia.

Formerly, Indonesia was one of the world’s largest petroleum producers and about one third of Indonesia’s exports were petroleum products.

Indonesia has greatly expanded oil production, most of which comes from Sumatra. The chief fields are Palembang, Jambi, Minas (near Pekan Baru), and around Pengkalan. The oil is refined at Lutong, Sarawak, or sent to Japan or Singapore.

Oil supplies nearly make the entire income of Brunei and provide the tiny country with very high standards of living. Malaysia has oilfields off shore of Sarawak and off the East Coast of Peninsular Malaysia.

Regardless of all the mineral wealth, very little heavy industry is carried on in Southeast Asia – Partly because the colonial powers did not want industry to develop and partly
because both coal and iron ore have not been found within the same country. The European powers wanted to extract the resources for their own use and sell manufactured goods back to the colonies.

- **Highways**: Highways do cross between the countries on the mainland, but they are few and poor. The Burma and Ledo roads, carved out of the jungle during World War II, are typical of road construction in the region. The Burma Road winds for 1,126 km between Lashio in Myanmar and Kunming in China’s Yunnan province. The Ledo Road covers less rugged terrain but crosses many rivers and smaller streams as it winds between Myanmar and the Assam region of India.

**INDONESIA**

- Consists of more than 17,000 islands of various sizes, about 6000 are inhabited.
- **Main islands** – Borneo (Kalimantan), Sumatra, Irian Java, Celebes (Sulawesi), Java, Madura and Bali.
- **Jakarta** is the capital city located on the Java Island.
- **Northern Borneo** is a part of Malaysia
- Indonesia’s only land frontiers are with Papua New Guinea (to the east of Irian Jaya), and with the Malaysia (states of Sarawak and Sabah) which occupy the northern Borneo.

**Physical Features**

- Islands generally have mountainous relief
- Earthquakes associated tidal waves called ‘Tsunamis’ are quite common
- Climate – Monsoon, heavy rainfall
- Very dense forests are found in most of the parts of Indonesia
- **Agriculture** – Most important Activity. Less than 50% of population is engaged in it.
- Food Crops – Rice, Maize, Cassava and Sweet potato
- **Cash Crops** – Rubber, oil palm, coffee, tea, cocoa, sugarcane and Tobacco. All cash crops are export oriented.
- **Railways** are limited to Java, Madura and Sumatra
- **River transport** is important in several areas especially in Kalimantan & Eastern Sumatra

![Map of Southeast Asia](image)
People

- **Fourth in population** after China, India and USA
- Density of population is high in Java, Madura and Bali
- Nearly 90% of Population is Muslim
- **Bahasa Indonesia** is the official language

MALAYSIA

- Located North of the **Equator**
- Consist of two widely separated areas –
  1. Malay Peninsula (part of Asian Mainland).
  2. Northern part of Borneo Island.
- **Northern Borneo** has two states, Sarawak and Sabah
- **Peninsular Malaysia** separated from Sumatra Island by **Strait of Malacca** and from Sarawak and Sabah by South China Sea.
- At the tip of **Malaya Peninsula**, lies **Singapore**
- Kuala Lumpur is the capital and the largest city of Malaysia

Physical Features

- Central part of Malay Peninsula is mountainous & is surrounded by narrow coastal plains
- The **highest peak is Kinablu**
- Climate – **Equatorial type**, high temperature and rains throughout the year
- Evergreen forests in Sarawak and Sabah are denser than that of peninsular Malaysia

Natural Resources

- **Tin, Copper & Uranium deposits** are found in Central highlands of Malay Peninsula
- **Plantation agriculture** is important activity and Malaysia has remained a leading producer of Rubber for a long time
- Road and Rail transport are better developed in Peninsular Malaysia than in Sabah and Sarawak
- **Major Seaport** of Peninsular Malaysia is **Pinang (Georgetown)**.

REGIONAL GEOGRAPHY OF SOUTH ASIA

PAKISTAN

- The country can be divided into **two physical units** –
  1. Mountains and Plateaus in the west
  2. Indus river basin in the east is the plain region
- From **South to North** are located - Baluchistan Plateau and Mountain Ranges of Kirthar, Sulaiman and Hindu-Kush in the same order
- There are **2 important passes** in these mountains – **Khyber Pass** in the Hindu Kush and **Bolan Pass** in the Kirthar.
- **Potwar Plateau** is located to Southeast of the Hindu Kush. Region is generally dry.
- **Climate** of Pakistan is hot & dry. Rainfall decreases from North to South. Average rainfall is 50 cm.
- Northern Mountain area is forested with broadleaved evergreen oak and chestnut. Southern part is steppe.
- Coal, Iron ore, Gold and Mineral oil are found in Baluchistan
- Mineral oil is also found in Potwar and Ghodak
- Most of the industries are located in Punjab
- **Urd**u is **National language**. Punjabi, Sindhi, Pushtu and Baluchi are other important regional languages.

**PoK**

- POK (Pak Occupied Kashmir) is the area, which was forcefully occupied by Pakistan in the first Kashmir war in 1947.
- The Pak government with its capital at **Muzaffarabad** rules this region. The region has its own **self-declared prime minister**. This region is defined by **LOC** (Line of Control) which came into effect when truce was decreed in **Shimla Agreement of 1972**.
- The northern part of **Azad Jammu and Kashmir** encompasses the lower part of the Himalayas, including Jamgarh Peak.
- **Sarwali peak** in the Neelum Valley is the highest peak in the state.
- Monsoon floods of the Jhelum and Leepa river are common.

**CoK**

- **Aksai Chin** is one of the two main disputed border areas between China and India, the other being a part of Arunachal Pradesh.
- It is administered by China, but is also claimed by India as a part of the Ladakh region of the state of Jammu and Kashmir. In 1962, China and India fought a brief war over Aksai Chin and Arunachal Pradesh, but in 1993 and 1996, the two countries signed agreements to respect the Line of Actual Control.
- The area is largely a vast high-altitude desert with a low point (on the Karakash River). In the southwest, mountains up to 22,500 feet (6,900 m) extending southeast from the Depsang Plains form the de facto border (Line of Actual Control) between Aksai Chin and Indian-controlled Kashmir.
- In the north, the Kunlun Range separates Aksai Chin from the Tarim Basin, where the rest of Hotan County is situated.
- Aksai Chin area has number of endorheic basins with many salt or soda lakes. The major salt lakes are Surigh yil ganning kol, Tso tang, Aksai Chin Lake, Hongshan hu, etc.

NEPAL

- A small landlocked country, also known as Himalayan Kingdom
- Three Divisions:
  1. Northern part consists of Himalayan ranges– Great Himalayas (highest range of Himalayas) run along northern border of Nepal. Mt. Everest (8848m) - world’s highest peak is located here, known as Sagarmatha in Nepalese. To the south lies the Mahabharata Range of Middle Himalayas
  2. Central Part – Occupied by Valleys – Katmandu and Pokhra
  3. Southernmost low lying plain called Terai, liable to flooding during Monsoon
- Nepal has one of the greatest hydropower generation potentials of the world. But only about 1.3% of this potential is being used.
• Traditional cottage industries constitute 60% of the industrial production.
• Tourism is the most important industry of Nepal. It is major source of earning foreign exchange.
• It imports manufactured good and exports forest and agro based products.

**Nepal Earthquake**

• The **April 2015** Nepal earthquake was also known as the Gorkha earthquake, with a magnitude of 7.8Mw or 8.1Ms and a maximum Mercalli Intensity of IX (Violent).
• Its epicenter was east of the district of Lamjung, and its hypocenter was at a depth of approximately 8.2 km (5.1 mi). It was the **worst natural disaster** to strike Nepal since the 1934 Nepal–Bihar earthquake.
• The earthquake triggered an **avalanche on Mount Everest** and another huge avalanche in the Langtang valley.
• A **major aftershock** occurred on 12 May 2015 at 12:51 NST with a moment magnitude (Mw) of 7.3. The epicenter was near the Chinese border between the capital of Kathmandu and Mt. Everest.
• The temblor was caused by a sudden thrust, or release of built-up stress, along the **major fault line where the Indian Plate**, carrying India, is slowly diving underneath the Eurasian Plate, carrying much of Europe and Asia. Kathmandu, situated on a block of crust approximately 120 km (74 miles) wide and 60 km (37 miles) long, reportedly shifted 3 m (10 ft) to the south in a matter of just 30 seconds.

**Hydroelectric and Infrastructure Projects**

**With China**

• Under China’s Three Gorges International Corp, a new hydropower project has been approved to be built in Nepal. The dam is to be built on the **West Seti River** in northwest Nepal.
• China plans to build a 540-kilometre **strategic high-speed rail link between Tibet and Nepal** passing through a tunnel under Mt Everest. The rail line is expected to be completed by 2020.
• Nepal has decided to join the **New Silk Road**, under which Nepal would be connected to a Chinese rail line in Tibet. China recently extended its **rail network from Lhasa to Xigaze** (Shigatse), a city just 253 km away from China’s border with Nepal and India.

**With India**

• India and Nepal signed an agreement for the **900 MW Arun III dam**, making India the largest hydropower developer in Nepal. Also **900 MW Upper Karnali dam** in western Nepal has been signed off with India.
• The 18.6 km long **Jogbani-Biratnagar (17.65 km) rail link** connecting Bihar and Biratnagar in Nepal is underway. Another project connecting Jaynagar (Bihar) to Bardibas (Nepal) and extension to Bardibas is in progress.
• The **Kathmandu-Tarai Fast Track Road** aims to link Nijgarh and Bara with capital Kathmandu. On completion, the road will be the shortest to link Kathmandu and India as Bara shares the border with India.

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BHUTAN

- Small **landlocked** country in eastern Himalayas
- To the north and NW, it adjoins Tibet (China). To its west, south & east, it is bordered by India.
- It is almost entirely mountains. Its terrain is among the most rugged in the world.
- From level plain area in south called **duars**, the land rises steadily towards the north.
- **Highest peak of Bhutan is Gangar Punsun**
- **Chukha hydroelectric project** is built with the help of India has a generation capacity of 336 MW
- Agriculture is the most imp. economic activity and includes rearing of Yak & Sheep
- Nearly 90% of the population is dependent on agriculture and farmlands are owned by the women mostly
- Bhutan and India are mutually working on joint construction of four hydropower projects in Nepal:
  - **Under consuruction**- Chamkarchu project (largest of all), Punatsangchu-I, Punatsangchu-II and Mangdechhu project
  - **Already Operational** - Chukha project, Kurichu project , Tala project
- **Mountain passes** between Bhutan and India are as follows-
  - Nathu La - It connects the Indian state of Sikkim with China's Tibet Autonomous Region.
  - Jelep La - is a high mountain pass between India and Tibet in the East Sikkim District of the Indian state of Sikkim. The Menmecho Lake lies below the Jelep La Pass.

MYANMAR

- Formerly called as **Burma**, lies to east of India and Bangladesh and to S-W of China.
- **Myanmar** has transferred its **Capital from Yangon (Rangoon) to Pyinmana.** Yangon is located on southern coast while Pyinmana is in central Myanmar.

- **Structurally – three units:**
  1. Young fold mountains of the west and north are the southward continuation of the Eastern Himalayas. From **North to South**, they are known successively as **Patkai, Naga, Chin** and **Arkan Yoma**. Altitude of Mountain Ranges decreases towards the south.
  2. **Eastern Part** is of upland and low hill - extend through the **Shan** and **Kayinni** Plateaus to the Southern Part.
  3. **Alluvial Lowlands** – running North South between mountains of the west and the upland regions of the east. Important rivers – **Irrawaddy** and **Salween**

- Climate – **Tropical Monsoon Type**
- Most of the people follow Buddhism; **Urbanization is low**
- **Mandalay** is located in the interior on the bank of **Ayeyarmaddy (Irrawaddy)**
- **‘Sundari Trees** are found in the delta regions
- Rubber trees grow in hot and humid coastal regions
- **Teak** – Most important species of Tree, alone constitute nearly 17% of country’s total export
- Precious stones e.g. Sapphires, emeralds, and rubies are found on the Shan Plateau.
- **Pearls are found in the Gulf of Martaban**
- Agriculture contributes about 60% of the GDP
- Rice is the major crop and occupies about 50% of all land under cultivation

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Infrastructure Projects

With India
- **Kaladan multi modal project**: ensures sea connectivity to India’s Northeast and roads connecting India to ASEAN and an alternate market for Myanmar’s gas supplies. The sea link of the project is to **connect Kolkata with Sittwe**. The port of Sittwe is being developed by India.
- **Tamu-Kalewa-Kalemyo road**: to be handed over to Myanmar; nearly 71 bridges on this stretch are to be upgraded under the Trilateral Highway project. Trilateral Highway Project: The highway is expected to connect Moreh in India to Mae Sot in Thailand via Myanmar.

With China
- **Sino-Burma Pipelines**: A pipeline project that would allow transportation of oil and natural gas from the deep-water port of Kyaukphyu (Sittwe) in the Bay of Bengal to Kunming in China’s Yunnan province.
- **Shwe Gas Project**: The Shwe Gas Project one of the major parts of the Sino Burmese Pipeline Project. The gas field is located in the Andaman Sea. Discovered in 2004 it began production in 2013.
- **Myitsone Dam**: The Myitsone Dam which literally translates Confluence Dam is a major hydroelectric power project which is located at the confluence of the Mali and N’Mai rivers and the source of the Irawaddy River.

BANGLADESH
- Formerly called ‘East Pakistan’, became **independent in 1971**
- Bordered by India from three sides – West, north and east. Myanmar lies to its southeast. Bay of Bengal is to its south.

Physical Features
- Almost all of it lies in the Ganga-Brahmaputra delta. These are alluvial plains.
- Southeast part of Bangladesh is hilly. The Chittagong Hills, in fact, are continuation of the hill ranges of Myanmar.
- **Cox’s bazaar** – located on the eastern coast of Bangladesh is the largest Sandy-beach in the world.
- **Brahmaputra** is called ‘Jamuna’ in Bangladesh and after meeting Ganga, the joint stream is called **Padma**.
- Other rivers are the Meghna, Surma and Karnaphuli
- Climate is of Tropical Monsoon Type
- Deltaic coast has **mangrove forests** containing ‘Sundari’ trees. Wood is used for making boats.
- **Natural gas** is found in Comilla and Sylhet districts
- Rice and Jute are the major crops
- It has a small manufacturing sector. Most of the industries are small scale and cottage industries.
- Dhaka, Chandpur, Barisal and Khulna are inland ports
- **It has highest density of Population in South Asia**

Indo – Bangaldesh Land Swapping
- The India–Bangladesh enclaves were the **enclaves along the Bangladesh–India border**, in Bangladesh and the Indian states of West Bengal, Tripura, Assam and Meghalaya.
- The prime ministers of India and Bangladesh signed the **Land Boundary Agreement in 1974** to exchange enclaves and simplify their international border. A revised version of the

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agreement was adopted by the two countries in May 2015, when the Parliament of India passed the 100th Amendment to the Indian Constitution.

- Under this agreement, India received 51 Bangladeshi enclaves (covering 7,110 acres (2,880 ha)) in the Indian mainland, while Bangladesh received 111 Indian enclaves (covering 17,160 acres (6,940 ha)) in the Bangladeshi mainland.
- After the Land Boundary Agreement, India lost around 40 km² (10,000 acres) to Bangladesh.
- **Tin Bigha Border** is a strip of land belonging to India on the West Bengal–Bangladesh border. The corridor, which connects Dahagram-Angarpota (Bangladesh) with the mainland Bangladesh (Patgram) as well as Kuchilibari (India) with Mekliganj town, has turned into a veritable crossroads of friendship and harmony between India and Bangladesh.

**South Talpatti or New Moore Island**

- South Talpatti or New Moore, was a small uninhabited offshore sandbar landform in the Bay of Bengal, off the coast of the Ganges-Brahmaputra Delta region.
- The island was situated only two kilometers from the mouth of the Hariabhanga River.
- The island was claimed by both Bangladesh and India, based on a case filed by the Government of Bangladesh in 2009 at the Permanent Court of Arbitration the dispute was settled in 2014 by a final verdict not open to appeal and in favour of Bangladesh.

**SRI LANKA**

- **Separated from India by Gulf of Mannar and the Palk Strait**
- Almost the entire Sri Lanka, except Jaffna Peninsula in the north and coastal strip in the Northwest is made of hard rocks.
- South – Central part is the highest land.
- **Mahaveli Ganga** is the longest river which flows northeast and meets the Bay of Bengal.
- It has hot and humid climate.
- **Rainfall divides country in two zones** –
  1. **Wet Zone**– Southwest of island receives rainfall from both southwest and northeast monsoons.
  2. **Dry Zone**– Northern and Eastern parts receive rainfall only from Northeast monsoon; inadequate thus falls in the dry zone.
- **Agriculture** – Most important activity. Rice is the major food crop.
Tea, rubber and coconut are principal cash crops. Cocoa and Spices are grown for export.

Graphite and gemstones are Sri Lanka’s most valuable mineral products.

**Sea Ports – Trincomalee (Eastern Coast) and Colombo (Western Coast).**

Kandy is a modern city and is famous Buddhist temple

Sinhalese and Buddhists are the major groups, they speak Sinhalese. Other major group is of Tamils from India, settled in the northern and eastern parts of Sri Lanka.

**Sethusamudram Shipping Canal Project** is a proposed project to create a shipping route in the shallow straits between India and Sri Lanka. This would provide a **continuously navigable sea route** around the Indian Peninsula. The channel would be dredged in the Sethusamudram Sea between Tamil Nadu and Sri Lanka, passing through the limestone shoals of Adam’s Bridge. The proposed route through the shoals of Adam’s Bridge is opposed by some groups on religious, environmental and economical grounds.

**REGIONAL GEOGRAPHY OF EAST ASIA**

**CHINA**

- World’s most populous country (one-fifth of the world population). In area, China is **third largest**.
- Large part of China is **mountainous and arid**, thus it has one of the smallest areas of cultivable land per person in the world
- Intensive agriculture and horticulture is practiced, yield per hectare is high.
- **Rice** is the main crop, grown in southern and central China
- Silk, cotton, tobacco and tea are important cash crops
- **Shanghai is the largest city** of China. It is the **largest port and a big textile centre**.
- Most provinces of North China have coalfields, and Iron ore deposits are abundant in the anthracite fields of Hebei, Shanxi and Shandong.
- Nearly 70% of the energy is produced from coal. China is 2\textsuperscript{nd} largest consumer of energy after USA.
- Loess Plateau is made of fine yellow sand called loess.
- Towards east lies the river valleys of Huang He, Chang Jiang and Xi Jiang interspersed with hills.
- Salween and Mekong originate from the eastern part of the plateau of Tibet, they flow into Southeast Asia.
- **Valley of Chang Jiang** is the **largest**.

**Physiography and Relief**

China consists in broad terms of **3 physiographical divisions:**

1. **The Western Highlands:** The lofty mountains in the far west, bordering Szechuan and Yunnan are known as the **Szechuanese Alps** or **Great Snowy Mountains** and towering up to heights in excess of 4500 m culminate in **Minya Gongkar**, 7660 m; from these mountains great plateau and mountain spurs project eastwards, the most important being the separate northern from central China.

2. **The Eastern Uplands:** The uplands in the east margining the sea which though once probably connected together now form a series of detached massifs, the **Liaotung, Shantung and Chekiang–Fukien** Uplands, all of which are broken and much denuded.
The Lowlands: In between the Western highlands and the Eastern Uplands lie a series of depressions forming the lowlands. These lowlands comprise the Great Plain Of North China and the Middle Yangtze Basin.

Drainage

China is a region of dense stream network

- One of the contrasts that characterize China’s physical environment lies in the abundance of water and the dense hydrographic network of the eastern regions as compared with the great aridity of the western region, where surface flows generally toward the exterior,
- The desert regions of the Gobi, the Qaidam basin, part of Dzungaria and the Takla Makan Region are devoid of any constantly flowing streams.
- The great Chinese rivers, the Hwang Ho and the Chang Jiang, descend from Tibet.
- Hwang Ho: Before the plains, the Hwang Ho passes through the Loess Plateau at the foot of the Qilian Shan range in Ganshu and Shanxi provinces. Here the river has dug deep ravines and carried downstream appreciable quantities of silt. Its irregular now, however, gives rise to unexpected and disastrous silting, often causing the course of its bed to be altered.
- Yangtze Kiang River: The largest river of China flows in the middle part of eastern China and drains into the East China Sea. Shanghai is located on the back of this river.
- Si Kiang: Rises in the eastern part of Yunnan Plateau flows through the southernmost part of China. It drains into South China Sea and its mouth is located near Canton.

<table>
<thead>
<tr>
<th>Major Rivers of China</th>
<th>Drains into</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yangtze Kiang</td>
<td>East China Sea</td>
</tr>
<tr>
<td>Hwang Ho or Yellow River</td>
<td>Yellow Sea</td>
</tr>
<tr>
<td>Si Kiang</td>
<td>South China Sea</td>
</tr>
</tbody>
</table>

- The Yun Ho (Grand) Canal connects the Hwang Ho and Chang Jiang (Yangtze Kiang) rivers and runs northward to Beijing. It is the main inland waterway of China. Besides the complex network of canals that connect with the rivers, eastern China also has a number of lakes that are part of the inland waterway system.

Natural Lakes of China

- Because of its morphology, China has a considerable number of natural lakes, remnants in many cases of older, more extensive basins, such as those located in the alluvial depressions traversed by the Yangtze Kiang (Chang Jiang).
- They are also common in the interior areas of western China, where they frequently have a seasonal or permanently brackish character owing to the intense evaporation (Lop Nor in Xinijiang and Qinghai, or Koko Nor, amid the ranges of the Nan Shan).

Population

- The result of the geographical contrast between east and west is that if a line is drawn from Yunnan province in the south west to Heilungkiang province in the north east (in Manchuria) it is found that about 96% of the population of China live on the 58% of the land to the east of the line.

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The only areas of moderately dense population to the west are where irrigation and lines of communication exist, as along the Kansu corridor or upper Hwang Ho.

In 1990, 23% of the world’s population lived in China over 90% of these belonged to the dominant Han people the remainder comprise 56 small minority groups.

By 1979, the government, in order to control the population growth, started giving inducements for restricting to one child per family.

In 1987 the government began to relax its rigid policy in response to intermittent outrage about cases of coercion and brutality in implementing population goals. In urban areas, there is still the minimum age for marriage and restricts families to one child. However, a second child is allowed in rural areas if the firstborn is a girl and providing there is a 4 years gap between births.

China’s family size had fallen from 5.8 to 2.4 in 20 years, the figure is 1.7 in urban areas (better education, stronger state control), compared with 2.7 in rural areas.

One Child Policy is a population control policy of the People’s Republic of China. The policy is enforced at the provincial level through fines that are imposed based on the income of the family and other factors. The policy was introduced in 1978 to alleviate social, economic and environmental problems in China. Since implementation in 1979, the one-child policy had many impact on China’s demography:

1. It reduced China’s population by an estimated 400 million people. In addition to creating a gender imbalance, numerically favoring men over women, the policy also skewed the age demographic.
2. Economists estimate that China’s elderly population will increase 60 percent by 2020, even as the working-age population decreases by nearly 35 percent. This type of demographic shift is unprecedented and presents serious challenges to the economic health of the nation.
3. The one-child policy has had several unintended consequences, including a dearth of workers, a reduced female population due to gendercide, and fewer young people to take care of a quickly aging population.
4. Moreover, the policy has created conditions conducive to a severe regional human-trafficking and human-smuggling epidemic to compensate for the lack of Chinese women. It has already facilitated the practice of mail-order brides and created a burgeoning illegal-adoption market.

Agriculture

There are 4 distinct production regions:

- The Hwang Ho Plain: Essentially a large alluvial plain created by the Hwang Ho River. It is the heartland of Chinese civilization. This lowland area has been under intense cultivation for centuries. The major crops produced are wheat, barley, corn, millet, and cotton. The region also produced most of China’s apples, and hogs are found nearly everywhere.

- Loess hills of Northern China: To the west of the Hwang Ho Plain lie the loess hills of Northern China. This region of wind-blown soil has been dissected by thousands of gullies, but the flat areas between the miniature canyons are farmed intensively.

- The Chang Jiang drainage basin: The third major farming region of China is the rice-producing area. Rice is the major crop along the river from the Szechwan Basin to Shanghai. The region has also been noted for the production of silk and tea. Mulberry trees for feeding silk worms are still common, although the silk industry has declined.

- South China: It is the poorest of the four major agricultural regions. The plain surrounding Canton is not large, and the rolling hills give way quickly to non-arable mountains.
JAPAN

- It is called as ‘Nippon’ in Japanese which means ‘land of the rising sun’
- It has 3,900 islands but 4 are large and important
- In order of their size they are – Honshu, Hokkaido, Kyushu and Shikoku.
- Archipelago forms an arc. Sea of Japan separates it from mainland Asia
- Mountainous area. Mountains account for 72% of Japan’s total land area. Most of the mountains are of volcanic origin. Mt. Fujiyama near Tokyo is a famous mountain; it has not erupted since 1707. However it is still considered as an active volcano.
- Recreational resorts have hot-springs
- Japan lies at the margins of converging Pacific Plate and Eurasian Plate. Therefore earthquakes are frequent here.
- Lowland area – Kanto Plain, where lies the cities of Tokyo and Yokohama.
- Nagoya is also known as ‘Detroit of Japan’ owing to its automobile industry

Climate

- Mild and varies from place to place. Northern part is colder than the south.
- Winds from Siberia dominate the winter weather and causes heavy snow and rain in the northern and western parts of the country.
- In summers, oceanic winds cause rainfall on eastern and southern parts of Japan
- During September, violent tropical rain-storms originating in Philippines Sea or in the neighborhood of Caroline Islands called Typhoons strike the Southern part of Japan frequently.
- Plentiful rainfall and temperate climate produces rich forests and luxurious vegetation that cover the entire countryside.
- Cold ocean current (Oya Shio) from north and the warm ocean current (Kuro Shio) from the south meet on the eastern coasts of Japan. This causes thick fog and creates ideal condition for fish to thrive. This area is therefore, one of the major fishing grounds of the world (2nd largest). It contributes nearly 15% to the total fishing of the world.

Natural Resources

- Japan’s main mineral resource is coal, which is of low grade. Hence basic minerals such as mineral oil, iron-ore, coking coal, and non-ferrous metal ores such as copper, nickel and bauxite have to be imported.
- It depends on overseas sources to meet roughly 85% of energy requirements
- Japan is poorly endowed with other natural resources also.
- Despite these limitations, Japan has emerged as a leading industrial nation of the world owing to highly developed human resources.
- Japan’s major exports are automobiles, steel, ships, various kinds of machines and electronic goods.

Agriculture

- Only 14% of total land of Japan is arable
- Farms are small in size but are intensively cultivated
- Only 7% of population is engaged in agriculture
- Rice is the main crop. Wheat, barley and soyabeans are other important food crops.
- Nearly two third of the total area of Japan is forested
Industry

- Japan has seen phenomenal industrial development. Many factors contributed to this phenomenal development.
- Japan has developed hydro-electric power as supplement of coal.
- The indented coastline has facilitated the development of many large ports, which helped import large quantities of raw materials from all over the world.
- Some of the raw materials like copper, manganese, as well as silk, kaolin and timber have been fully utilized.
- Nearness of Japan to the densely populated continent of Asia provides a big readymade market.
- The high density of population of Japan has proved a boon for the industrial development. Not only the labour is cheap, it is skilled as well.
- The extent of government encouragement can be imagined by the fact that apart from encouraging the industrialists, it has formulated a technically biased educational system.
- Other factors have been generous aid from the U.S.A. in post World War II period, the competitiveness of Japanese industries, technological innovations.
- There are 4 important industrial regions in Japan. They are- the Kwanto Plain, the Kinki Plain, the Nagoya region, and Northern Kyushu.

1. **Kwanto Plain**: The Kwanto Plain has attracted the largest urban agglomeration in Japan and in the world and contributes about 30% of nation’s industrial output. It is the largest plain of Japan and provides ideal sites for setting up of industries. In this plain, Tokyo grew originally as a political capital and Yokohama developed as the area’s main seaport.

<table>
<thead>
<tr>
<th>Centres</th>
<th>Important Industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tokyo</td>
<td>Electrical engineering industries like television sets, refrigerators, computers.</td>
</tr>
<tr>
<td>Yokohama</td>
<td>Engineering, shipbuilding, oil refining, petrochemicals &amp; port industries</td>
</tr>
<tr>
<td>Kawasaki</td>
<td>Marine engineering, cement works and glass works</td>
</tr>
<tr>
<td>Chiba</td>
<td>Integrated iron and steel works</td>
</tr>
</tbody>
</table>

2. **Kinki Plain**: Japan’s 2nd largest urban agglomeration & industrial concentration is the Kinki Plain at the head of the Osaka Bay. The 3 important cities- Osaka, Kobe, and Kyoto- together contribute about 20% of the country’s industrial output. The local power supplies are inadequate and the region obtains coal from north Kyushu, Hokkaido and abroad.

<table>
<thead>
<tr>
<th>Centres</th>
<th>Important industries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osaka</td>
<td>Textiles, plastics, footwear and textile machinery</td>
</tr>
<tr>
<td>Kobe</td>
<td>Shipbuilding, oil refining and petrochemical industries</td>
</tr>
<tr>
<td>Kyoto</td>
<td>Traditional handicrafts, oriental porcelain, toy lacquer works</td>
</tr>
</tbody>
</table>

3. **Nagoya**: A huge metropolis, Nagoya, has developed as an important industrial centre, on the Nobi Plain at the head of the Isa Bay.

4. **Northern Kyushu**: On Northern Kyushu are the Kitakyushu (a collective name for several cities including Yawata, Kokura, and Moj) and Fukuoko agglomerations. Here heavy industries have developed on or near the Chikugo coalfield. It produces steel,
ships machine parts, chemicals and textiles. Nagasaki is also an important industrial centre in the region. Other industrial towns are Hakodate and Sapporo in Hokkaido.

<table>
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<tr>
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<th>Important Industries</th>
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<tbody>
<tr>
<td>Muroran</td>
<td>Iron and steel industry</td>
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<tr>
<td>Akita</td>
<td>Oil refinery</td>
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<tr>
<td>Niigata</td>
<td>Oil refinery</td>
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<tr>
<td>Hiroshima</td>
<td>Engineering industry</td>
</tr>
<tr>
<td>Kure</td>
<td>Shipbuilding</td>
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<tr>
<td>Okayama</td>
<td>Textiles industry</td>
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</tbody>
</table>

Other Facts about Japan

- Japan has both national and private railroad systems. The national railroad is devoted mostly to carrying freight, while the private railroads carry mostly passengers.
- Tokyo is by far the largest Japanese city; the urban area of Tokyo merges into two other millionaire cities of Japan. Kawasaki and its near neighbor, Yokohama, is Japan’s second largest.
- The Tokyo-Yokohama conurbation contains more than 10% of the people of the entire country.
- Disputed islands with China- The Senkaku Islands (Diaoyu Islands) are a group of uninhabited islands controlled by Japan in the East China Sea. They are located roughly due east of Mainland China, northeast of Taiwan, west of Okinawa Island, and north of the southwestern end of the Ryukyu Islands. The islands are disputed between China and Japan and between Japan and Taiwan.

People

- Ranks 10th in the world vis-à-vis its population size
- It is one of the most densely populated country
- One of the most urbanized nation of the world. More than 60% of the population is concentrated in the major metropolitan areas of Tokyo, Yokohama, Osaka, Nagoya and Kitakyushu.
- Equal rights to women were granted in 1947 and women are the major participants in the development of the nation

<table>
<thead>
<tr>
<th>Forest Resources</th>
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<tbody>
<tr>
<td>COUNTRY</td>
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<td>----------</td>
</tr>
<tr>
<td>S. Korea</td>
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<tr>
<td>North Korea</td>
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<td>Japan</td>
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<tr>
<td>China</td>
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<td>Mongolia</td>
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</tbody>
</table>
REGIONAL GEOGRAPHY OF SOUTH-WEST ASIA

MAIN PHYSIOGRAPHIC FEATURES

- The South-West Asia consists of the countries of Iran, Iraq, Syria, Saudi Arabia, Oman, Yemen, Jordan, Israel and Turkey.
- The main physiographic features include the Armenian Plateau (between Caspian and Black Sea), Taurus, Pontic Mountains, Zagros and Elburz Mountains.
- Another major feature is the deserts of SW Asia. These include:
  - Arabian Desert, which is the continuation of the Sahara Desert covering an area of about 2.6 million km² of Arabian Peninsula. Its one-third area is covered with sand dunes, highest in the world.
  - Iranian Desert: the second largest

DRAINAGE

The Tigris and Euphrates

- The Tigris and Euphrates rivers flow through Mesopotamia and the lowland area in Iraq that some consider being the birthplace of civilization.
- Babylon, the world’s first large city, was located along the Euphrates in the centre of Mesopotamia.
- The two rivers begin in the mountains of Turkey and flow roughly parallel to each other toward the southeast.
- The Euphrates cuts through Syria, both rivers flow through Iraq and they eventually empty into the Persian Gulf.
- The Tigris is actually a tributary of the Euphrates.
- The land of the Tigris and Euphrates has always been fertile and productive and with the economic property this region is known as ‘Fertile Crescent’.
- The lower part of the river has been used as the international boundary between Iraq and Iran, the two countries. Baghdad, the capital and largest city of Iraq is located on the banks of the Tigris River.

The Jordan River

- The Jordan River, which is only 240 km, is one of the world’s best known rivers because of its location in the Holy land and significance for Christianity.
- Essentially, the river flows from the Sea of Galilee southward into the Dead Sea.
- The surface of the Dead Sea lies 375 below mean sea level and the lowest place on earth.

IRAQ

Covered above with Map

IRAN

- The country is bordered to the northwest by Armenia and Azerbaijan; with Kazakhstan and Russia across the Caspian Sea; to the northeast by Turkmenistan; to the east by Afghanistan and Pakistan; to the south by the Persian Gulf and the Gulf of Oman; and to the west by Turkey and Iraq
- It is the only country that has both a Caspian Sea and an Indian Ocean coastline
• Iran has long been of **geostrategic importance** because of its central location in Eurasia and Western Asia, and its proximity to the Strait of Hormuz.
• The **eastern part** consists mostly of desert basins such as the Dasht-e Kavir, Iran's largest desert. The Elburz Mountains in the north rise to 18,603 ft (5,670 m) at Mount Damavend.
• Iran is a **major regional and middle power**, exerting considerable influence in international energy security and the world economy through its large reserves of fossil fuels, which include the largest natural gas supply in the world and the fourth-largest proven oil reserves.
• **Ethnic Groups**: Persian 61%, Azeri 16%, Kurd 10%, Lur 6%, Baloch 2%, Arab 2%, Turkmen and Turkic tribes 2%, other 1%

**SYRIA**

Covered above with Map

**SAUDI ARABIA**

• Saudi Arabia is geographically the **second-largest state** in the Arab world after Algeria.
• Saudi Arabia is **bordered by** Jordan and Iraq to the north, Kuwait to the northeast, Qatar, Bahrain, and the United Arab Emirates to the east, Oman to the southeast, and Yemen to the south.
• It is the only nation with both a **Red Sea coast and a Persian Gulf coast**, and most of its terrain consists of arid inhospitable desert or barren landforms.
• Saudi Arabia occupies about 80% of the **Arabian Peninsula** (the world's largest peninsula).
• There are **virtually no rivers or lakes** in the country, but wadis are numerous. The few fertile areas are to be found in the alluvial deposits in wadis, basins, and oases.
Saudi Arabia is the world's largest oil producer and largest exporter, and controls the world's second largest hydrocarbon reserves.

The ethnic composition of Saudi citizens is 90% Arab and 10% Afro-Asian. Most Saudis live in Hejaz (35%), Najd (28%), and the Eastern Province (15%).

YEMEN

Covered above with Map

OMAN

- Holding a strategically important position at the mouth of the Persian Gulf, the nation is bordered by the United Arab Emirates to the northwest, Saudi Arabia to the west and Yemen to the southwest, and shares marine borders with Iran and Pakistan.
- The coast is formed by the Arabian Sea on the southeast and the Gulf of Oman on the northeast.
- The Madha and Musandam exclaves are surrounded by the UAE on their land borders, with the Strait of Hormuz and Gulf of Oman forming Musandam's coastal boundaries.
- Tourism is the fastest-growing industry in Oman.
- Omani people are predominantly Arab, Baluchi, South Asian (Indian, Pakistani, Sri Lankan, Bangladeshi), and African ethnic groups.

JORDAN

- Jordan is bordered by Saudi Arabia to the south and east, Iraq to the north-east, Syria to the north, and Israel and Palestine to the west.
Jordan is **landlocked** except at its southern extremity, where nearly 26 kilometres (16 mi) of shoreline along the Gulf of Aqaba provide access to the Red Sea.

The **Jordan Rift Valley** of the Jordan River separates Jordan from Israel and the Palestinian Territories. The highest point in the country is Jabal Umm al Dami.

The **Jordan River** is short, before reaching Jordanian territory the river forms the Sea of Galilee.

Jordan is classified by the World Bank as a country of "upper-middle income".

**Phosphate mines** in the south have made Jordan one of the largest producers and exporters of this mineral in the world.

The vast majority of **Jordanians** are Arabs, accounting for 95–97% of the population.

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**ISRAEL**

- Israel is a country in West Asia, situated at the **southeastern shore of the Mediterranean Sea** and the northern shore of the Gulf of Aqaba in the Red Sea.
- It **shares land borders** with Lebanon to the north, Syria in the northeast, Jordan on the east, the Palestinian territories (which are claimed by the State of Palestine and are partially controlled by Israel) comprising the **West Bank and Gaza Strip** to the east and west, respectively, and Egypt to the southwest.
- Israeli **sovereignty over Jerusalem** is internationally disputed.
- The **Jordan River** runs along the Jordan Rift Valley, from Mount Hermon through the Hulah Valley and the Sea of Galilee to the Dead Sea, the lowest point on the surface of the Earth.
- The Jordan Rift Valley is the result of tectonic movements within the **Dead Sea Transform** (DSF) fault system.
- Israel is considered the **most advanced country in Southwest Asia** and the Middle East in economic and industrial development.
- Israel is a global leader in **water conservation and geothermal energy**, and its development of cutting-edge technologies in software, communications.
- 74.9% **population** are Jews and 20.7% of the population comprised of Arabs.

**TURKEY**

- Turkey is **bordered by eight countries**: Syria and Iraq to the south; Iran, Armenia, and the Azerbaijani exclave of Nakhchivan to the east; Georgia to the northeast; Bulgaria to the northwest; and Greece to the west.
- The **Black Sea** is to the north, the Mediterranean Sea to the south, and the Aegean Sea to the west.
- The **Bosphorus, the Sea of Marmara, and the Dardanelles** demarcate the boundary between Thrace and Anatolia; they also separate Europe and Asia.
- Turkey's location at the **crossroads of Europe and Asia** makes it a country of significant geostrategic importance.
- Turkey has a sizeable **automotive industry**
- The majority of the **Turkish population** are of Turkish ethnicity. They are estimated at 70–75 percent.
- The **three "Non-Muslim" minority groups** claimed to be officially recognized in the Treaty of Lausanne are Armenians, Greeks and Jews.
EVOLUTION OF INDIAN CONSTITUTION

Before we start: please understand that initially, East India Company was sent to India by British Government for commercial purposes; but the company soon found that its commercial ends shall not be fulfilled unless it has a good say in political affairs of the country. Using its carrot & stick policies, the company started controlling political affairs of different kings. When the company’s political control was established in India, the British Government in Britain started regulating and controlling the affairs of the company to establish its own control through various Acts and Regulations. Between 1600 and 1765, the Company chiefly remained a trading corporation, whose charter was renewed by the Crown from time to time.

<table>
<thead>
<tr>
<th>CONSTITUTIONAL LANDMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regulating Act of 1773</strong></td>
</tr>
<tr>
<td>- <strong>First step</strong> by British Government to regulate affairs of East India Company (EIC); establish a central administration; determine the form of Indian government &amp; first statute that recognizes the Company as fulfilling functions other than those of trade.</td>
</tr>
<tr>
<td>- It established a definite system of government of India.</td>
</tr>
<tr>
<td>- Designated Governor of Bengal as Governor General (GG) of Bengal. 1st one was Warren Hastings and subordinated Governors of Bombay &amp; Madras to GG of Bengal.</td>
</tr>
<tr>
<td>- Established Supreme Court (SC) at Calcutta</td>
</tr>
<tr>
<td><strong>1st step</strong> to control EIC</td>
</tr>
<tr>
<td>Centralization Started</td>
</tr>
<tr>
<td>GG of Bengal &amp; SC</td>
</tr>
<tr>
<td><strong>Pitts India Act, 1784</strong></td>
</tr>
<tr>
<td>- Indian affairs came under direct control of British Government in Britain</td>
</tr>
<tr>
<td>- Distinguished between commercial &amp; political functions of the company.</td>
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<tr>
<td>- Board of Control (representing British Cabinet) was established to manage political affairs of the company.</td>
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<tr>
<td>- Introduced dual government in India.</td>
</tr>
<tr>
<td>- Direct control</td>
</tr>
<tr>
<td>- Dual government</td>
</tr>
<tr>
<td>- Ended EIC’s political functions</td>
</tr>
<tr>
<td><strong>Charter Act of 1833</strong></td>
</tr>
<tr>
<td>- Final step towards centralization in British India</td>
</tr>
<tr>
<td>- GG of Bengal became Governor-General of India. GG was vested with all civil &amp; military powers, &amp; Governors of Bombay &amp; Madras were deprived off their legislative powers.</td>
</tr>
<tr>
<td>- Created Government of India, for first time having authority over British India (the part of India under control of Britain)</td>
</tr>
<tr>
<td>- Ended activities of East India Co. as commercial body</td>
</tr>
<tr>
<td>- Presidency of Bengal was divided into 2 parts- Bengal and Agra</td>
</tr>
<tr>
<td>- GG of India</td>
</tr>
<tr>
<td>- Centralization completed</td>
</tr>
<tr>
<td>- Ended EIC’s commercial functions too</td>
</tr>
<tr>
<td><strong>Charter Act of 1853</strong></td>
</tr>
<tr>
<td>- Separated Legislative &amp; Executive functions of GG’s Council</td>
</tr>
<tr>
<td>- Separate</td>
</tr>
</tbody>
</table>
- A **separate Lieutenant-Governor** was appointed for **Bengal**.
- Created separate **Legislative Councils** for India, but with only officials as its members.
- Also **introduced** open **competition** for civil services of the company & deprived the Directors of the company their patronage powers.

<table>
<thead>
<tr>
<th><strong>Government of India, 1858</strong></th>
</tr>
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<tbody>
<tr>
<td><strong>Rule of company</strong> was replaced by <strong>rule of crown</strong></td>
</tr>
<tr>
<td><strong>Secretary of State</strong> (SoS) for India was appointed to exercise the power of the crown. He was member of <strong>British Cabinet</strong>, responsible to British <strong>Parliament</strong> &amp; assisted by <strong>Council of India</strong> having <strong>15 members</strong>.</td>
</tr>
<tr>
<td><strong>GG became the agent</strong> of the crown.</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>Indian Councils Act of 1861</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduced some Indians</strong> as <strong>non-official members</strong> in Legislature</td>
</tr>
<tr>
<td><strong>Provision was also made for the inclusion of some Indians in the Governor-General’s Council.</strong></td>
</tr>
<tr>
<td><strong>Thus seeds of Parliamentary system</strong> sown in India (representative institutions)</td>
</tr>
<tr>
<td><strong>Initiated</strong> process of <strong>decentralization</strong> by restoring Bombay &amp; Madras’ legislative powers</td>
</tr>
<tr>
<td><strong>Policy of legislative devolutions introduced which culminated into grant of almost complete internal autonomy of Provinces in 1937</strong></td>
</tr>
<tr>
<td><strong>Empowered GG to frame rules of business</strong> (powers that Indian President has today under Article 77)</td>
</tr>
<tr>
<td><strong>Statutory recognition to portfolio system</strong></td>
</tr>
<tr>
<td><strong>Member in charge of his department could issue final orders</strong> with regard to matters which concerned his department</td>
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<thead>
<tr>
<th><strong>Indian Councils Act of 1892</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduced</strong> <strong>indirect elections</strong>. GG still had power to nominate members</td>
</tr>
<tr>
<td><strong>Enlarged functions</strong> of Legislative Councils. They had power to <strong>discuss budget</strong> and <strong>address questions</strong> to the executive, but they were not given the power of voting.</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th><strong>Indian Councils Act, 1909 :: Morley-Minto Reforms</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Minto (Governor-General of India); Morley (Secretary of State)</strong></td>
</tr>
<tr>
<td><strong>Changed name of Central Legislative Council to Imperial Legislative Council. Officials had majority in it</strong></td>
</tr>
<tr>
<td><strong>Attempted for the first time the introduction of representative and popular element in the government</strong></td>
</tr>
<tr>
<td><strong>Provincial legislative Councils had non-official majority</strong></td>
</tr>
<tr>
<td><strong>Introduced separate electorate system. Introduced communal representation for Muslims. Legalized communalism (Lord Minto called as father of communal electorate)</strong></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th><strong>Government of India Act, 1919 (Montagu –Chelmsford Reforms)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chelmsford (Governor-General of India); Montagu (Secretary of State)</strong></td>
</tr>
<tr>
<td><strong>Separated</strong> central subjects from provincial</td>
</tr>
<tr>
<td><strong>Provincial subjects</strong> were of 2 types: 1. <strong>Transferred</strong> 2. <strong>Reserved</strong></td>
</tr>
</tbody>
</table>
Transferred subjects administered by Governor with aid of ministers responsible to Legislature
- Reserved subjects administered by Governor & his executive Council without any responsibility to Legislature
- Diarchy (dual system of government) was introduced
- Introduced Bicameral Legislature (upper & lower houses)
- Introduced direct elections for the first time as majority members of both houses were directly elected.
- 3 of 6 members of Governor-General’s Council were Indian
- Demand for responsible government remains unfulfilled as Central Government remain responsible to British Parliament.
- Diarchy failed in Provinces because of dominance of Governor and Executive Council over policy and ministers
- Provided for establishing a Public Service Commission for recruitment to higher civil services.
- Local-self government became a provincial & transferred subject under a responsible Indian minister.

Simon commission
- The Indian Statutory Commission was a group of 7 British Members of Parliament that had been dispatched to India in 1927 to study constitutional reform in Britain's most important colonial dependency.
- Commonly referred to as the Simon Commission after its chairman, Sir John Simon.
- One of its members, Clement Attlee, who subsequently became the British Prime Minister, would oversee the granting of independence to India and Pakistan in 1947.

The Commission’s recommendations were:
- Future Advance:
  ✓ First principle was that new constitution should, as far as possible, contain within itself provision for its own development. It should not lay down too rigid & uniform a plan, but should allow for natural growth & diversity.
  ✓ Constitutional progress should be the outcome of practical experience. Where further legislation is required, it should result from the needs of the time, not from the arbitrary demands of a fixed time-table.
  ✓ The constitution, while contemplating and conforming to an ultimate objective, should not attempt to lay down length or the number of the stages of the journey.
- Almost Responsible Government at the Provincial Level:
  ✓ Diarchy should be scrapped and Ministers responsible to the Legislature would be entrusted with all provincial areas of responsibility.
  ✓ However, safeguards were considered necessary in areas such as the maintenance of peace and tranquility and the protection of the legitimate interest of the minorities. These safeguards would be provided, mainly, by the grant of special powers to the Governor.
- Federation
  ✓ The Report considered that a formally federal union, including both British India & Princely States, was the only long-term solution for a united, autonomous India.
- Immediate Recommendations at the Centre
  ✓ To help the growth of political consciousness in the people, the franchise should be extended; and the Legislature enlarged.
  ✓ The Report strongly opposed the introduction of Diarchy at the Centre.
## Government of India Act, 1935

- Provided for establishment of All-India Federation with its units consisting of Provinces & Princely States (they didn’t join & so federation didn’t come into existence)
- 3 lists of subjects – Federal, Provincial & Concurrent- introduced; Residuary powers with GG.
- Abolished Diarchy in provinces & introduced provincial autonomy
- Introduced Diarchy at Centre & Bicameralism in Provinces (in Bombay, Madras, Bengal, Assam, Bihar, United Provinces)
- Introduced Responsible governments in Provinces (that is, Governor responsible to Provincial legislature)
- Established a federal court having original, appellate & advisory jurisdiction
- Provided for the protection of the rights & privileges of members of civil services.
- Provided for establishment of not only a Federal Public Service Commission but also a Provincial Public Service Commission and Joint Public Service Commission for two or more provinces.

## Indian Independence Act, 1947

- Declared India as independent & sovereign state
- Created 2 independent dominions, GG of each appointed by king
- Established responsible government at both Center & Provinces
- Designated GG of India & Provincial Governors as constitutional heads (nominal heads)
- It assigned dual functions (i.e. constituent and legislative) to the Constituent Assembly formed in 1946. It declared this dominion legislature as a sovereign body.
- Federation of India
- Concurrent list added
- Provincial autonomy

## SOME FACTS ABOUT THE EVOLUTION OF INDIAN CONSTITUTION

- **Idea of Constituent Assembly** for making the constitution was first mooted by M. N. Roy in 1934
- First time Indian National Congress officially demanded the formation of constituent assembly in 1935
- In 1940, the coalition Government in England recognized the principle that Indians should themselves frame a new constitution for autonomous India. First time demand accepted, in principle, for a constituent assembly in August offer of 1940.
- Cripps Mission (March 1942) (came in the backdrop of WW-II), failed due to disagreement between Congress and Muslim League. In its proposals, it had envisaged the framing of constitution of India by an elected constituent Assembly of the Indian People.
- Finally, under the provisions of Cabinet Mission Plan (1946) a constituent assembly was formed for framing the Indian Constitution.
- Out of total no. of Members (389) - 296 were indirectly elected from British India and Princely States nominated 93. Thus, Constituent Assembly had nominated as well as elected members. The elected members from British India were to be indirectly elected by members of the provincial assemblies.
- The Constituent Assembly met for the first time in New Delhi on 9 December 1946 in the Constitution Hall, which is now known as the Central Hall of Parliament House. 207 representatives, including nine women were present.
- The inaugural session began at 11 a.m. with the introduction of Dr. Sachchidananda Sinha, by Acharya Kripalani.

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Sachinand Sinha, the oldest member, was elected as the temporary President of assembly. The Muslim league boycotted the Constituent Assembly. Due to the boycott of Muslim League, only 211 elected members of the congress attended it. Constituent Assembly was not a sovereign body as it was brought about by British Government and could be abolished by it.

Later, Dr. Rajendra Prasad and H. C. Mukherjee were elected as President and Vice-President of the assembly respectively.

Sir B. N. Rau was appointed as the constitutional advisor to the assembly.

The historic 'objective resolution' was moved by Pt. Jawaharlal Nehru, which was later accepted in its modified form as the preamble of the constitution.

In addition to the making of the constitution and enacting of ordinary laws, the constituent assembly also performed following functions:
- It ratified India’s membership of the Commonwealth in May 1949
- It adopted the national flag on 22 July 1947
- It adopted the national anthem and national song on January 24, 1950
- It elected Dr. Rajendra Prasad as the first President of India on January 24, 1950

On 26 November 1949, constitution was declared as passed after the signature of the President of the assembly. Thus on 26 November 1949 the constitution of India was adopted.

The Constituent Assembly took 2 years, 11 months and 17 days to complete its historic task of drafting the Constitution for Independent India. During this period, it held eleven sessions covering a total of 165 days.

As to its composition, members were chosen by indirect election by the members of the Provincial Legislative Assemblies, according to the scheme recommended by the Cabinet Mission.

On 29 August 1947, the Constituent Assembly set up a Drafting Committee under the Chairmanship of Dr. B.R. Ambedkar to prepare a Draft Constitution for India. While deliberating upon the draft Constitution, the Assembly moved, discussed and disposed of as many as 2,473 amendments out of a total of 7,635 tabled.

The Constitution of India was adopted on 26 November 1949 and the Hon’ble members appended their signatures to it on 24 January 1950.

In all, 284 members actually signed the Constitution.

The provisions relating to citizenship, elections, provisional Parliament, and temporary provisions, were given effect from 26 November 1949.

The rest of the constitution came in to force on 26 January, and date is referred to in the constitution as the Date of its commencement. (To commemorate the independence day celebrated since 1930 after the passage of Purna Swaraj resolution)

On January 24, 1950, the constituent assembly held its last session. However, it continued as the provisional Parliament of India from 26 January 1950 until the formation of new Parliament after the first general elections in 1951-52.

### IMPORTANT COMMITTEES OF THE CONSTITUENT ASSEMBLY AND THEIR CHAIRMEN

<table>
<thead>
<tr>
<th>Name of the Committee</th>
<th>Chairman</th>
</tr>
</thead>
<tbody>
<tr>
<td>Committee on the Rules of Procedure</td>
<td>Rajendra Prasad</td>
</tr>
<tr>
<td>Steering Committee</td>
<td>Rajendra Prasad</td>
</tr>
<tr>
<td>Finance and Staff Committee</td>
<td>Rajendra Prasad</td>
</tr>
<tr>
<td>Credential Committee</td>
<td>Alladi Krishnaswami Ayyar</td>
</tr>
<tr>
<td>House Committee</td>
<td>B. Pattabhi Sitaramayya</td>
</tr>
<tr>
<td>Order of Business Committee</td>
<td>K.M. Munsi</td>
</tr>
</tbody>
</table>

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### Committees

<table>
<thead>
<tr>
<th>Committee</th>
<th>Chairperson</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ad hoc Committee on the National Flag</td>
<td>Rajendra Prasad</td>
</tr>
<tr>
<td>Committee on the Functions of the Constituent Assembly</td>
<td>G.V. Mavalankar</td>
</tr>
<tr>
<td>States Committee</td>
<td>Jawaharlal Nehru</td>
</tr>
<tr>
<td>Advisory Committee on Fundamental Rights, Minorities and Tribal and Excluded Areas</td>
<td>Vallabhbhai Patel</td>
</tr>
<tr>
<td>Minorities Sub-Committee</td>
<td>H.C. Mookherjee</td>
</tr>
<tr>
<td>Fundamental Rights Sub-Committee</td>
<td>J.B. Kripalani</td>
</tr>
<tr>
<td>North-East Frontier Tribal Areas and Assam Excluded &amp; Partially Excluded Areas Sub-Committee</td>
<td>Gopinath Bardoloi</td>
</tr>
<tr>
<td>Excluded and Partially Excluded Areas (Other than those in Assam) Sub-Committee</td>
<td>A.V. Thakkar</td>
</tr>
<tr>
<td>Union Powers Committee</td>
<td>Jawaharlal Nehru</td>
</tr>
<tr>
<td>Union Constitution Committee</td>
<td>Jawaharlal Nehru</td>
</tr>
<tr>
<td>Drafting Committee</td>
<td>B.R. Ambedkar</td>
</tr>
</tbody>
</table>

- The most important of the committees was the **drafting committee**, which was entrusted with the task of making the new constitution. It consisted of **seven members**
  1. Dr. Ambedkar (chairman)
  2. N. Gopalaswamy Ayyengar
  3. Alladi Krishnaswamy Aiyyar
  4. Dr. K.M. Munshi
  5. Syed Saadullah
  6. N. Madhav Rau (he replaced B.L. Mitter who resigned due to ill-health)
  7. T.T. Krishnamachari (he replaced D.P. Khaitan who died in 1948)

- **First ‘Draft constitution of India’** was published in Feb 1948. It was prepared by **Sir B. N. Rau**, constitutional advisor to the constituent assembly. Dr. **B. R. Ambedkar**, the chairman of the drafting committee is recognized as the **father of the Indian constitution**.

- As far as composition of Constituent Assembly is concerned United Provinces had highest no. of members (55) followed by Madras (49) and Bihar (36) among Provinces. Among States, Mysore (7) had highest members.

### STATUS OF INDIAN STATES UNDER THE BRITISH CROWN

- At time of GoI Act, 1935, India was divided into two parts- **British India and the Indian States**.
- While British India comprised the 9 Governors’ Provinces and some other areas administered by the Government of India itself, the Indian States comprised some 600 States, which were mostly under the personal rule of the Rulers or proprietors.
- The relationship between the Crown and the Indian States since the assumption of suzerainty by the crown in 1858 came to be described by the term ‘**Paramountcy**’.
- The Indian States had **no international life**, and for external purposes, they were practically in the same position as British India. As regards internal affairs, the policy of the British Crown was normally one of non-interference with misrule and mal-administration, as well as for giving effect to its international commitments. Therefore, even in the internal sphere, the Indian States had no legal right against non-interference.
- **Government of India Act, 1935** envisaged a federal structure for whole of India, in which Indian States could figure as units, together with Governors’ Provinces.
• Act differentiated the Indian States from the Provinces in two respects, and this differentiation ultimately proved fatal for the scheme itself.
• These were (a) While in the case of the Provinces accession to the Federation was compulsory or automatic, -in the case of an Indian State, it was voluntary and depended upon the option of the Ruler of the State. (b) While in the case of the Provinces, the authority of the Federation over the Provinces (executive as well as legislative) extended over the whole of the federal sphere chalked out by the Act, - in the case of the Indian States, the authority of the Federation could be limited by the Instrument of Accession and all residuary powers belonged to the State.
• Cabinet Mission recommended that there should be a Union of India, embracing both British India and the States, which would deal only with Foreign Affairs, Defence and Communications, while the State would retain all powers other than these.
• When the Indian Independence Act was passed, it declared the lapse of suzerainty (paramountcy) of the Crown.

SALIENT FEATURES OF INDIAN CONSTITUTION

• Indian constitution is the longest known constitution of the world. It is the highest law of the land. Originally, it contained 395 Articles and 8 Schedules. After amendments till date, there are more than 447 Articles and 12 Schedules. Indian constitution has borrowed various provisions from different constitutions.
• Indian constitution includes administrative provisions in detail. These are the fundamental principles of governance, followed and reproduced by the constitution makers from Government of India Act 1935. Such provisions were borrowed from this Act because people were familiar with the existing system.
• Constitution of India also includes the constitution of constituents of Indian Federation i.e. States. State of J&K is an exception as it has its own constitution and Article 370 of constitution of India provides it a special status.
• In order to address the regional problems of certain states, Articles 371 to 371-I have been introduced after inauguration of the constitution. These articles deal with Assam, Manipur, Andhra Pradesh, Maharashtra, Gujarat, Sikkim, Mizoram etc.
• Indian constitution provides for procedure and power for the amendment of the constitution to the Legislature under Article 368. Therefore, legislation is supplementary to the constitution. It has been supplemented by multiple amendments, and practically recast by 42nd, 43rd and 44th Amendments, 1976-78.
• Indian Constitution is rigid as well as flexible and written constitution, which implies Rigidity with Parliamentary sovereignty (implies flexibility)
• It is only the amendment of a few of the provisions of the Constitution that requires ratification by the State Legislatures and even then ratification by only ½ of them would suffice (while the American Constitution requires ratification by ¾ of the States).
• The rest of the Constitution may be amended by a special majority of the Union Parliament, i.e., a majority of not less than 2/3 of the members of each House present & voting, which, again, must be majority of total membership of the House.
• Though constitutional makers tried to make Indian constitution an exhaustive document but taking into consideration the organic law, room has been left for conventions. Therefore, some powers of the speaker of Lok Sabha have been left to conventions followed in England.
• Preamble is not an enforceable part of constitution. It serves following purposes:
  • Indicates the source from which constitution derives its authority
  • States some of objects which constitution seeks to establish
• Declares great rights and freedoms
• 3 Words ‘Secularism, socialism and Integrity’ were added to the Preamble by 42nd Amendment Act (1976).
• Power of Judicial review makes the Constitution legalistic. Judicial power of the state exercisable by the Courts under the Constitution as sentinels of Rule of Law is a basic feature of the Constitution.
• The Indian Constitution wonderfully adopts the via media between the American system of Judicial Supremacy and the English principle of parliamentary Supremacy.

<p>| SOURCES OF INDIAN CONSTITUTION |</p>
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INDIA: A UNITARY BASED FEDERAL SYSTEM

• India is a distinct federation. Following characteristics make it a federation:-
  o Dual Polity
  o Division of Powers
  o Bicameralism
  o Supremacy of the Constitution
  o Written Constitution
  o Rigid Constitution (complicated and difficult procedure for amendment)
  o Authority of Courts (legal supremacy of the constitution)

• However, there are certain features, which make it unitary biased. These are:-
  o Appointment of Governors by the centre
  o Parliament’s power to legislate in the national interest
  o Parliament’s power to from new States, change names of the States and alter the boundaries of existing States
  o Emergency Provisions
  o Single Constitution, All India Services, CAG
  o Constitution is more flexible than rigid as it can be amended by Parliament alone
  o Single citizenship, integrated judiciary, centralized election machinery,
THE PANCHAYATS

Generally, it is seen that when the size of an organisation and for that matter, of a country is very big, devolution and decentralization become imperative. Panchayati Raj is one such step towards decentralized and people-centered governance.

In India, institution of panchayats has an ancient origin and a hoary history, though its truly democratic form is of recent origin. Rippon’s Resolutions of 1881 & 1882 can be taken to be the origin of modern local government in India. The quest for revival of villages in free India was supported by several innovations. The first such experiment was the Community Development Programme (CDP) launched on 2 October 1952, which created an infrastructure for local governance and set up an entirely new unit called CD Block, each of which was headed by a Block Development Officer (BDO).

National Extension Scheme (NES) followed CDP in 1953. NES Blocks were carved out as lowest administrative and development units, each comprising 300 villages and functioning under a BDO. However, both were trapped within the control of the bureaucracy, which could not appreciate that the initiative for development must be left with the people. To redress the problem, GoI appointed a Committee headed by Balwantray Mehta and followed by many other:

BALWANTRAY MEHTA COMMITTEE

Appointed by GoI in Jan 1957; the philosophy underlined in the report was to move the decision-making centres closer to people. It recommended ‘democratic decentralization’ of powers & responsibilities. Its recommendations include:

1. 3-tier Panchayati Raj system: Gram Panchayat at village level, Panchayat Samiti at block level, and Zila Parishad at district level; District Collector should be the Chairman of the Zila Parishad.

2. All these organically linked through indirect elections. Village Panchayat will have directly elected representatives; and Panchayat Samiti & Zila Parishad should have indirectly elected members.

3. Panchayat Samiti should be the executive body while Zila Parishad should be the advisory, coordinating and supervisory body.

- Advisory, Coordinating & Supervisory
- Zila Parishad (DC Chairman) Indirect Elections
- Executive Body
- Panchayat Samiti Indirect Elections
- Gram Panchayat Direct Elections

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4 There should be genuine **transfer of power & responsibility** to these democratic bodies. **All planning & developmental activities** should be entrusted to these bodies. A system should be evolved to effect **further devolution** of authority.

5 **Adequate resources** should be transferred to these bodies to enable them to discharge their functions and fulfill their responsibilities.

Its recommendations were accepted by **National Development Council** in **1958**. The Council did not insist on a single rigid pattern and left it to the states to evolve their own patterns **suitable to local conditions**. However, the basic principles and broad fundamentals should be identical throughout the country. **Rajasthan** was the 1st state to establish Panchayati Raj followed by **Andhra Pradesh**.

**ADMINISTRATIVE REFORMS COMMISSION**

ARC in its report on State Administration submitted in 1969 departed from B.R. Mehta Committee and gave following recommendations:

1 **Zila Parishad** and not Panchayat Samiti should be the main executive organ of Panchayati raj. This is because, it will be able to have a broad overall view of the needs & resources of entire district and prepare a **balanced plan**.
2 **Development functions** should be transferred from the Collector to the Zila Parishad headed by a whole-time senior officer as CEO.
3 **Some developmental functions** will continue to be performed at the **block level**.
4 Area covered by **Block should be so re-demarcated** that the territorial unit of development administration would correspond to a Tehsil or Sub-division.
5 The **division of functions** between the two-tiers to be made by state government.
6 As a general rule, there should be a **Panchayat for each village**.

**ASHOK MEHTA COMMITTEE**

Appointed by **GoI** in Dec 1977; Its recommendations include:

1 **2-tier system** should replace 3-tier system: Zila Parishad at district level & Mandal Panchayat (consisting of a group of villages covering a population of 15,000- 20,000). District should be the 1st **point for decentralization** below state level.
2 **Zila Parishad** should be the **executive** body and made responsible for **planning** at the district level.

Executive Body for Planning at district level

\[ \text{Zila Parishad} \quad 1\text{st point of decentralization} \]

\[ \downarrow \]

\[ \text{Mandal Panchayat} \]

**NOTESMSVDS**

3 **N:: Nyaya Panchayats** should be kept as separate bodies from that of development Panchayats. They should be presided over by a **qualified judge**.
4 **O::** There should be an **Official participation of political parties** at all levels of Panchayat elections.
5 **T::** PRIs should have **compulsory power of Taxation** to mobilize their own financial resources to reduce their dependence on State.

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6 **E:: Chief Electoral Officer** of state in consultation with Chief Election Commissioner should organize and conduct the Panchayati Raj elections.

7 **S::** There should be a regular **Social Audit** by a **district level agency** and by a committee of legislators to check whether the funds allotted for the vulnerable social and economic groups are actually spent on them.

8 **M::** A **Minister for PRIs** should be appointed in the state council of ministers to look after their affairs.

9 **S::** State government **should not supersede PRIs**. In case of an imperative supersession, election should be held **within 6 months** from the date of supersession.

10 **V:: Voluntary agencies** should play an important role in mobilizing the support of the people for Panchayati Raj.

11 **D:: Development functions** should be transferred to Zila Parishad & all development staff should work under its control & supervision.

12 **S::** Seats for **SCs and STs** should be reserved on the basis of their population.

No action could be taken on its recommendations due to the collapse of Janata Government. However, **Karnataka, West Bengal & Andhra Pradesh** accepted some of its recommendations. Karnataka established **Mandal panchayats**.

**G. V. K. Rao Committee**

Appointed by **Planning Commission**; it is also known as Committee on Administrative Arrangements for Rural Development (CAARD). It concluded that excessive bureaucratization of development administration has weakened PRIs leading to what is called as ‘**grass without roots**’. It gave following recommendations:

1 **PRIs at district & lower levels** should be assigned an important role w.r.t planning, implementation & monitoring of rural development programmes.

2 **Zila Parishad** at district level should be of **pivotal importance** as the district is the proper unit for planning & development.

3 A post of **District Development Commissioner** should be created; who shall act as the CEO of Zila Parishad and should be in charge of all the development departments at the district level.

4 Some of the **planning functions** at the state level should be transferred to the district level planning units for effective decentralized district planning.

5 **Elections** to PRIs should be held regularly.

6 The **post of BDO** should be revamped.

**Dantwala & Hanumantha Rao Committee**

- Both these committees advocated **separate district planning bodies** under either the District Collector (DC) or a minister. In both cases, the Collector shall play a significant role.
- **Hanumantha Rao** recommended that the Collector should be the coordinator at the district level. It differed from all earlier committees, which had assigned a major role to Panchayati Raj in development administration & recommended reduction in developmental role of DC.
L. M. SINGHVI COMMITTEE

Appointed by Department of Rural Development, GoI; it emphasized the importance of Gram Sabha & called it as the embodiment of direct democracy. It made the following recommendations:

1 PRIs should be given a constitutional status by inserting a new chapter in the Constitution.
2 There should be constitutional provisions for regular, free & fair elections to PRIs.
3 Judicial Tribunals should be established in each state to adjudicate controversies about elections to PRIs, dissolution & other matters.
4 Nyaya Panchayats should be established for a cluster of villages.
5 Villages should be reorganized to make Gram Panchayats more viable.
6 Village Panchayats should have more financial resources.

On the recommendations of Singhvi Committee to constitutionalise these institutions, Rajiv Gandhi introduced the 64th Constitutional Amendment Bill (1989) for PRIs and 65th Constitutional Amendment Bill (1989) for Urban Bodies. However the Bills were rejected by Rajya Sabha on the ground that is sought to strengthen centralization in the federal system. V.P. Singh Government re-introduced the Bill in 1990. However, the fall of the government resulted in the lapse of the Bill.

P. V. Narasimha Rao government drastically modified the proposals & deleted the controversial aspects. It introduced both the Bills in the Lok Sabha in September 1991. The Lok Sabha and the Rajya Sabha passed these in 1992. Later, these were approved by the 17 state Assemblies and received the assent of the President in April 1993. Thus, there emerged the 73rd Amendment Act, 1992, came into force on 24 April 1993 and 74th Constitutional Amendment Act of 1992, and came into force on 1 June 1993. These two amendments introduced two new parts, namely, Part IX and Part IX-A in the Constitution respectively.

The 65th Amendment Bill of Rajiv Gandhi envisaged 3 types of Nagar Palikas: Nagar panchayat for a population between 10,000 and 20,000, municipal council for a population between 20,000 and 3,00,000 and municipal corporation for population exceeding 3,00,000. It made provisions for elected Ward Committees, representation for women and SC/ST, elections by Central Election Commission.

CONSTITUTIONAL PROVISIONS RELATING TO PANCHAYATS
(In a simplified language)

Article 243 provides following definitions:

1 “District” means a district in a State; “village” means a village specified by the Governor by public notification to be a village for the purposes of this Part.
2 “Panchayat” means an institution (by whatever name called) of self- government constituted under Article 243 B, for the rural areas; “Panchayat Area” means the territorial area of a Panchayat;
3 “Intermediate level” means a level between the village and district levels specified by the Governor of a State by public notification to be the intermediate level for the purposes of this Part;
4 “Gram Sabha” means a body consisting of persons registered in the electoral rolls relating to a village comprised within the area of Panchayat at the village level.
5 “Population” means the population as ascertained at the last preceding census of which the relevant figures have been published;

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<thead>
<tr>
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<th>NOT LESS THAN</th>
<th>NOT EXCEEDING</th>
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<tr>
<td>A</td>
<td>Powers &amp; functions of Gram Sabha at village level decided by Legislature of a State</td>
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<td>B</td>
<td>Panchayats to be constituted at village, intermediate &amp; district levels. Panchayats at intermediate level, not to be constituted in States having a population ( &gt; 20 \text{ lakhs} )</td>
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</table>
| C | - Legislature will decide composition of Panchayats; but the ratio between population under a Panchayat at any level & the no. of seats in such Panchayat to be filled by election shall be the same throughout the State; that is,  

| Population |
| No. of seats |
| to be same throughout State (so far as practicable) |

- All seats in a Panchayat shall be filled by direct election and for this purpose; it shall be divided into constituencies.
- Legislature to provide for representation of Chairpersons of village Panchayats in intermediate level Panchayats and of intermediate level Panchayats in district level Panchayats; of MPs & MLAs of concerned constituencies in such Panchayat
- Chairperson & other members whether chosen by direct election or not shall have the right to vote in the meetings.
- Legislature shall decide the manner in which a Chairperson at village level shall be elected; Chairperson at intermediate or district level shall be elected by & from amongst the elected members at village level.

| D | Seats shall be reserved for SCs & STs in every Panchayat in proportion to their population in that Panchayat area. Minimum \( \frac{1}{3} \) of these shall be reserved for women belonging to SC/ ST. No. of offices of Chairpersons reserved for SC/ STs shall bear proportion to their population in the State.
- Minimum \( \frac{1}{3} \) of total no. of seats for members & Chairpersons in every Panchayat shall be reserved for women (including those reserved for SC/ ST women)
- Legislature can make provisions for reservation in favour of backward classes.
- Seats reserved for SC/ ST, Women may be allotted by rotation to different constituencies in a Panchayat |

| E | Term of every Panchayat shall be 5 years from the date appointed for its first meeting & no longer.
- Election to Panchayat shall be completed before the expiry of its duration or before expiration of a period of 6 months from the date of its dissolution provided that where the remainder term of the dissolved Municipality is <6 months, it shall not be necessary to hold any election under this clause
- Panchayat constituted upon dissolution before its expiration of term shall continue only for the remainder of the period for which the dissolved Panchayat would have continued |

| F | A person is disqualified for elections to Panchayats if he is so disqualified for the elections to the Legislature of the State or any law made by Legislature (except for the condition of 25 years of age, because age required for Panchayats is 21 years)
- Legislature may appoint an authority & decide the manner to look into the question of disqualification of a person. |

| G | Legislature may endow Panchayats with such powers & authority to enable them to function as institutions of self-government, w.r.t (a) preparation of plans for economic development & social justice; (b) implementation of such schemes as may be entrusted to them including matters in XI Schedule |

| H | Legislature may
- authorise them to levy, collect & appropriate taxes, duties, tolls & fees within limits & specified procedure
- assign them taxes, duties, tolls and fees levied & collected by State Government within limits & specified purposes
- make grants-in-aid to them from Consolidated Fund of State
- constitute such Funds in which all moneys received by or on behalf of Panchayats can be credited and withdrawn |
Governor to constitute a Finance Commission every 5 years to review financial position of Panchayats and recommend:

a. principles governing distribution between the State & the Panchayats of the net proceeds of the taxes, duties, tolls & fees levied by the State
b. determine taxes, duties, tolls & fees which may be assigned to or appropriated by Panchayats
c. grants-in-aid to Panchayats from Consolidated Fund of State
d. measures needed to improve the financial position of Panchayats
e. any other matter referred by Governor in interest of sound finance of Panchayats

Legislature to provide for its composition, powers, qualifications of its members and manner of their selection.

Governor to lay report containing its recommendations & explanatory memorandum on action taken before the Legislature.

Legislature to make provisions w.r.t maintenance of accounts by Panchayats & their auditing

Superintendence, direction & control of the preparation of electoral rolls & conduct of all elections to Panchayats shall be vested in a State Election Commission consisting of a State Election Commissioner (SEC)

Governor will appoint SEC & decide his Conditions of service & tenure. These cannot be varied to his disadvantage after his appointment.

SEC can be removed in same manner & on grounds like a Judge of a High Court

Governor to make available necessary staff on request of SEC

Legislature to make provision w.r.t all matters relating to these elections

President may direct that the provisions of this Part shall apply to any UT by public notification

Provisions of this Part do not apply to:

- Nagaland, Meghalaya & Mizoram (however Legislative Assemblies of these States can extend the provisions to these states by passing a resolution by a majority of the total membership of that House and by a majority of not less than 2/3rd of the members of that House present & voting)
- Arunachal Pradesh (provisions relating to reservation for SCs)
- Scheduled & Tribal Areas mentioned under Article 244 (Parliament may extend the provisions to these areas by law and it shall not be deemed as an amendment of the Constitution)
- Hill areas of Manipur for which District Councils exist
- Hill areas of Darjeeling District in West Bengal for which Darjeeling Gorkha Hill Council exists

Before 73rd Amendment, if there is any law relating to Panchayats, which is inconsistent with the provisions of this Part; it shall continue until amended or repealed by Legislature or other competent authority or until 1 year from the commencement of this amendment, whichever is earlier.

All Panchayats existing before the commencement of 73rd Amendment shall continue till the expiration of their duration unless sooner dissolved by a resolution passed by Legislative Assembly or both Houses where a Legislative Council also exists.

Validity of any law relating to delimitation of constituencies or allotment of seats to such constituencies (under 243 K) shall not be called in question

Legislature to provide for an authority & manner to present election petitions

The most progressive state in post-73rd Amendment has been Madhya Pradesh where the devolution of powers to PRIs has been made in more than a dozen salient functional areas. Gujarat is the state where since 1965 statewide Panchayat elections have been held regularly. It is the state since PR elections were conducted even during the emergency. In MP, PRIs have right to recall. Recently in Gujarat, compulsory voting was introduced in PRIs.
### 73rd Amendment Act Provisions

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<td>1. Giving representation to MPs &amp; MLAs in panchayats at different levels</td>
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<td>2. Establishment of panchayats at village, intermediate &amp; district levels</td>
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<td>3. Direct elections to all seats at village, intermediate &amp; district levels</td>
<td>3. Granting powers &amp; authority to panchayats to enable them to function as institutions of self-government</td>
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<td>4. Indirect elections to the post of chairperson at intermediate &amp; district levels</td>
<td>4. Devolution of powers &amp; responsibilities upon panchayats to prepare plans for economic development &amp; social justice &amp; perform some or all of functions listed in XI Schedule</td>
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<tr>
<td>5. 21 years to be the minimum age for contesting elections</td>
<td>5. Granting financial powers to panchayats, authorizing them to levy, collect &amp; appropriate taxes, duties, tolls &amp; fees</td>
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<td>9. State Election Commission</td>
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<td>10. State Finance Commission</td>
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### XI Schedule (29 items)

1. Agriculture, agricultural extension
2. Land improvement, implementation of land reforms, land consolidation & soil conservation
3. Minor irrigation, water management & watershed development
4. Animal husbandry, dairying & poultry
5. Fisheries
6. Social forestry & farm forestry
7. Minor forest produce
8. Small-scale industries, food processing industries
9. Khadi, village, cottage industries
10. Rural housing
11. Drinking water
12. Fuel & fodder
13. Roads, culverts, bridges, ferries, waterways & communication
14. Rural electrification, distribution of electricity
15. Non-conventional energy sources
16. Poverty alleviation programme
17. Education: primary & secondary schools
18. Technical training & vocational education
19. Libraries
20. Adult & non-formal education
21. Cultural activities
22. Markets & fairs
23. Health & sanitation, hospitals, primary health centres & dispensaries
24. Family welfare
25. Women & child development
26. Social welfare, welfare of handicapped & mentally retarded
27. Welfare of weaker sections, SC/ST
28. Public distribution system
29. Maintenance of community assets

### XII Schedule (18 items)

1. Urban planning; town planning
2. Regulation of land use & construction of buildings
3. Planning for economic & social development
4. Roads and bridges
5. Water supply for domestic, industrial and commercial purposes
6. Public health, sanitation, conservancy and solid waste management
7. Fire services
8. Urban forestry, protection of environment and promotion of ecological aspects
9. Safeguarding interests of weaker sections, including handicapped & mentally retarded
10. Slum improvement & upgradation
11. Urban poverty alleviation
12. Provision of urban amenities and facilities such as parks, gardens, playgrounds
13. Promotion of cultural, educational & aesthetic aspects
14. Burials & burial grounds, cremations, cremation grounds & electric crematoriums
15. Cattle ponds, prevention of cruelty to animals
16. Vital statistics including registration of births and deaths
17. Public amenities including street lighting, parking lots, bus stops and public conveniences
18. Regulation of slaughter houses & tanneries
2nd WORLD WAR & NATIONALIST RESPONSE

The WW-II started in Sept. 1939 and Britain declared war against Germany along with India’s support for the war without consulting the Indian opinion. The Congress greatly opposed India’s unilateral involvement in WW-II and was of the view, “the issue of war and peace is to be decided by the people of India not the imperialist government”. The onset of WW-II placed the Indian leaders in a difficult situation. They were totally opposed to Fascist philosophy for it being ruthless totalitarianism and racial bigotry, but were strongly opposed to imperialism too. Thus, their attitude depended on aims and objectives of the war.

- Viceroy Linlithgow declared India was at war without consulting Indian opinion.
- Different perspectives were adopted by Congress leaders in relation to War.
- Gandhiji strongly opposed to Nazism and was sympathetic to Allies.
- Subhash Bose, Socialist, communists called it as imperialist war with both sides motivated by Imperialism.
- Nehru who has been warning the world against dangers of Nazi aggression and believed that Justice is on the side of Allies but at the same time, he understood that Britain and France were imperialists.
- He emphasized that if Britain was fighting for Democracy and Freedom then she should declare how her war aims would be applicable to India. Congress accepted his view.
- Congress asked Britain to declare how war aims would be implemented in India after war.
- Viceroy Linlithgow in Oct 1939 refused to define Britain war aims beyond stating that British were just resisting aggression.
- Congress rejected the Viceroy’s statement and asked ministries to resign.

AUGUST OFFER (1940)

- A change of government took place in Britain in May 1940 and Winston Churchill became the prime minister (1940–45). The fall of France temporarily softened the attitude of Congress in India. Britain was in immediate danger of Nazi occupation. As the war was taking a menacing turn from the allied point of view, congress offered to cooperate in the war if transfer of authority in India is done to an interim government.
- Viceroy Linlithgow offered a set of proposals to Congress for securing its cooperation in war in August 1940 known as August proposals. These are -
  - It turned down Congress demand for provisional National government.
  - It envisaged representative Constitution making body after the war.
  - For present there would be expansion of Viceroy’s Council to include Indians
  - A war advisory Council would be set up.
- However, Congress rejected it as Nehru said that idea of Dominion on which August offer was based was dead as a doornail.

INDIVIDUAL SATYAGRAHA (Oct 1940)

- In Oct 1940, Gandhiji launched Individual Satyagraha in which selected Satyagrahis in every locality would undertake the individual Satyagraha.

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The demand of the Satyagrahi would be **freedom of speech against participation in the War**. The Satyagraha was kept limited so as not to restrict British war efforts but at the same time idea was to let everyone know that India condemned both Nazism and British colonialism.

The individual satayagraha (1940) is also known as **Delhi Chalo Movement**.

Vinoba *Bhave* was selected as the **first satyagrahi** whereas *Nehru* was to be **second**. Third was *Brahma Datt*, one of the inmates of the Gandhi's Ashram. Other prominent Satyagrahis were Srikrishna Sinha, C. Rajagopalachari, N. V. Gadgil, Mian Iftikhar-ud-din (President of Punjab Congress), Sarojini Naidu, G. V. Mavalankar, Aruna Asaf Ali and Satyawati.

However, since it was not a mass movement, it attracted little enthusiasm and in December 1940, Gandhi suspended the movement. The campaign started again in January 1941, this time, thousands of people joined and around 20 thousand people were arrested.

Meanwhile Japan had occupied Rangoon (1942) and was at India’s doorstep.

There was pressure on P.M Churchill by American President Roosevelt and Chiang Kai Shek of China and Labour Party to seek **active cooperation of India in War**.

This led Churchill to send his Cabinet Minister Stafford Cripps, who was member of Labour Party and had actively supported Indian national movement with a mission.

**CRIPPS MISSION (1942)**

In March 1942, a mission headed by Stafford Cripps was sent to India with constitutional proposals to seek **Indian support for the war**. Stafford Cripps was a left wing Labourite, the leader of the House of Commons and a member of the British War Cabinet who had actively supported the Indian national movement. The Mission visited during the lordship of Lord Linlithgow.

**Main Proposals**

- The main proposals of the mission were as follows –
  - An Indian Union with a **dominion status** would be set up; it would be free to decide its relations with the Commonwealth and free to participate in the United Nations and other international bodies.
  - **After the end of the war**, a **constituent assembly** would be convened to frame a new constitution. **Members** of this assembly would be partly **elected by** the **provincial assemblies** and **partly nominated by the princes**.
  - The British Government would accept the new constitution subject to two conditions: (i) any province not willing to join the Union could have a separate constitution and form a separate Union, and (ii) the new constitution-making body and the British Government would negotiate a treaty to effect the transfer of power and to safeguard racial and religious minorities.
  - In the meantime, **Executive Council** would be expanded to include Indians but defence of India would remain in British Hands.
  - The making of the constitution was to be **solely in Indian hands** now (and not “mainly” in Indian hands – as contained in the August Offer).
  - A concrete plan was provided for the constituent assembly.
  - Option was available to any province to have a separate constitution – a blueprint for India’s partition.

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- Cripps Mission failed to satisfy Indian nationalists and turned out to be merely a propaganda device for US and Chinese consumption.

- The **Congress objected** to
  - The offer of dominion status instead of **complete independence**.
  - **Representatives of Princely States** to be nominated by princes.
  - **Right to secede** as this went against the principle of national unity.
  - Above all, **no immediate plan** for transfer of effective power, the governor general’s supremacy had been retained.

- The **Muslim League** objected to absence of any plan for **separate state of Pakistan**.
- The incapacity of Cripps to go beyond the Draft Declaration and the adoption of a rigid “**take it or leave it**” attitude along with efforts of Churchill (the British Prime Minister), Amery (the secretary of state), Linlithgow (the viceroy) and Wavell (the commander-in-chief) to prevent any real agreement was important reason for failure.
- Talks broke down on the question of the **viceroy’s veto**.
- **Gandhi** described the scheme as “**a post-dated cheque**” as all-important proposals were to be implemented only after War was over.
- Now frustrated and embittered Indian people, who, though still sympathizing with the victims of Fascist aggression, that the time had come for a final struggle.
- **Gandhiji also wanted to launch new struggle to reinvigorate people in chance of Japanese aggression so that they would be able to resist it.**
- In July **1942**, Congress Working Committee met at **Wardha** and passed the famous resolution for the new struggle.
- **All India Congress Committee** met at **Bombay** at **Gowalia Tank Maidan** on 8 Aug 1942 and ratified the famous “**Quit India**” resolution.
- Here Mahatma Gandhi asked British to Quit India & gave famous Mantra **Do or Die**.
- On the wee hours of 9 August all the important leaders of Congress were arrested and thus movement passed into hands of people. They followed the **Resolution of August 8** – that “**Every man his own guide**”.
- Many young leaders went underground and continued the struggle - such as Aruna Asaf Ali, Achyut Patwardhan, **J. Prakash Narayan (he had escaped from prison)**, Ram Manohar Lohia, Sucheta Kriplani, Biju Patnaik, R. P. Goenka.
- **Most of the underground leaders were Congress Socialists**.
- Sucheta Kriplani & Aruna Asaf Ali were important woman organizers of Underground movement.
- **Congress radio** was started by **Ram Manohar Lohia** and **Usha Mehta** at **Bombay**.
- Most remarkable aspect of 1942 was rise of **Parallel governments** at **Satara** (Maharashtra), **Ballia** (U.P), **Tamluk** (Bengal), **Talcher** (Orissa)

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<tr>
<th>AREA</th>
<th>NAME</th>
<th>LEADER</th>
<th>WORK</th>
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<tr>
<td>Satara (Maharashtra)</td>
<td>Prati Sarkar</td>
<td>Nana Patil</td>
<td>Nyayadan Mandals (peoples courts), Gandhi Marriages</td>
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<tr>
<td>Tamluk (Bengal)</td>
<td>Jatiya Sarkar</td>
<td>Satish Samanta</td>
<td>Vidyut Vahini (armed wing)</td>
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<tr>
<td>Ballia (U.P)</td>
<td>-</td>
<td>Chittu Pandey</td>
<td>-</td>
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- The native state of Aundh in Maharashtra got its constitution drafted by Gandhiji.
- In Tamluk, 73-year old Matangini Hazra and Kanaklata Barua (Bihar) became martyrs to British repression.

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National Herald and Harijan (after Gandhijis arrest it was edited by K. G. Mashruwalla) ceased to publish for entire duration of struggle, others for shorter period.

The Quit India movement is also described as Revolt of 1942 or August Revolt.

Gandhiji was jailed in Aga Khan Palace near Poona (Kasturba and Mahadev Desai, Gandhiji’s Secretaty died here during their imprisonment)

Here he started the 21 day fast as Government pressurized him to condemn violence by people

Erosion of loyalty of government’s own officers was an important aspect of 1942.

INDIAN NATIONAL ARMY

The idea of I.N.A. was first conceived in Malaya by Mohan Singh, officer of British Indian army. It was to be formed of Indian Prisoners of war in custody of Japan.

In Sep. 1942, first division of INA formed with help from Japanese army.

But soon differences arose between Mohan Singh and Nirjan Singh Gill (senior officers of INA) and Japanese as later only wanted a token force of Indians.

The veteran revolutionary leader Rash Behari Bose had already organized Indian Independence League in Japan.

Meanwhile Subhash Chandra Bose had escaped from India in 1941 to go to USSR to seek help against British but as USSR joined Britain and he went to Germany.

From there he reached Singapore in 1943 and on request of Rash Behari Bose assumed leadership of Indian Independence League and rebuilt the INA.

He formed the Provisional government of Free India (Azad Hind) in Oct 1943 at Singapore and declared war on Britain and U.S. He gave the call of Chalo Delhi and Exhorted to “Give me Blood and I will give you Freedom”.

Bose established two INA HQs at Rangoon and Singapore.

Subhas C. Bose through his radio address sought blessing of Gandhiji and called him the father of the Nation.

INA had women battalion Rani Lakshmi Regiment under Lakshmi Swaminathan.

INA joined Japanese army in its march on India and participated in the Imphal campaign.

Netaji Bose went to Andamans (occupied by Japanese) and hoisted the Flag of India there and named the islands as Shaheed and Swaraj.

He is supposed to have died in Air crash in Formosa (modern Taiwan)

After World War ended the trial of 3 officers of INA Shah Nawaz Khan, G. S. Dhillon and P. K. Sehgal was carried out at Red Fort, Delhi.

They were defended by Nehru, Bhulabahi Desai, Tej Bahadur Sapru, K. N. Katju and Asaf Ali.

The INA trials were one of the great upsurges of Post-war struggles, which brought together Hindus and Muslims.

SEARCH FOR NATIONAL UNITY: The decade of 1940s saw various efforts to solve the problem of national unity such as CR formula and Desai-Liaquat Pact.

RAJAGOPALACHARI FORMULA (1944)

C. Rajagopalachari prepared a formula for Congress-League cooperation based on a tacit acceptance of demand for Pakistan. The formula seemed to have support of Gandhiji. The CR Plan had following proposals

- Muslim League to endorse Congress demand for independence.

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• League to **cooperate** with Congress in **forming a provisional government at centre**.
• After the end of the war, the entire population of Muslim majority areas in the North-West and North-East India to decide by a **plebiscite**, whether or not to form a **separate sovereign state**.
• In case acceptance of partition, **agreement to be made jointly** for safeguarding defence, commerce, communications, etc.
• The above terms to be operative only if **England transferred full powers** to India
• **Gandhi Jinnah talks** were held in Bombay to discuss it. But Jinnah outrightly rejected the plan.

**DESAI-LIAQAT PACT (1944)**

• **Bhulabhai Desai**, leader of the **Congress** Party in the **Central Legislative Assembly**, met **Liaqat Ali Khan**, deputy leader of the Muslim League in that Assembly and drafted the proposal for an interim government at the centre
• An equal number of persons were to be nominated by the Congress and the League in the central legislature. 20% seats were reserved for minorities.

**WAVELL PLAN OR SHIMLA CONFERENCE (1945)**

As the war ended in Europe, **Viceroy Lord Wavell** was permitted to start negotiations with Indian leaders. Congress leaders were released from jails in June 1945. The idea was to **reconstruct the Governor - General’s Executive Council** pending the preparation of a new constitution after the war.

• For this purpose, a **conference** was convened by the viceroy, Lord Wavell, **at Shimla** in June 1945.
• The main proposals of the Wavell Plan were as follows:
  • With the exception of the Governor-General and the Commander-in-Chief, all members of the executive council were to be Indians.
  • Caste Hindus and Muslims were to have **equal representation**. There will be representation of minorities also.
  • Representatives of different parties were to submit a **joint list** to the viceroy for nominations to the executive council. If a joint list was not possible, then separate lists were to be submitted.
  • The **League**, asserting itself as **sole representative of Indian Muslims**, wanted all Muslim members to be League nominees.
  • However, it was **unacceptable to Congress** as it would reduce the Congress to the status of a purely caste Hindu Party and insisted on its right to include members of all communities among its nominees.
  • On unbending attitude of Muslim League, Wavell declared failure of talks (as he wanted pro-British **Khizr Hyatt Khan of Unionist Party** as the Muslim representative from Western Punjab).
  • Thus, it is said that **Wavell gave the League and Jinnah a virtual Veto to** obstruct all negotiations and strengthened the League’s position.

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TOWARDS INDEPENDENCE

The end of world war saw increasing militant activities by people all over India including those of Princely States. Many struggles took place such as

<table>
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<tr>
<th>STRUGGLE</th>
<th>AREA</th>
<th>NATURE</th>
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<tbody>
<tr>
<td>INA Trials</td>
<td>All India</td>
<td>Trial of INA officers united the nation; Calcutta mass demonstrations for release of Abdur Rashid, INA prisoner</td>
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<tr>
<td>RIN mutiny of Feb.1946</td>
<td>Bombay and Karchi</td>
<td>Naval ratings of <em>HMIS TALWAR</em> struck work at Bombay for discriminatory treatment and for arresting B.C.Dutt for writing Quit India on the ship. Soon spread to Karachi. Vallabhai Patel and Jinnah negotiated the surrender of ratings.</td>
</tr>
<tr>
<td>Tebhaga</td>
<td>Bengal</td>
<td>Peasant struggle</td>
</tr>
<tr>
<td>Punnapra-Vaylar</td>
<td>Travancore (Kerala)</td>
<td>People of the princely state were protesting for democratic reforms and to become part of independent India</td>
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<tr>
<td>Telengana</td>
<td>Hyderabad</td>
<td>Anti-Nizam and Anti-Zamindar movement inspired by Communist</td>
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- In elections to provincial assembly, the Congress won overwhelmingly on general seats and Muslim League won on Muslim seats.
- Meanwhile in England Churchill’s Conservative party was defeated by Labour Party and Clement Attlee became the P.M.
- It was now clear that Britain weakened by the War would not be able to hold against the rising tide of Indian nationalism.
- The new government sent a Cabinet Mission to hold talks on issue of Indian Independence. It consisted of 3 members- Lord Pathick Lawerence, Sir Stafford Cripps and A.V. Alexander
- The mission reached Delhi in March 1946 and had prolonged discussions with Indian leaders of all parties and groups on the issues of –
  1. Interim Government.
  2. Principles and procedures for framing a new Constitution giving freedom to India.
- As the Congress, the League could not come to any agreement on the fundamental issue of the unity or partition of India, the mission put forward its own plan for the solution of the constitutional problem in May 1946.

CABINET MISSION PLAN (1946)

It rejected the demand for a full-fledged Pakistan mainly because Pakistan so formed would include a large non-Muslim population in the North-west and in Northeast; it grouped existing provincial assemblies into 3 sections:

- **Section A** – Madras, Bombay, Central Provinces, United Provinces, Bihar and Orissa (Hindu-majority provinces).
- **Section B** – Punjab, North-West Frontier Province and Sindh (Muslim-majority provinces) in NW.
- **Section C** – Bengal and Assam (Muslim-majority provinces) in NE.

- Three-tier executive and legislature at provincial, section and union levels.
- A constituent assembly to be elected by provincial assemblies by proportional representation (voting in three groups – General, Muslims, Sikhs). This constituent
Assembly to be a **389-member** body with provincial assemblies sending 292, chief commissioner’s provinces sending 4, and princely states sending 93 members.

- In the constituent assembly, members from sections A, B and C were to **sit separately to decide the constitution for provinces** and if possible, for the groups also then, the whole constituent assembly (all three sections A, B and C combined) would **sit together to formulate the Union constitution**.
- A **common centre** would control defence, communication and external affairs.
- **Provinces** were to have **full autonomy** and **residual powers**.
- **Princely states** were no longer to be under paramountcy of British Government. They would be **free to enter into an arrangement** with successor governments or the British Government in U.K.
- After the first general elections, a **province** was to be **free to come out of a group** and after 10 years, a province was to be **free to call for a reconsideration** of the group or the Union constitution.
- Meanwhile, an **interim government** to be formed from the constituent assembly.

**CHANGE IN BRITISH ATTITUDE**

- The rejection of Partition was important, as earlier British had helped Communality.
- It was due to the fact British wanted a united and friendly India and an active partner in defence of the Commonwealth, and divided India would lack in defence and would be a blot on Britain’s diplomacy.
- This was reflected in declaration of March 1946, of the British Prime Minister Clement Attlee said: “...though mindful of the rights of minorities we cannot allow a minority to place their veto on advance of the majority.”
- Both Congress and Muslim League agreed to the plan but could not agree on different interpretations of grouping clause of the Cabinet Mission.
- **Congress -Provinces should not** have to wait until the first general elections to come out of a group. They should have the option of **not joining a group** in the first place. Compulsory grouping contradicts the oft-repeated insistence on provincial autonomy.
- **Muslim League-Grouping** should be **compulsory** with **sections B and C** developing into **solid entities** with a view to future secession into Pakistan.
- **July 1946** Elections were held in provincial assemblies for the Constituent Assembly.
- **In September** 1946, an **interim government headed by Jawaharlal Nehru** (called as Vice President of Executive Council) was formed by Congress and included – Sarat Chandra Bose, Jagjivan Ram, Rajendra Prasad, Vallabhai Patel, Asaf Ali and Syed Ali Zaheer, Baldev Singh, John Mathai, C.Rajagopalachari.
- **Muslim League** did not take part in interim Government at first and called **August 16, 1946** to be observed as “**Direct Action day**” for realizing the demand of Pakistan. The League ministry of **Bengal** headed by **Suhrawardy encouraged violence** and riots during the Great Calcutta Killings.
- However League soon joined the Interim Government but without giving up its policy of Direct action and with view of obstructing the working of Interim government. **Liaquat Ali Khan (Finance minister)** did not release funds for the departments of Congress ministers.
- While the country was passing such anarchic phase the **Famous Attlee declaration** of **February 20 1947** where **P.M. Attlee** declared that Britain would transfer power in responsible hands and leave India **not later than June 1948**.
- He also announced appointment of **Lord Mountbatten as Viceroy** in place of Wavell.
MOUNTBATTEN PLAN or 3rd JUNE PLAN/ DICKEY BIRD FORMULA

The freedom-with-partition formula was coming to be widely accepted. It was suggested by V.P. Menon (Senior Civil Servant and political advisor to Viceroy) the immediate transfer of power on the basis of grant of dominion status (with a right of secession), thus obviating the need to wait for an agreement in the Constituent Assembly on a new political structure. Based on these deliberations Mountbatten put forward on 3rd June his plan for transfer of power

MAIN PROPOSALS

- Punjab and Bengal Legislative Assemblies would meet in two groups, Hindus and Muslims, to vote for partition. If a simple majority of either group voted for partition, then these provinces would be partitioned.
- In case of partition, two dominions and two constituent assemblies would be created.
- Sindh would take its own decision.
- Referendum in NWFP and Sylhet district of Bengal would decide the fate of these areas.
- Independence for princely states ruled out, they would join either India or Pakistan.
- Freedom would come on August 15, 1947.
- The boundary commission would be set up if partition was to be effected. (it was set up under Radcliffe)
- Thus, League’s demand was conceded to the extent that Pakistan would be created and the Congress’ position on unity was taken into account to make Pakistan as small as possible. Mountbatten’s formula was to divide India but retain maximum unity.
- Both Congress and Muslim League accepted this plan.
- Many criticized the partition of India but the most moving was Khan Abdul Ghaffar Khan’s anguish “Congress has thrown us to wolves”.
- Punjab and Bengal were partitioned. NWFP and Sylhet dist. of Assam voted for joining Pakistan.
- In July, India Independence Act was passed in British Parliament in July 1947 provided for setting up two dominions of India and Pakistan from 15 August 1947. It provided for separate Governor-general for each dominion.
- Thus, Pakistan came into existence on 14 August 1947 (with Jinnah as Governor-General) and India on 15 August 1947 (Mountbatten as Governor-General).
UNIFICATION OF PRINCELY STATES

Under the June 3 Plan, more than 600 princely states were given the option of joining either India or Pakistan, or choosing independence. There was a prevailing fear that if these states did not accede, a vast majority of the people and territory would be fragmented and there shall be Balkanization of India. Sardar Patel was chosen for the task of achieving unification of the princely states with the Indian dominion. Some kings, such as the kings of Bikaner and Jawhar, were motivated to join India out of ideological and patriotic considerations.

- Patel and Menon backed their diplomatic efforts by producing **2 types of treaties**:
  1. **Standstill Agreement**: confirmed that the agreements and administrative practices that existed as between the princely state in question and the British would be continued by India.
  2. **Instrument of Accession**: by which the ruler of the princely state in question agreed to the accession of his kingdom to independent India, and to granting India control over specified subject matters. The nature of the subject matters varied depending on the acceding state.

- Instruments of Accession implemented a **number of other safeguards**. It provided that the princes would not be bound to the Constitution of India as and when it was drafted. Rulers who agreed to accede would receive guarantees that their Extra-territorial rights, such as Immunity from prosecution in Indian courts and exemption from Customs duty, that none of the 18 major states would be forced to merge, and that they would remain eligible for British honours.

- Between **May 1947 and August 15 1947**, the vast majority of states signed Instruments of Accession. In addition, all but three of the states (Jammu and Kashmir, Junagadh, and Hyderabad State) willingly merged into the Indian union.

- **Junagadh**- Nawab under pressure from Shah Nawaz Bhutto acceded to Pakistan. It was however, quite far from Pakistan and 80% of its population was Hindu. Patel sent the Army to occupy three principalities of Junagadh. A plebiscite later organised produced a 99.5% vote for merger with India.

- **Hyderabad**- Its ruler, the Nizam Osman Ali Khan was a Muslim, although over 80% of its people were Hindu. The Nizam sought independence or accession with Pakistan. In September 1948, Patel emphasized military action and ordered the Indian Army to integrate Hyderabad (in his capacity as Acting Prime Minister) when Nehru was touring Europe. Hyderabad was comfortably secured into the Indian Union.

- **Kashmir**- Kashmir was ruled by Maharaja Hari Singh, a Hindu, although the state itself had a Muslim majority. Pakistan, attempting to force the issue of Kashmir's accession, cut off supplies and transport links. Pathan tribesmen from the North-West Frontier Province of Pakistan crossed the border and entered Kashmir. The Maharaja of Kashmir wrote to India, asking for military assistance, offering an Instrument of Accession (Jammu and Kashmir), and setting up an Interim government headed by Sheikh Abdullah. The accession was accepted.

  Indian troops secured Jammu, Srinagar and the valley itself during the Indo-Pakistani War of 1947, but the intense fighting flagged with the onset of winter, which made much of the state impassable. Nehru declared a ceasefire and sought UN Arbitration arguing that India would otherwise have to invade Pakistan itself, in view of its failure to stop the tribal incursions. On January 26 1957, the Constitution of India came into force in Kashmir, but with special provisions made for it in the Constitution's Article 370.
ARCHITECTURE OF INDIA

I. INDUS VALLEY CIVILIZATION

The Indus civilization or the Harappan civilization, which flourished during the Bronze Age i.e. 2500-2000 BC is ranked among the four widely known civilizations of the old world. Extensive excavation work that has been done since Independence has so far identified more than 100 sites belonging to this civilization.

- A few prominent among them are Dholavira (Gujarat), Kalibangan (Rajasthan), Lothal (Gujarat), Sarkotada (Gujarat), Diamabad (Maharashtra), Alamgirpur (U.P.), Bhagwanpura (Haryana), Banawali (Haryana), Kuntasi, Padri (Gujarat) and Mauda (Jammu).
- Extensive town planning was the characteristic of this civilization, which is evident from the gridiron pattern for the layout of cities, some with fortifications and the elaborate drainage and water management systems.
- The houses were built of baked bricks, which is rare in contemporary civilizations at Mesopotamia and Egypt. Bricks of fixed sizes, as well as stone and wood were also used for building.
- Buildings in the lower area are rather monotonous, being mainly functional rather than decorative. However, many houses are two storeyed.
- The most imposing of the buildings is the Great Bath of Mohenjodaro. It is 54.86 metres long and 32.91 metres wide and with 2.43 metres thick outer walls. The Bath had galleries and rooms on all sides.
- Another important structure was the Granary complex comprising of blocks with an overall area of 55 x 43 metres. The granaries were intelligently constructed, with strategic air ducts and platforms divided into units.
- The mature phase of this civilization is known as the Harappan Civilization, as the first of its cities to be unearthed was located at Harappa, excavated in the 1920s in what was at the time the Punjab province of British India (now in Pakistan). To date, over 1,052 cities and settlements have been found, mainly in the general region of the Ghaggar-Hakra River and its tributaries.
- The Harappans used chisels, pickaxes, and saws. These tools were most likely made of copper, as copper tools and weapons have been found at Harappan sites.
- A 11 cm long bronze sculpture of a little girl dancing was found by archaeologists in 1926. Believed to be one of the most famous pieces of Indus Valley art. This sculpture also shows that the people liked and knew of some form of dance.
- Civilians of the Indus River Valley Civilization loved wearing jewelry. They wore things from earrings, necklaces, beads, and more.

II. THE MAURYAN PERIOD

If the remnants of the Indus culture are excluded, the earliest surviving architectural heritage in India is that of the Mauryans. The Mauryan period was a great landmark in the history of Indian art. Some of the monuments and pillars belonging to this period are considered as the finest specimens of Indian art.
The Mauryan architecture was **embalmed in timber**, for rocks and stones were not as freely in use then. The art of **polishing of wood** reached so much perfection during the Mauryan period that master craftsmen used to make wood glisten like a **mirror**. Chandra Gupta Maurya had built many buildings, palaces and monuments with wood, most of which perished with time. In 300 B.C., **Chandragupta Maurya** constructed a wooden fort 14.48 km long and 2.41 km wide, along the Ganges in Bihar. However, only a couple of teak beams have survived from this fort.

**Ashoka** was the first Mauryan Emperor who began to "think in stone". The **stonework** of the Ashokan Period (3rd century B.C.) was of a highly diversified order and comprised of **lofty free-standing pillars**, railings of the stupas, lion thrones and other colossal figures. The use of stone had reached such great perfection during this time that even small fragments of stone art was given a high lustrous polish resembling fine enamel. While most of the shapes and decorative forms employed were indigenous in origin, some exotic forms show the influence of Greek, Persian and Egyptian cultures.

The Ashokan period marked the beginning of the Buddhist School of architecture in India. It witnessed the construction of many rock-cut caves, pillars, stupas and palaces. A number of cave-shrines belonging to this period have been excavated in the **Barabar and Nagarjunai hills** and Sitamarhi in Bihar. These rock-cut sanctuaries, quarried from large masses of rocks called gneisses, are simple in plan and are devoid of all interior decorative carvings. The caves served as the residences of the monks. There are several inscriptions, which indicate that these rock-cut sanctuaries were constructed by Emperor Ashoka for the monks of the **Ajivika sect**, who are more closely related to the Jains than to the Buddhists.

Even though constructing pillars are very old, **Mauryan pillars are different from the pillars in the other parts of the world** (like Achaemenian pillars) as they are **rock cut** pillars thus displaying the carver’s skills.

The Ashokan rock-edict at **Dhauli**, near Bhubaneshwar, is considered to be the **earliest rock-cut sculpture** in India. It has a sculpted **elephant** on the top, which signifies the Emperor’s conversion to Buddhism after his **Kalinga victory**. The monolithic Ashokan pillars are marvels of architecture and sculpture. These were lofty freestanding monolithic columns erected on sacred sites. Originally, there were about thirty pillars but now only ten are in existence, of which only two with lion capitals stand in situ in good condition at **Kolhua** and **Laurya Nandangarh** respectively.

Each pillar was about 15.24 metres high and weighed about 50 tonnes and was made out of fine sandstone. The pillar consisted of three parts-the prop, the shaft and the **capitol**. The capitol consisted of fine polished stone containing one or more animal figures in the round. Made of bricks, they carried declarations from the king regarding Buddhism or any other topic.

The pillars did not stand in isolation and were usually found near stupas in a spot either unknowingly marked by the Buddha himself or along the royal route to Magadha, the capital. The **Sarnath pillar** is one of the finest pieces of sculpture of the Ashokan period. The Ashokan pillars also throw light on the contacts India had with Persia and other countries. Two of the Ashkan edicts have also been found at **Laghman**, near Jalalabad in modern Afghanistan.

**Ashoka** was responsible for the construction of **several stupas**, which were large halls, capped with domes and bore symbols of the Buddha. The most important ones are located at **Bharhut, Bodhgaya, Sanchi, Amravati** and **Nagarjunakonda**. The Buddhist shrines or the monasteries were built in somewhat irregular designs following the **Gandhara style of** crackIAS.com
architecture. Built on the patterns of a fort and defended by a stonewall, the monastery evolved from the site of an ancient stupa. The principle buildings were housed within a rectangular courtyard with a stupa in the south and the monastery in the north.

- **Ashoka** had also built a number of palaces, but most of them have perished. Ashoka’s palace near **Patna** was a masterpiece. Enclosed by a high brick wall, the highlight of the palace was an immense 76.2 metres high pillared-hall having three storeys. The Chinese traveller Fahien was so impressed by this palace that he stated that "it was made by spirits" and that its carvings are so elegantly executed "which no human hands of this world could accomplish". Made mostly of wood, it seems to have been destroyed by fire. Its existence was pointed out during the excavations at **Kumrahar**, near Patna, where **its ashes have been found** preserved for several thousand years.

**The Stupas**

- **Sanchi Stupas**: The early stupas were hemispherical in shape with a low base. The hemispherical shape symbolized the cosmic mountain. The later stupas assumed an increasingly cylindrical form. The early stupas were known for their simplicity. Apart from the than ruins of stupa at **Piprahwa** (Nepal), the core of stupa No 1 at Sanchi can be considered as the oldest of the stupas. Originally built by **Asoka**, it was enlarged in subsequent centuries. An inscription by the ivory carvers of Vidisha on the southern gateway throws light on the transference of building material from perishable wood and ivory to the more durable stone.

- **Amaravati Stupa**: Amaravati stupa, built in 2nd or 1st century BC was probably like the one at Sanchi, but in later centuries it was transformed from a Hinayana shrine to a Mahayana shrine. The diameter of the dome of the stupa at ground level was about 48.76 metres and its height was about 30 metres. Amaravati stupa is different from the Bharhut and Sanchi stupas. It had free-standing columns surmounted by lions near the gateways. The dome was covered with sculptured panels. The stupa had an upper circumambulatory path on the drum as at Sanchi. This path had two intricately carved railings. **The stone is greenish-white limestone of the region.**

- **Gandhara stupa**: The Gandhara stupa is a further development of stupas at Sanchi and Bharhut. In Gandhara stupas the base, dome and the hemisphere dome are sculpted. The stupa tapers upward to form a tower like structure. The stupas of **Nagarjunakonda** in Krishna valley were very large. At the base, there were brick walls forming wheel and spokes, which were filled with earth. The **Maha Chaitya** of **Nagarjunakonda** has a base in the form of **Swastika**, which is a sun symbol.

**Yakshas and Yakshinis**

- Large statues of Yakshas and Yakshinis are found at many places like **Patna, Vidisha and Mathura**.
- They are mostly in the **standing** position.
- Their polished surface is distinguished element.
- **Depiction of faces** is in full round with pronounced cheeks and physiognomic detail.
- They show sensitivity towards depicting the human physique.
- Finest example is **Yakshi figure from Didarganj, Patna**. It is a tall well proportioned, free standing sculpture in round made in sandstone with a polished surface. The chauri is held in the right hand, whereas the left hand is broken.
Caves

- The caves are also some of the finest examples of the **Mauryan art**. As Ashok was a religious minded king, he constructed many caves for the monks to live in. These caves also served the purpose of churches & assembly halls. They were built by cutting the hard & refractory rocks.
- The internal walls of the caves were polished so nicely that they looked like mirrors. Many caves are found in the ranges of Magarjun & the Barbarahills near Gaya. **Dasharatha**, the grandson of Ashok, also took interest in the construction of caves & temples by cutting the rocks. This fact proves that Ashok was a follower of the policy of **religions toleration**.
- **Lomus Rishi Cave at Barabar Hills** near Gaya in Bihar is known as Lomus Rishi Cave. It is patronized by Ashoka for Ajeevika sect. The facade of the cave is decorated with the semicircular Chaitya (worship place) arch as the entrance. An elephant frieze carved in high relief on the chaitya.

III. THE SUNGAS, KUSHANS AND SATAVAHANAS

- The Mauryan dynasty crumbled after Asoka's death in 232 B.C. In its wake came the Sungs and Kushans in the north and the Satavahanas in the south. The period between 2nd century B.C. and 3rd century A.D. marked the beginning of the **sculptural idiom** in Indian sculpture where the elements of physical form were evolving into a more refined, realistic and expressive style. The sculptors strived at mastering their art, especially of the **human body**, which was carved in high relief and bore heaviness and vigour. These dynasties made advances in art and architecture in areas like **stone construction**, **stone carving, symbolism** and beginning of temple (or **chaitya hall**) and the monastery (or **vihara**) constructions.
- Under these dynasties the **Asokan stupas were enlarged** and the earlier brick and wood works were replaced with stone-works. For instance, the Sanchi Stupa was enlarged to nearly twice its size in 150 B.C. and elaborate gateways were added later.
- The Sungs also reconstructed the **railings** around the Barhut Stupa. The Sungs also built the **toranas or the gateways** to the stupas. An inscription at the Barhut Stupa indicates that the torana was built during the reign of Sungs i.e. 184-72 B.C. These toranas indicate the influence of Hellenistic and other foreign schools in the Sunga architecture.
- The Satavahanas constructed a large number of stupas at **Goli, Jaggiahpeta, Bhattiprolu, Gantasala, Nagarjunakonda and Amravati**.
- Fine examples of architecture-sculpture of this period are the **Karle cave-chaitya**, Buddhist caves in Nasik, Kalyan and elsewhere and the stupas of Amaravati.
- During the Kushan period (1-3 A.D.), the **Buddha was represented in human form** instead of symbols. Buddha's image in endless forms and replicas became the principal element in Buddhist sculpture during the **Kushan period**. Another feature of this period was that the Emperor himself was shown as a divine person. The Kushans were the pioneers of the **Gandhara School of Art** and a large number of monasteries; stupas and statues were constructed during the reign of **Kanishka**.
- **Kanishka was a patron of art**, as is evident by the cities of Mathura, Taxila and Peshawar and the innumerable stupas, chaityas and viharas built during his reign. Kanishka erected a **multi-storied chaitya and monastery** on the mortal remains of Buddha at his capital, Purushpur or Peshvar. Four specific schools of art flourished in Mathura, Sarnath, Amaravati and Gandhar during his rule.

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THE SCHOOLS OF ART

The Gandhara School of Art (50 B.C. to 500 A.D.):

- The Gadhara region extending from Punjab to the borders of Afghanistan was an important centre of Mahayana Buddhism up to the 5th century A.D. The region became famous throughout the world since a new school of Indian sculpture known as the Gandhara School developed during that period.
- Owing to its strategic location, the Gandhara School imbibed all kinds of foreign influences like Persian, Greek, Roman, Saka and Kushan. The origin of Gandhara art can be traced to the Greek rulers of Bactria and Northwest India. But it was during the reign of Kanishka that the art received great patronage.
- The Gandhara School of Art is also known as the Graeco-Buddhist School of Art since Greek techniques of Art were applied to Buddhist subjects. The most important contribution of the Gandhara School of Art was the evolution of beautiful images of the Buddha and Bodhisattavas, which were executed in black stone and modelled on identical characters of Graeco-Roman pantheon. Hence, it is said, "the Gandhara artist had the hand of a Greek but the heart of an Indian."
- The most characteristic trait of Gandhara sculpture is the depiction of Lord Buddha in the standing or seated positions. The seated Buddha is always shown cross-legged in the traditional Indian way. Another typical feature of the Gandhara Art is the rich carving, elaborate ornamentation and complex symbolism.
- The best specimens of Gandhara art are from Jaulian and Dharmarajika stupa at Taxila and from Hadda near Jalalabad in modern Afghanistan. The tallest rock-cut statue of Lord Buddha is also located at Bamiyan in modern Afghanistan and dates back to 3-4 century AD.

The Mathura School of Art:

- The Mathura School of art flourished at the holy city of Mathura, especially between 1-3 A.D. It established the tradition of transforming Buddhist symbols into human form.
- Buddha’s first image can be traced to Kanishka’s reign (about 78 A.D.). The earliest sculptures of Buddha were made keeping the yaksha prototype in mind. They were depicted as strongly built with the right hand raised in protection and the left hand on the waist. The figures produced by this school of art do not have moustaches and beards as in the Gandhara Art. These figures can be seen in the museum of Mathura.
- The standing Buddha figures resembles the yaksha figures and indicates the Kushan influence. The seated figures are in the padmasana posture. The Mathura School not only produced beautiful images of the Buddha but also of the Jain Tirthankaras and gods and goddesses of the Hindu pantheon. Many scholars believe that the Mathura School of Art, although of indigenous origin, was greatly influenced by the Gandhara School of Art. The Guptas adopted the Mathura School of Art and further improvised and perfected it.

The Amravati School of Art:

- This school of art developed at Amravati, on the banks of the Krishna River in modern Andhra Pradesh. It is the site for the largest Buddhist stupa of South India. Its construction began in 200 B.C. and was completed in 200 A.D.
- The diameter of the stupa at the base was 51 metres. The height of the dome was 31 metres and its outer railing was 5 metres wide. The stupendous stupa could not withstand the ravages of time and its ruins are preserved in the London Museum.

TEMPLE ARCHITECTURE OF INDIA

- Despite the vastness of the land, Indian temple architecture is remarkably uniform. It is, however, often distinguished into two chief styles, each having numerous sub-styles. The Northern or Indo-Aryan style is marked by a tower with rounded top and curvilinear outline while the Southern or Dravidian style has the tower usually in the shape of a rectangular truncated pyramid.
- The standard type of the Hindu temple has remained fundamentally same from the 6th century AD to the present day. The construction of temples – whether in the north or in the south – essentially followed a similar pattern. There is the sanctuary or the vimana of which the upper and outer pyramidal and tapering portion is called the shikhara, or pinnacle.
- The vimana is a rather dark place that houses the divine deity. This small area is called garbha griha, literally meaning 'womb house'. The entrance is through a doorway, normally from the eastern side. The doorway is reached through a mandapa or pillared hall, where devotees congregate for prayers. However, earlier temples may have had the mandapa at a little distance from the main temple (the Shore Temple in Mamallapuram near Chennai, circa 700 A.D.), although this practice was done away with in later constructions.

- Later it became necessary to unite both buildings, making way for the antarala or intermediate vestibule. A porch or a smaller room called ardha mandapa leads up to a hall (mandapa), which in turn goes into a maha mandapa. A tower generally surmounted the shrine-room while smaller towers rose from other parts of the building. The whole conception was set in a rectangular courtyard, which sometimes contained lesser shrines and was often placed on a raised platform. The perfect examples of temples on this structure are the Khajuraho temples. Here, each chamber has its own separate pyramidal roof rising in gradual steps so that the final sanctum’s roof towers up, surrounded by smaller spires, finally forming a graceful, rising stepped pyramid.

- In some parts of India, the ascending pyramid roof format was not followed. The roof in such temples was still pyramidal, but was formed of layers that gradually became narrower as they rose. A courtyard was built around the temple, and sometimes a wall would be constructed to ensure seclusion. The outer walls were treated by carving in an orderly group of repetitive miniatures. The shikhara or tapering roof was specifically based on this design, which may have originated from the domed huts of central and eastern India.

- Mentioned as one of three styles of temple building in the ancient book Vastu shastra, the majority of the existing structures are located in the Southern Indian states.
- This styled architecture can also be found in parts of North India (Teli ka Mandir Gwalior, Bhitargaon Baitala Deula, Bhubaneswar), Northeastern and central Sri Lanka, Maldives, and various parts of Southeast Asia. Angkor Wat in Cambodia and Prambanan in Indonesia were built based on Dravida architecture.
IV. THE PRATHIHARAS, PALAS & CHANDELAS

- **The Pratiharas**, who ruled over an extensive empire from Ujjain during the 8th and 9th centuries, were among the significant successors of the Guptas. The **Pratihara temples** of Central India have their own unique designs and decorative schemes. The important temples of Ujjain include the **Mahakaleshwar** temple, which has one of the **twelve Jyotirlingas** of India, **Kal Bhairava** temple, which finds a mention in the Skanda Purana, and **Mangalnath** temple, which is regarded as the birthplace of Mars, according to the Matsya Purana.

- The most important groups of architectural works generally credited to the early Pratiharas are at **Osian in the heart of Gurjara**, to the east in the great fort at Chittor and at Roda in the south by the border of modern Gujarat - which the Pratiharas had absorbed by the end of the 8th century. They had also reached north-central India, where several temples around Gwalior are comparable to the later works at Osian. The extraordinary Teli-ka-Mandir in Gwalior fort is the oldest surviving large-scale Pratihara work.

- There is a group of around 22 temples in the Naresar village in Morena district. **These temples were built in the 8th century by Yashovarman and Amaraj of Kannauj**. Albeit built by independent rulers, the architecture of these temples belongs to the Pratihara style, the dominant style of the region.

- **The Pala School of Architecture** (8-13th Centuries AD) flourished in Bengal and Bihar under the Pala and the Sena rulers. **Nalanda** was its most active centre, whose influence was spread to Nepal, Myanmar and even Indonesia. Stone sculptures of this period are found at Nalanda, Rajagriha, Bodh Gaya, Rajashahi and other places. The Pala School of art is seen at its best at Nalanda and several sculptures belonging to this period have been unearthed in excavations.

- The matchless examples of the Art and Architecture of **Pala Dynasty** find their significance in the museums in Bangladesh and West Bengal as the remarkable display. The museums play abode to the innumerable beautiful sculptures on Rajmahal black basalt stone. The sculptures beautifully carved in the Pala period demonstrate the mastery of Pala dynasty.

- The plan of central shrine in the **Buddhist Vihara** evolved in Bengal during the Pala rule. Other instances demonstrating the brilliance of the art in the Pala period include the terracotta plaques.

- **The Chandelas of Jijihoti or Bundelkhand** were known as great builders during the 10th-11th centuries. They built the **temples at Khajuraho** justly famous for their graceful contours and erotic sculptures. These 22 temples (out of the original 85) are regarded as one of world’s greatest artistic wonders. The Khajuraho Temples do not illustrate a development over a long period but were built within a short period of hundred years from 950-1050 A.D. The Khajuraho Temples have highly individualistic architectural character and are generally small. Each temple is divided into three main compartments - the **cella or garbha griha**, an assembly hall or **mandapa** and an entrance portico or **ardha mandapa**. Some temples also contain the **antarala** or vestibule to the cella and the transepts or **maha-mandapa**. The **Kendriya Mahadev temple** is the largest and most beautiful of the Khajuraho Temples. The **Shiva Temple at Visvanath** and the **Vishnu Temple at Chaturbhanj** are other important temples at Khajuraho.
CAVE ARCHITECTURE OF INDIA

The earliest fabricated caves date back to the 2nd century BC while the latest date to the 7th century AD. The splendid sculpture and lovely frescoes adorning these caves make them one of the glorious monuments of India's past.

Ajanta Caves

- The cave temples of Ajanta, situated north of Aurangabad, were first mentioned in the writings of the Chinese pilgrim Huen Tsang who visited India between 629 AD and 645 AD. The British officers discovered these caves in 1819 AD. The thirty temples at Ajanta are set into the rocky sides of a crescent shaped gorge in the Inhyadri hills of the Sahyadri ranges.
- At the head of the gorge is a natural pool, which is fed by a waterfall. The excavations spanned a period of about six centuries. The earlier monuments include both chaitya halls and monasteries. These date from the 2nd to 1st centuries B.C. After a period of more than six centuries, excavations once again revived during the reign of the Vakataka ruler Harishena. The sculptures contain an impressive array of votive figures, accessory figures, narrative episodes and decorative motifs. The series of paintings is unparalleled in the history of Indian art, both for the wide range of subjects and the medium.
- The caves depict a large number of incidents from the life of the Buddha (Jataka Tales). Overlapping figures suggest that the perspective and colors are harmoniously blended and that the line work is sinuous. However, the identities of the artists responsible for the execution of the Ajanta caves are unknown.

Bhimbetaka Caves

- Bhimbetka is located in the Raisen District of Madhya Pradesh about 45 km to the southeast of Bhopal near a hill village called 'Bhiyanpur'. Bhimbetka, discovered in 1958 by V.S. Wakanker, is the biggest prehistoric art depository in India. Atop the hill a large number of rock-shelters have been discovered, of which more than 130 contain paintings.
- Excavations in some of the rock-shelters revealed history of continuous habitation from early Stone Age (about 10000 years) to the end of Stone Age (c. 10,000 to 2,000 years) as seen from artificially made stone tools and implements like hand-axes, cleavers, scrappers and knives. Neolithic tools like points, trapezes and lunates made of chert and chalcedony, besides stone querns and grinders, decorated bone objects, pieces of ochre and human burials were also found here.

Elephanta Caves

- The 6th century Shiva temple in the Elephanta caves is one of the most exquisitely carved temples in India. The central attraction here is a twenty-foot high bust of the deity in three-headed form. The Maheshamurti is built deep into a recess and looms up from the darkness to fill the full height of the cave. This image symbolizes the fierce, feminine and meditative aspects of the great ascetic and the three heads represent Lord Shiva as Aghori, Ardhanarishvara and Mahayogi.
- Aghori is the aggressive form of Shiva where he is intent on destruction. Ardhanarishvara depicts Lord Shiva as half-man/half-woman signifying the essential unity of the sexes. The Mahayogi posture symbolises the meditative aspect of the God and here

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Lord Shiva is shown in his most quiet and serene form. Other sculptures in these caves depict Shiva's cosmic dance of primordial creation and destruction and his marriage to Parvati.

Mahakali Caves

- These are rock-cut Buddhist caves situated in the Udayagiri hills, about 6.5km from Mumbai. These were excavated during 200 BC to 600 AD and are now in ruins. They comprise of 4 caves on the southeastern face and 15 caves on the northwestern face. **Cave 9** is the chief cave and is the oldest and consists of a stupa and figures of Lord Buddha.

Jogeshwar and Kanheri Caves

- Located in the western suburbs of Bombay, it is the **second largest known cave** after the Kailasa cave in Ellora & houses a **Brahmanical temple** dating back to the 6th century AD.
- Excavated between the 1st and 2nd centuries, the **Kanheri** is a 109-cave complex located near Borivili National Park in Bombay. The Kanheri caves contain illustrations from Hinayana and Mahayana Buddhism and show carvings dating back to 200 BC.

Karla and Bhaja Caves

- About 50-60 kms away from Pune, these are rock-cut Buddhist caves dating back to the 1st and 2nd centuries BC. The caves consist of several **viharas and chaityas**.

V. RAJPUT ARCHITECTURE

The Rajputs were great patrons of art and architecture, the finest examples being their forts and palaces. The Rajput palaces are complex compositions built as inner citadels surrounded by the city and enclosed by a fortified wall as at Chittorgarh and Jaisalmer. Some forts, such as those at Bharatpur and Deeg, were protected by wide moats.

- The oldest surviving palaces date from the mid-fifteenth century and are found at Chittor and Gwalior. The **Man Mandir**, the largest palace in Gwalior, was built by Raja Man Singh Tomar (1486-1516). The Man Mandir has two storeys above, and two below, ground level overhanging a sandstone cliff. This gigantic cliff is punctuated by five massive round towers, crowned by domed cupolas and linked by delicately carved parapets. The whole facade is enriched with brilliant blue tiles.
- Beautiful examples of Rajput palaces are the **Udaipur Palace** on lake Pichola built by Maharana Udai Singh and the Hawa Mahal in Jaipur built by Raja Jai Singh.
- Some other places where they built **majestic fortresses** are Jaipur (Amber), Jaisalmer, Jodhpur, Mandu and Ranthanbor. These forts were usual **built on hillocks and entry was a circuitous ascent** made difficult by barriers at intervals.
- The most exquisite of their **Sthambas is the Jaya Sthamba** or Victory Tower in Chittor. A 37 metres. High nine storeyed structure - it is elaborately decorated with statues of Hindu deities both inside and outside. It was erected by Maharana Kumbha in the 13th century to commemorate his victory over Mahmd. I, the ruler of Malwa. The tower is as square structure and has balconied windows and mouldings on all four sides.
- Beautiful examples of Rajput palaces are the **Udaipur Palace** on lake Pichola built by Maharana Udai Singh and the Hawa Mahal in Jaipur built by Raja Jai Singh.
- The palaces of Jaisalmer, Bikaner, Jodhpur, Udaipur and Kota represent the maturity of the Rajput style. All of these palaces were **built predominantly in the 17th and early 18th**
centuries. The huge fortified city of Jaisalmer is situated far out in the Thar Desert. The buildings are constructed with the local yellow-brown stone and they have been remarkably preserved owing to their remote location.

- The city of Bikaner is encircled by 5.63 km long stonewall in rich pink sandstone. There are five gates and three sally ports. The Jodhpur Fort dominates the city, which is surrounded by a huge wall with 101 bastions, nearly 9.5 km long. The Meherangarh fort stands on a cliff with a sheer drop of over 36 metres.
- The foundation of Jaipur, the fabled "pink city", in 1727 AD represents the final phase of Rajput architecture. Built by Jai Singh, Jaipur represents a fusion of Eastern and Western ideas of town planning. The city is enclosed by a wall and has bastions and towers at regular intervals.
- The City Palace is at the center of the walled city and is a spectacular synthesis of Rajput and Mughal architectural styles. The famous building Hawa Mahal, or Palace of Winds, (1799) has a five-storeyed symmetrical facade composed of 953 small casements in a huge curve each with a projecting balcony and crowning arch. The Jantar Mantar, the largest of five observatories built by Jai Singh II in the early eighteenth century, is another interesting example of Rajput architecture.

VI. JAIN ARCHITECTURE

- The contribution of Jain art to the mainstream art in India has been considerable. Every phase of Indian art is represented by a Jain version and each one of them is worthy of meticulous study and understanding. Jain architecture cannot be accredited with a style of its own, for in the first place it was almost an offshoot of Hindu and Buddhist styles.
- In the initial years, many Jain temples were made adjoining the Buddhist temples following the Buddhist rock-cut style. Initially these temples were mainly carved out of rock faces and the use of bricks was almost negligible.
- Excellent Jain architecture and sculpture can be seen in their Stupas and rock-cut caves found in Mathura, Bundelkhand, Madhya Pradesh and Orissa cave temples. A number of rock-cut caves have been discovered in Udaigiri and Khandagiri, twin hills in Puri District of Orissa and in Ellora in Maharashtra.
- The eighteen Udaigiri and fifteen Khandagiri caves differ in plan from the rock-cut viharas of the Buddhists. The Jain viharas here do not have the assembly or prayer hall surrounded by cel1s nor a sanctuary like the Buddhist viharas.
- The largest and finest of the Udaigiri caves is Cave 1 called the Rani-Gumpha or Rani Cave. (Gumpha the local word tor cave). The Rani-Gumpha is important for its heavily sculptured friezes. Figures of thirthankaras carved on the walls of the cells are a later addition to the Khandagiri caves, which were redone in about the 11th and 12th centuries A.D. to serve as sanctuaries.
- The Hathigumpha is important for its rock-cut inscription of King Karavela of Orissa, which describes chronologically the events of his rule.
- Jain architecture reached the peak of excellence in the 11th and 12th century AD as can be seen in their temples in Rajgir in Bihar and Palitana in Kathiawar.
- Compared to the number of Hindu temples in India, Jain temples are few and spaced out. Surrounded by embattled walls, the temples are divided into wards, guarded by massive bastions at its ends, with fortified gateways as the main entrances. These temple-cities were not built on a specific plan; instead, they were the results of sporadic construction.
- Natural levels of the hill on which the 'city' was being built accommodated various levels so that as one goes higher the architecture and grandeur increases. The only variation in

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these temples was in the form of frequent chamukhs or four-faced temples. In these, the image of a Tirthankara faces the four sides, or four Tirthankars are be placed back to back to face four cardinal points. Entry into this temple is also from four doors. The Chamukh temple of Adinath (1618 AD) is a characteristic example of the four-door temple.

- The great Jain temples and sculptured monuments of Karnataka, Maharashtra and Rajasthan are world-renowned. The most spectacular of all Jain temples are found at Ranakpur and Mount Abu in Rajasthan. Deogarh (Lalitpur, U.P.), Ellora, Badami and Aihole also have some of the important specimens of Jain Art.

VII. THE INDO-ISLAMIC ARCHITECTURE

- Indian architecture took new shape with the advent of Islamic rule in India towards the end of the 12th century AD. New elements were introduced into the Indian architecture that include: use of shapes (instead of natural forms); inscriptive art using decorative lettering or calligraphy; inlay decoration and use of coloured marble, painted plaster and brilliantly glazed tiles.

- In contrast to the indigenous Indian architecture which was of the trabeate order i.e. all spaces were spanned by means of horizontal beams, the Islamic architecture was arcuate i.e. an arch or dome was adopted as a method of bridging a space. The concept of arch or dome was not invented by the Muslims but was, in fact, borrowed and was further perfected by them from the architectural styles of the post-Roman period.

- The Muslims used the cementing agent in the form of mortar for the first time in the construction of buildings in India. They further put to use certain scientific and mechanical formulae, which were derived by experience of other civilizations, in their constructions in India. Such use of scientific principles helped in not only obtaining greater strength and stability of the construction materials but also provided greater flexibility to the architects and builders. This amalgamation of the Indian and the Islamic elements led to the emergence of a new style of architecture called the Indo-Islamic Architecture.

- One fact that must be stressed here is that, the Islamic elements of architecture had already passed through different experimental phases in other countries like Egypt, Iran and Iraq before these were introduced in India. Unlike most Islamic monuments of these countries, which were largely constructed in brick, plaster and rubble, the Indo-Islamic monuments were typical mortar-masonry works formed of dressed stones.

- It must be emphasized that the development of the Indo-Islamic architecture was greatly facilitated by the knowledge and skill possessed by the Indian craftsmen, who had mastered the art of stonework for centuries and used their experience while constructing Islamic monuments in India.

- In simple terms, the Islamic architecture in India can be divided into religious and secular. Mosques and Tombs represent the religious architecture, while palaces and forts are examples of secular Islamic architecture. Forts were essentially functional, complete with a little township within and various fortifications to engage and repel the enemy.

- Mosques: The mosque or masjid is a representation of Muslim art in its simplest form. The mosque is basically an open courtyard surrounded by a pillared verandah, crowned off with a dome. A mihrab indicates the direction of the qibla for prayer. Towards the right of the mihrab stands the mimbar or pulpit from where the Imam presides over the proceedings. An elevated platform, usually a minaret from where the Faithful are summoned to attend
the prayers is an invariable part of a mosque. Large mosques where the faithful assemble for the Friday prayers are called the Jama Masjids.

- **Tombs:** Although not actually religious in nature, the tomb or maqbara introduced an entirely new architectural concept. While the masjid was mainly known for its simplicity, a tomb could range from being a simple affair (*Aurangzeb’s grave*) to an awesome structure enveloped in grandeur (*Taj Mahal*).

- The tomb usually consists of solitary compartment or tomb chamber known as the huzrah in whose centre is the cenotaph or zarih. This entire structure is covered with an elaborate dome. In the underground chamber lies the mortuary or the maqbara, in which the corpse is buried in a grave or qabr. Smaller tombs may have a mihrab, although larger mausoleums have a separate mosque located separately from the main tomb. Normally the whole tomb complex or rauza is surrounded by an enclosure. The tomb of a Muslim saint is called a dargah. Almost all Islamic monuments were subjected to free use of verses from the Holy Koran and a great amount of time was spent in carving out minute details on walls, ceilings, pillars and domes.

**VIII. COLONIAL ARCHITECTURE**

- European colonists brought with them to India concepts of their "world view" and a whole baggage of the history of European architecture --- Neo-Classical, Romanesque, Gothic and Renaissance. The initial structures were utilitarian warehouses and walled trading posts, giving way to fortified towns along the coastline.

- The Portuguese adapted to India the climatically appropriate Iberian galleried patio house and the Baroque churches of Goa. *Se Cathedral* and *Arch of Conception* of Goa were built in the typical Portuguese-Gothic style. The *St. Francis Church* at Cochin, built by the Portuguese in 1510, is believed to be the first church built by the Europeans in India.

- The Portuguese also built the fort of *Castella de Aguanda* near Mumbai and added fortifications to the Bassein fort built by Bahadur Shah, the Sultan of Gujarat, in 1532 AD. The *Bassein fort* is famous for the *Matriz* (Cathedral of St Joseph), the *Corinthian pillared hall* and the *Porte da Mer* (sea gate).

- The Danish influence is evident in Nagapatnam, which was laid out in squares and canals and also in Tranquebar and Serampore. The French gave a distinct urban design to its settlement in Pondicherry by applying the Cartesian grid plans and classical architectural patterns. The Church of Sacred Heart of Jesus (*Eglise De Sacre Coeur De Jesus*), the *Eglise de Notre Dame de Anges* and the *Eglise de Notre Dame de Lourdes* at Pondicherry have a distinct French influence.

- However, it was the British who left a lasting impact on the India architecture. They saw themselves as the successors to the Mughals and used architecture as a symbol of power. The British followed various architectural styles – Gothic, Imperial, Christian, English Renaissance and Victorian being the essentials.

- The first buildings were factories but later courts, schools, municipal halls and dak bungalows came up, which ordinary structures were built by garrison engineers. A deeper concern with architecture was exhibited in churches and other public buildings. Most of the buildings were adaptations of the buildings designed by leading British architects of that time like Wren, Adam, Nash and others in London and other places. For instance, the *Church of St. John at Calcutta* was built in 1787 inspired by St. Stephens Church at Walbrooks, the *Government House* in Calcutta was built by Capt. Charles Wyatt modelled on the *Kedleston Hall of Derbyshire*, the *Indian Government Mint* in Calcutta is a half-
scale replica of the Temple of Minerva at Athens and the Pachaiyappa's Hall in Chennai was modelled on the Athenium Temple of Theseus.

- Unlike Europe, however, these buildings were built mostly of brick and stuccoed with lime or chunam, sometimes "facades" incised to look like stones. Some later buildings were, however, built with stones. Churches, which were symbols of colonialism, were built in great style. Based on London prototypes, several churches evolved with variations as highly original works. The earliest example is the St. Mary's Church in Fort St. George in Chennai.

- Neo-Gothic architecture flourished in different parts of India under the British, inspired by the Houses of Parliament in London. Colonel Thomas Cowper built the town hall in Bombay during 1820 to 1835. Governor Sir Bartle Frere tried to give a truly imperial ambience to the city of Bombay. During his reign, the old town walls were broken down and the Gateway of India was built in the Gothic style of architecture. The Secretariat, University Library, Rajabai Tower, Telegraph Office and the Victoria Terminus all followed the Victorian Gothic style, similar to buildings in London.

- Undoubtedly, the Victoria Terminus, designed by the architect Frederick William Stevens modelled on the St.Pancras Station, is the finest example of Gothic architecture with a subtle hint of the Indo-Saracenic motifs, an extravaganza of polychromatic stone, decorated tile marble and stained glass. Stevens also designed other buildings like the Churchgate Terminus and the Municipal Building opposite the Victoria Terminus.

- In Varanasi, one of the true Gothic monuments is Queen’s College, built in a perpendicular style by Major Kitoe from 1847 to 1852. In Allahabad, the British built a series of edifices including the University, All Saints Cathedral, the High Court and the Mayo College. In Calcutta, a High Court was constructed following the Gothic style. The Howrah Bridge (1943), with its red brick facade surrounded by eight square towers represents a combination of the Oriental and Roman styles. Fort William, the stronghold of the British in mid 19th century that took 13 years to construct at a cost of more than $3.5 million and the Victoria Memorial in Calcutta (1921), designed by Sir William Emerson, are probably the most imposing of all British structures in India.

- The passing of power from the East India Company to the British Crown, the rise of Indian nationalism and the introduction of Railways were the watersheds in the British Colonial Indian architectural history. New materials like concrete, glass, wrought and cast iron opened up new architectural possibilities. The British also started assimilating and adopting the native Indian styles in the architecture.

- All these factors led to the development of Indo-Saracenic architecture towards the end of the 19th century. Victorian in essence, it borrowed heavily from the Islamic style of Mughal and Afghan rulers. In fact it was a pot pouri of architectural styles; a hybrid style that combined in a wonderful manner diverse architectural elements of Hindu and Mughal with gothic cusped arches, domes, spires, tracery, minarets and stained glass.

- The Indo-Saracenic style was Indian on the outside and British inside since the facade was built with an Indian touch while the interior was solely Victorian. F.S.Growse, Sir Swinton Jacob, R.F.Chisholm and H.Irwin were the pioneers of this style of architecture. The Chepauk Palace in Chennai designed by Paul Benfield is said to be the first Indo-Saracenic building in India. Other outstanding examples of this style of architecture include the Law Courts, Victoria Memorial Hall, Presidency College and Senate House of Chennai, Muir College at Allahabad, Napier Museum at Thiruvanthapuram, the Post...
Office, Prince of Wales Museum and the Gateway of India in Mumbai, the Maharaja's Palace at Mysore and M.S.University and Lakshmi Villas Palace at Baroda.

- The architecture of New Delhi was the crowning glory of the British Raj. Robert Byron described New Delhi as "The Rome of Hindostan". The British built New Delhi as a systematically planned city after it was made the capital in 1911. The British Viceroy made Sir Edward Lutyens responsible for the overall plan of Delhi. He was specifically directed to "harmonise externally with the traditions of Indian art". Thus, the Western architecture with Oriental motif was realised with chajjas, jalis and chhattris, as stylistic devices in the Viceroy's House (now Rashtrapati Bhawan). Herbert Baker added the imposing buildings of the South Block and the North Block, which flank the Rashtrapati Bhawan.
- Another Englishman called Robert Tor Tussell built the Connaught Place and the Eastern and Western Courts. St Martin’s Garrison Church marks the culmination of the British architectural ventures in India. The Church is a huge monolith with a high square tower and deeply sunken window ledges reminiscent of Dutch and German architecture.

IX. MODERN ARCHITECTURE OF INDIA

- The post-Independence period saw the emergence of two schools of thought in architecture-- the Revivalist and the Modernist. The Revivalists, who advocated "continuity with the past", could not break the shackles of the colonial legacy and left no significant impact on the neo-Indian architecture. The Modernists too depended heavily on the European and American models and tried to adopt them in India without taking into consideration the regional aspirations, diversities and requirements.

- Jawaharlal Nehru, the first Prime Minister, had called for an open architectural competition for the design of the Ashoka Hotel in 1956, which was won by B.E.Doctor, an architect from Bombay. Using technology to create large pillar-less spaces, Doctor created a facade that borrowed from Islamic, Hindu, British and modern architecture.

- Indian architecture witnessed a revolution when the Punjab government engaged Le Corbusier to design the new city of Chandigarh. Built in three stages, Corbusier divided the city into three sections. The 'head' consisted of political, bureaucratic and judicial buildings, the administrative parts of the city. The 'body' housed the university and residential complexes in the heart of the city. The 'feet' consisted of industrial sectors and the railway station. Apart from the initial layout of the city, Corbusier also designed several buildings in Chandigarh. The High Court building has a sloping roof, supported by concrete walls, which allow air to pass through them. The Assembly is a squarish structure topped with a huge industrial chimney while the Secretariat is made up of hundreds of rooms with an airy exterior.

- Taking inspiration from Le Corbusier's creativity, a young Indian architect D V Joshi designed the Institute of Indology in Ahmedabad. Charles Mark Correa, Doshi’s contemporary, designed the Hindustan Lever pavilion for the India International Trade Fair in 1961. The pavilion was an exposed concrete structure resembling a crumpled packing case made of concrete with a zigzag ramp to walk along. Correa also designed the Gandhi Sanghralaya in Ahmedabad as a tribute to Mahatma Gandhi.

- The Asiad Village in New Delhi, designed by Raj Rewell and built as a colossal complex with more than 800 residential units, landscaped courts, streets, restaurants and shops, all...
catering to sports persons who had assembled for the 1982 Asian Games, is one of the architectural landmarks of modern India.

- The lotus-shaped Bahai temple in New Delhi, designed by Fariburz Sabha in 1980 and completed in December 1986, is an awe-inspiring example of the ingenuity of the Indian architects.

- However, the fact remains that the contemporary architecture in India has failed to inspire. Even after 50 years of Independence, our cities are still symbolised by pre-independence buildings. For instance, Calcutta is symbolised by the Victoria Memorial, New Delhi by the Rashtrapati Bhawan, Mumbai by the Victoria Terminus and the Gateway of India and Chennai by the Victoria Memorial Hall. The post-independence buildings such as the New Secretariat building in Calcutta or the Vigyan Bhawan in New Delhi has nothing much to offer in terms of architectural style.

- In contrast most major cities in the world have splendid modern buildings to boast off, like Sydney has its Sydney Opera House, Paris has new Grand Arch and the Georges Pompidos Centre, New York has its World Trade Centre, Chicago has the Sears Tower and Toronto has the C.N.Tower. Even cities in other Third World countries have several buildings to feel proud about, like Kuala Lumpur has its Petronas Tower, Shanghai has the TV Tower, Hong Kong has its Hong Kong and Shanghai Corporation building and the Bank of China Building and even Colombo has its new Parliament building.

- In November 1998, the media reported that the foundation stone of World Centre of Vedic Learning, the world’s tallest building would be laid at Karondi village, in Jabalpur in Madhya Pradesh.

- Madhya Pradesh seems to be the only state in India, which has several grand public buildings and international award winning projects. The New Assembly building in Bhopal and the Madhya Pradesh State Electricity Board office in Jabalpur, The Judicial Academy in Bhopal, the Rajiv Gandhi Jal Grahan Mission in Raipur and the proposed "White House" in Bhopal are some fascinating examples, which show that global aesthetics is moving very fast into the smaller Indian cities.

- Paradoxically, it is the smaller cities and towns like Indore, Raipur, Rajkot, Baroda and Bhopal, with no greatly visible architectural traditions like that of Jaipur, Hyderabad or Lucknow that are displaying unprecedented alacrity in adapting to 'international styles'.

- There is a growing brand of young and dynamic architects, which include Charles Correa, Prashant Diwakriti, Ajay Kataria, Anjum Gupta, Vineet Chadha, Nikhil Sompura and others, who do not shy away from experimentation. Most often, these architects employ a hybrid style that is a free mix of Roman, English, Gothic, Rajasthani and Mughal styles.

- This new-age architectural aesthetics has redefined the idea of space. The emphasis now seems to be on having more open spaces, green spaces and natural lighting. It is, however, not possible to term this new trend as a 'representative' architecture of our times as it is highly restricted in geographic terms and also confined to the affluent lot.

SCULPTURE IN INDIA

- As far as the origin of sculpture is concerned, it goes back to the Stone Age. The Megalithic people buried their dead and constructed monumental stones over them and worshipped them. The change over from worshipping the ancestral spirits to a personal God is reflected in making icons of the God with his specific attributes. Tiny terra-cotta seals discovered from the Indus Valley reveal carvings of peepal leaves, deities and animals. The famous

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The figurine of the **dancing girl of Mohenjo-Daro** bears witness to the fact that the tradition of sculpture and bronze casting goes back to the Indus Valley Civilisation and shows tremendous sophistication and artistry.

- The sculpture in India started appearing from 3rd century BC with the **stone pillars of Ashoka**, the **stupas** and **Toranas** of Sanchi, Bharhut, Amravati and the **rock-cut viharas** of Barabar, Bhaja, Pitalkhoda, Karle, Bedsa, Ajanta and others and continued till the 12th century AD. During the reign of the Mauryan emperor Ashoka, nearly 85,000 stupas were constructed. Many awe-inspiring statues exhibiting a serene Buddha, with a glowing face were crafted in large numbers. Though, Buddhism deplored idol worship, human forms of Lord Buddha began to be depicted with features like a halo around the head, the **dharmachakra** engraved upon his palms and soles of his feet, and the lion throne representing his royal ancestry.

- The earliest archaeological evidence of sculpture work in metal, terracotta, wood and stone in the Indian sub-continent is provided by the remains found at the pre-Harappan sites of Baluchistan, the Makran areas of Pakistan and Kalibangan in Rajasthan, dating back to 3000 BC.

- Literary evidence from the Rigveda states that copper and bronze-smithy were a specialized science and that craftsman were held in high esteem. Whether it is in wood, stone or ivory, the Indian carver-craftsman has been extremely versatile in applying his techniques and designs to various media.

- Carved wooden facades and fixtures of dwellings, domestic shrines, temples, churches and palaces of Rajasthan, Gujarat, Kashmir and Kulu in Himachal Pradesh are marked by intricate designs. In Punjab and Haryana, there exists a tradition of clay wall relief in appliqué. India is also famous for producing a startling range of terracotta figures, ritual and secular utility objects and toys for children.

**MODERN SCULPTORS:** Modern sculpture, like other mediums of art, has experienced a revival. While the traditionalists continue to follow the rhythmic, decorative tradition of the **Gupta and Chola periods**, there is a growing breed of modern sculptors who are endeavouring to simplify the art form and to bring in contemporary elements and social awareness into their art. Sculptors of this group freely assimilate art forms of Europe and other places to evolve their own individualistic styles. Some of the modern sculptors are **Amarnath Sehgal** (Conquest of Moon, Collection in White House, Rising Spirit), P. Ramachandra Kamat, Panchal Rajnikant, Dhanraju Bhagat, Jairam, D.P.Choudhury, Sankha Choudhury, Raghav Kaneria, S.Dhanapatil, P.V.Janakiram, C.Dakshinamoorthy, P.S.Nandhan, S.Parmavisam, Vidyashankar Sthapathy, S.Nandagopal, Chintamoni, Nandgopal Shankar, Niranjan Pradhan, Pradosh Kusum Das Gupta, Meera Mukherjee and Jashu Shilpi.

**WORLD HERITAGE SITES**

- **In 1972**, the **General Conference of UNESCO** adopted a resolution with overwhelming enthusiasm creating thereby a 'Convention concerning the protection of the World Cultural and Natural Heritage'. The main objectives were to: (a) Define the World Heritage in both cultural and natural aspects, (b) Enlist sites and monuments from member countries which are of exceptional interest and universal value the protection of which is the concern of all mankind and (c) Promote co-operation among all Nations and people to contribute for the protection of these universal treasures intact for future generations.
- India is an active member State on the World Heritage from 1977. It has been working in close co-operation with other International agencies like International Council of Monuments and Sites (ICOMOS), International Union for the Conservation of Nature and Natural Resources (IUCN) and International Centre for the study of Preservation and Restoration of Cultural Property (ICCROM).

- The Department of Culture and Archaeological Survey of India, apart from observing this World Heritage Day on April 18 and the World Heritage Week from 19th November every year. It is specially aimed to involve the youth of the country through NSS/NCC units in such works as protection, preservation and propagation of the great heritage for which our India is world famous.

- The various Indian monuments and sites included in the World Heritage List are the Ajanta Caves, Ellora Caves, Agra Fort, Taj Mahal, Sun Temple at Konarak, the Group of Monuments at Mahabalipuram, Kaziranga National Park, Manas Wildlife Sanctuary, Keoladeo National Park, Churches and Convents of Goa, Group of Monuments at Khajuraho, Group of Monuments at Hampi, Fatehpur Sikri, Group of Monuments at Pattadakal, Elephanta Caves, Brihadeeshwara Temple at Thanjavur, Sundarbans National Park, Nanda Devi National Park, Buddhist Monastery at Sanchi, Humayun's Tomb at Delhi and Qutab Minar and associated monuments at Delhi. The UNESCO World Heritage Committee has bestowed world heritage status on the Darjeeling Himalayan Railway in December 1999.
BODY PARTS AND PROCESSES

BLOOD

- The chief transport system of animals is **blood vascular system**. It includes blood, the pumping organ – heart and blood vessels.
- Blood **transports following types of materials** –
  - **Wasteful and Poisonous** by-products of metabolism transported to kidneys for excretion.
  - **Hormones**, which regulate activities of metabolism, growth and development, are carried from organs where they are produced to other places.
  - **Oxygen** from lungs to tissues & **CO₂** from tissues to lungs
  - Digested food from ‘Small Intestine’ i.e. ileum get into blood plasma in the form of various salts, amino acids etc. to liver and into circulatory system.
  - The substances carried by blood fight diseases, clotting of blood, healing of wounds.
  - **Temperature** is controlled to a constant value through distribution of heat by blood.
- There is 5-6 litre blood in normal human body, which makes about 7% of total weight
- **pH of blood** is **7.4** (alkaline)
- Blood consists of following components:
  1. Plasma – 60%
  2. Corpuscles – 40% (RBCs & WBCs)
  3. Platelets

**Plasma**

- It is the **liquid part** of blood. It consists of 90% Water and rest is **protein** (Albumin, “Gamma Globulin”, Fibrogen), Glucose and Salts. Gamma Globulin – Rich in **antibodies** and provide immunity to certain infectious diseases. Fibrogen helps in **blood clotting**.

**Corpuscles**

- **RBC** (Red Blood Corpuscles) are also called **Erythrocytes**. Produced in **Red Bone Marrow** and worn out RBCs are destroyed by **Liver** and **Spleen**. Blood contains a ‘protein’ molecule called **hemoglobin**; a carrier of O₂ and CO₂ in human system.
- **WBC** (White Blood Corpuscles) or **Leucocytes** move through tissue spaces by a process called ‘Diapedesis’. These work as a military – Destroy harmful bacteria and dead cells. These are larger than RBCs. An overproduction of WBCs results into a disease called **leukemia**.
- Ratio of RBC: WBC in our body is **600: 1**.
- Hemoglobin (Hb) is **red respiratory pigment present in RBC**. Hemoglobin in Males is 14-18 gm/ 100 ml of blood and in Females is 11-14 gm/ 100ml. Maximum Hemoglobin content is found in New born baby. Its 24.4–34.4 gm/ 100 ml of blood
- The organs, which produce blood corpuscles are called hemopoietic tissues and the process of their formation is called **hemopoiesis**
- People living in high attitudes have more RBCs. The count sharply **falls** in **anaemia** and rises in **polycythemia**.
<table>
<thead>
<tr>
<th>RBCs</th>
<th>WBCs</th>
<th>BLOOD PLATELETS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rounded or disc-like. Contain Hb, &amp; thus transport oxygen</td>
<td>Colourless and amoeba like, much larger than RBCs. Provide immunity to body</td>
<td>Small, spherical; Clotting of blood</td>
</tr>
<tr>
<td>No nucleus</td>
<td>One nucleus each</td>
<td>Enucleated</td>
</tr>
<tr>
<td>50 lacs in no</td>
<td>9000</td>
<td>2 to 3 lacs</td>
</tr>
<tr>
<td>120 days life</td>
<td>1-2 weeks</td>
<td>Few hours</td>
</tr>
</tbody>
</table>

**Platelets**

- Also called **Thrmbocytes**, help in clotting of blood. Much smaller than RBCs
- **Blood Platelets** occur only in mammals. They are also named as megakaryocytes and having essential role in blood coagulation. They are derived in red bone marrow.

**Serum**: It is the residue blood from, which blood-clotting protein called fibrinogen has been removed. Therefore, this plasma cannot clot and stored in blood banks. Thus, Serum (plasma) **lacks Fibrinogen** (a protein).

**ANTIBODIES**

1. IgM – first to come
2. IgG – longest acting
3. IgE – work in allergic reactions

**BLOOD VESSELS**

- Blood vessels are of three types connected to form one continuous ‘**Closed’ system or a ‘Loop’**. These are **Arteries** – Widest and carry blood from heart elsewhere. Arteries branch out into thinner tubes called **Arterioles** and further into even thinner **Capillaries**.
- The walls of Capillaries are just one cell thick, and so permeable to water, small molecules, dissolved food, waste products, O₂ and CO₂, which are exchanged with tissues surrounding the capillaries. Through this process, liver is in contact with blood and the substances transported thereby. Also Alveoli of lungs picks up and expels air though these.
- Capillaries join to form **Venules** and finally veins and return the blood to the heart.

**BLOOD GROUPS**

- Concept given by Carl **Landsteiner**. It is divided into four groups A, B, AB & O, based on formation of antigens and antibodies (Plasma) in the blood.
- Blood compatibility depends upon chemicals called **agglutinogen** or **antigens** on the surface of the red cells, and chemicals called **agglutinin** or **antibodies** in the plasma. There are two types of antigen: A and B; and two types of antibody: anti-A and anti-B.
- **Antigens** are the **foreign substances** that help production of antibodies.

<table>
<thead>
<tr>
<th>Blood Group</th>
<th>Rbc Antigen</th>
<th>Plasma Antibody</th>
<th>Can Donate Blood To</th>
<th>Can Receive Blood From</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>A</td>
<td>b</td>
<td>A, AB</td>
<td>A &amp; O</td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>a</td>
<td>B, AB</td>
<td>B &amp; O</td>
</tr>
<tr>
<td>AB</td>
<td>A &amp; B</td>
<td>–</td>
<td>Only AB</td>
<td><strong>Universal acceptor</strong> (because no Antibody)</td>
</tr>
<tr>
<td>O</td>
<td>–</td>
<td>a &amp; b</td>
<td><strong>Universal donor</strong> (no antigen)</td>
<td>Only from O</td>
</tr>
</tbody>
</table>

**O⁺ Most Common, AB⁺ Rarest, O⁻ Universal Donor, AB⁻ Universal recipient**

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CLOTTING OF BLOOD

- **Heparin** (antithrombin) prevents blood from clotting inside the body. It is produced naturally inside the body.
- Preservative added to blood in blood bank to prevent clotting is **SodiumCitrate** [Heparin can also be added]. SodiumOxylate/ PotassiumOxylate (Chelating Agents) are also used.
- **Vitamin K** helps in the production of Prothrombin –, which helps in blood clotting.
- Optimum **temperature** for preserving blood in blood bank is 4°C.
- Clotting time of blood for a normal human is 3-4 min.
- **Donatedbloods** are used within 15 days, otherwise RBC gets reduced.
- **Rh Factor**– name taken from Rhesus monkey [experiment done on Rhesus monkey]
  - In persons with Rh Factor, **3rd antigen** besides A & B is also found.
  - Person with this antigen are said to have Rh (+) ve. **90% male** have Rh (+) ve.
  - Person without this antigen are said to have Rh (-) ve. Most Female are Rh (-) ve.

- Rh (-) patients can receive **onetransfusion of Rh (+) blood without harm** because their plasma does not have an antibody to react with the incoming red cells. Subsequent transfusion, however, may be dangerous because first Rh (+) transfusion stimulates the body of the Rh (-) recipient to produce plasma antibody, which agglutinates Rh (+) blood. Rh (-) blood can be transfused into Rh (-) people any number of times without harm.
- If it enters a pregnantwomen’s blood, perhaps through a fault in the placenta, it will produce more antibodies and there is a danger that this will reach the embryo, destroy its red cells, a condition known as **erythroblastosis foetalis**.
- The danger can now be avoided. Rh (-) mother with a new born Rh (+) child can be injected with chemicals, which stop her body producing the Rhesus antibody.

DIGESTION OF FOOD

- **Enzymes** are the **proteins** and share common properties. Enzymes **catalyze** every **chemicalreaction** that occurs in the living system.
- Digestion mainly occurs in stomach and small intestine while absorption of food takes place in small intestine. Egestion of food occurs through large intestine and anus.

Teeth crush food
Enzymes in saliva decompose starch of food
\[
\text{Passes through food pipe or Oesophagus to stomach} \\
\text{Enzymes of gastric juice breakdown proteins} \\
\text{Passes to first part of small intestine called Duodenum Proteins, Carbohydrates and fat of food are further digested by enzymes of Juices from Pancreas and Bile from liver.} \\
\text{Bile makes the emulsion of food, which is absorbed by other part of small intestine i.e. ileum} \\
\text{Now finally it is absorbed by intestinalvilli and sent through blood to different parts of body} \\
\text{The undigested food is sent to large intestine and removed through rectum and anus}
\]
- HCl secreted in stomach leads to a lot of acidic character. To neutralize this, mucus is continuously secreted on walls of stomach.
- Stomach decomposes Protein, LightFat.
- SmallIntestine has an alkaline Medium, it decomposes Carbohydrates, Protein and Fat.
- Pigments present in bile are Bilirubin and Biliverdin.
- Yellow colour of bile is because of these pigments.
- Excess deposition (or) no decomposition of Bilirubin causes Jaundice.
- Yellow colour of urine is because of urochrome.

LIVER

- The liver is found only in vertebrates. Newly absorbed food materials pass through the liver before being transported round the body. An exception is the emulsified fat in the lacteals, which bypasses the liver. The liver stores carbohydrate as glycogen, lipids, mineral salts, vitamins A, D and B_{12}. The liver helps to keep the bloodsugar (glucose) level constant, which in turn helps to keep the osmotic pressure of the blood constant.

<table>
<thead>
<tr>
<th>PLACE OF ACTION</th>
<th>ENZYMES</th>
<th>SUBSTANCE → PRODUCT ATTACKED</th>
<th>FORMED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saliva in Mouth (slightly Acidic)</td>
<td>Amylase</td>
<td>Starch → Maltose (disaccharide)</td>
<td></td>
</tr>
<tr>
<td>Gastric Juice in Stomach (Acidic)</td>
<td>Pepsinogen (inactive) + HCl → pepsin (active)</td>
<td>Protein → Peptones</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prorennin (inactive) + H → rennin (active)</td>
<td>Milk protein (casein) → Paracasein</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lipase</td>
<td>Light fat → Fatty acid and glycerol</td>
<td></td>
</tr>
<tr>
<td>Juices from Pancreas (Alkaline medium)</td>
<td>Amylase</td>
<td>Starch → Maltose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maltase</td>
<td>Maltose → Glucose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lactase</td>
<td>Lactose → Glucose + Galactose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sucrase</td>
<td>Sucrose → Glucose + Fructose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lipase</td>
<td>Fat → Fatty acids + Glycerol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trypsinogen + enterokinase → trypsin (inactive)</td>
<td>Protein → Polypeptides</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chymotrypsinogen + (inactive) Trypsin – chymotrypsin (active)</td>
<td>Protein → Polypeptides</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carboxypeptidase</td>
<td>Polypeptide → Amino acid</td>
<td></td>
</tr>
<tr>
<td>Bile from liver (Alkaline medium)</td>
<td>It activates Lipase to emulsify fat. Makes Fat-Soluble substances water-soluble</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self Juices of the intestine (Alkaline medium)</td>
<td>Erepsin</td>
<td>Peptides → Amino acids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maltase</td>
<td>Maltose → Glucose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lactase</td>
<td>Lactose → Glucose + Galactose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sucrase</td>
<td>Sucrose → Glucose + Fructose</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lipase</td>
<td>Fat → Fatty acids + Glycerol</td>
<td></td>
</tr>
</tbody>
</table>

- Liver manufactures a wide variety of the products. These include most of the plasmaproteins and bile. Bile is stored in the gallbladder and passed into the duodenum to help in digestion. Bile contains salts, which help in emulsification of fats and absorption of food. The liver converts toxins into harmless substances. Many of the toxic by-products of the body’s own metabolism are made harmless in liver.

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• The **small intestine absorbs about 90% of digested food** and 10% of water and minerals. In order to enhance the absorption capacity of the small intestine its epithelial lining is thrown into a number of the folds called **villi**.

• The villi have a rich supply of blood capillaries. Simple sugars and amino acids are absorbed, through the intestinal wall into the blood capillaries. These are then carried to the liver before release into general circulation. The glycerides and fatty acids are transported usually, via the lymph vessels (lacteals) and thoracic duct to the blood.

**BIO-COMMUNICATION**

• For communication, two systems work in organisms- nervous and endocrine. Both of these release chemicals. The chemicals released by **nervous system** act quickly and help body to **respond immediately** and are called **neurotransmitters**. Chemicals released by **endocrine** act **slowly** and are called **hormones**.

• Nervous System consists of-
  1. Central nervous system – comprising brain and spinal cord
  2. Peripheral nervous system – comprising cranial and spinal nerve
  3. Autonomic nervous system– comprising parasympathetic and sympathetic nervous system

**Brain**

• Brain measures 1500 cm³ in volume and 1.36 kg in weight. It is covered with a soft protective membrane called **Menings** and further by **Cranium**. Thus, Cranium is the **Brain Box**.

• **Cerebrum** is largest part of brain and constitutes 2/3rd of it. It consists of two cerebral hemispheres. Cerebrum is the seat of **Consciousness**, Intelligence, Memory, Imagination and Reasoning. Receives impulses from various parts of body and initiates all voluntary activities.

• **Cerebral Cortex** or **Grey Matter** is the outer region of Cerebrum. It consists of Grayish nerve cells, consists of furrows and ridges.

• **Corpus Callosum** is a sheet of nervous tissues at the base of Cerebrum, joining its two lateral lobs. Regulates and coordinates the group movements of muscles as in actions like walking. Here, like Cerebrum, greymatter lie outside and white inside.

• **Hypothalamus** contains many regulatory centres for many physiological activities like feeling-Hunger, Thirst, Sexual etc.

• **Thalamus** is a group of nerve cells acting as a **Relay Station** for incoming and outgoing impulses to Cerebrum.

• **Pons** acts as a bridge that ensures the **coordination** of muscular movements on two sides of the body.

• **Medulla** is the **posterior-most part** of the brain where it merges with **Spinal Cord**. Here nerve fibers of left and right cerebral hemispheres cross each other. It controls the working of heart and respiratory movements.

• **Ventricle** are the cavities that contain a **nutritive fluid** i.e. Cerebrospinal Fluid
Each part of brain has a **specific role to play**:
- **Frontal Lobe** - Voluntary Activities
- **Paretal Lobe** - Sensory like Pain, Touch
- **Temporal Lobe** - Speech, Smell
- **Occipital Lobe** - Vision
- **Hippocampus** - Memory
- **Amygdala** - Anger
- **Cerebellum** - Coordinates group movements of Muscles (Walking)
- **Medulla + Pons** - Involuntary Activities (Breathing, Circulation, Respiration)

**ARAS (Ascending Leticular Activating System)** – Alertness, Wakefulness

If Anterior Damages – Polio, that is why, its called Asymmetrical Placid Paralysis.

If Posterior Damages – Sensory Capacity Lost

**Spinal Cord**

- Like a **tube** in shape, it is the downward extension of brain with same **Menings** as that of brain.
- Outer region – white matter while the inner region is **Grey** Matter
- Two functions:
  1. Conduct **impulses** to and from brain.
  2. Acts as a **ReflexCentre**
- Two Enlargements:
  1. **Cervical** – where nerves to upper limbs originate.
  2. **Lumbar** – where nerves to lower limbs originate.
- It is housed in **NeuralCanal** within Vertebral Column. Running along mid ventral line is **Anterior Median Fissure** and running along mid-Dorsal line is **Posterior Median**
Septum. Running along Centre of Spinal Cord is Central, which is continuation of Ventricles of brain and contains same fluid.

- Posterior Portion known as **Filum Terminale**

**Peripheral Nervous System**

- **Spinal Nerves** are those nerves that emerge from the spinal cord. There are 31 pairs of spinal nerves, all of which are mixed nerves (nerve consisting of both sensory and motor neurons)
- **Cranial Nerves** are those nerves that emerge from the brain. There are 12 pairs of them, some are sensory, some are motor and some are mixed nerves.

**Automatic Nervous System**

- It controls the functions of the internal organs of the body automatically and unconsciously. It mainly controls heartbeat, secretion of glands and size of pupils.
- **Sympathetic** involved in Excitation and **Emotional Stress**, while the **parasympathetic** in **relaxation** of organs particularly during **sleep**.
- **Sensory Neurons** that carry impulse from **sense organs to Central Nervous System**
- **Motor Neurons** carry impulse from Central Nervous System to a muscle/gland.
- **Mixed Nerves** are the nerves, which consist of both Sensory and Motor Neurons.
- **Nerve Impulse** travels at the speed of 50-100 m/s. These are **Electro-Chemical Messages**. Neurons are specialized to conduct them at high speed. Brain and Spinal Cord act as Central Clearing Houses for information furnished and Coordinate Activities of Body.
- **Reflex Action**: No deliberate effort on part of body is involved in any of these actions.
• Synapse is the junction between two neurons where one transmits the signal to other. There is no continuity between the two neurons at the synapse. These transmit the impulse only in one direction i.e. from axon of one neuron to cell body of other and never reverse.

• Basic Unit
  o Nervous System - Neuron
  o Kidney - Nephron

KIDNEYS

| Renal Artery from Aorta feeds blood into the kidney (bean shaped) inside, which, it branches up into millions of capillaries called glomeruli which filter the impure blood through the walls. |
|↓|
| Filtered liquid waste or serum is collected in tiny cups called Bowman’s Capsules and contains glucose, salts and nitrogen compounds |
|↓|
| Sent to bladder from where it is sent to Urethra for excretion |
|↓|
| But before it reaches urethra, it passes through tiny tubes where much of the glucose and useful substances of it are reabsorbed and sent back to the blood in the renal vein |
|↓|
| Renal Vein takes the filtered blood back to the heart for recirculation. This process of filtering out small molecules while keeping larger ones like proteins is called dialysis |

• The glomeruli of the kidneys act as dialysis bags. The dialysis principle is used in construction of artificial kidneys.

• Structural and functional unit of Kidneys is nephron.

HORMONES

• Mixed Glands contains both endocrine and exocrine Islands.

• The special chemicals, which regulate physiological processes in humans, called ‘Hormones’ are produced in special Organs called endocrine glands. These do not have ducts and secrete their Hormones directly to places where they are required.

<table>
<thead>
<tr>
<th>Hormone</th>
<th>Over-Secretion</th>
<th>Under-Secretion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth hormone</td>
<td>Gigantism: persons grow unusually tall.</td>
<td>Dwarfism: person remains unusually small.</td>
</tr>
<tr>
<td>Thyroxine</td>
<td>Increased metabolic rate, leading to lossofweight and increased heart rate</td>
<td>Simplegoiter: In children, physical &amp; mental development is retarded, leading to cretinism. In adults, metabolic rate slows down, leading to mental and physical slowness &amp; weight gain. This condition is called Myxoedema.</td>
</tr>
<tr>
<td>Insulin</td>
<td></td>
<td>Diabetes mellitus: blood sugar level becomes abnormally high- hyperglycemia. Sugar is excreted in the urine. This condition is also referred as glycosuria</td>
</tr>
<tr>
<td>Gluco-</td>
<td>Cushing’ssyndrome:</td>
<td>Addison’sdisease: bronze like pigmentation of</td>
</tr>
</tbody>
</table>
ENDOCRINE GLANDS AND THEIR HORMONES

PITUITARY GLAND – the ‘master gland’
Several of its Hormones activate other glands
However it depends on Hypothalamus for its own activity

<table>
<thead>
<tr>
<th>Posterior Lobe</th>
<th>Antidiuretic or vasopressin- controls re-absorption of water from kidneys</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oxytocin causes uterine contractions and active expulsion of milk during and after birth</td>
</tr>
<tr>
<td>Middle Lobe</td>
<td>Melanophore stimulating hormone: controls growth and development of melanocytes, which gives the skin its colour</td>
</tr>
<tr>
<td>Anterior Lobe</td>
<td>Thyroid Stimulating Hormone influence secreting activities of thyroid</td>
</tr>
<tr>
<td></td>
<td>Growth hormone stimulates growth of the body</td>
</tr>
<tr>
<td></td>
<td>Andreno-corticotrophic hormone influences adrenal cortex &amp; defends body against physiological stress</td>
</tr>
<tr>
<td></td>
<td>Follicle stimulating hormone: controls development and release of sperm, production of female sex hormones, oestrogen and development of follicles in the ovary</td>
</tr>
<tr>
<td></td>
<td>Leutinizing hormone: stimulates production of male sex hormone testosterone, release of ovum and oestrogen</td>
</tr>
<tr>
<td></td>
<td>Leutotrophic hormone or Prolactin: maintains pregnancy, helps in secretion of female sex hormone progesterone and stimulates secretion of milk from the mammary glands</td>
</tr>
</tbody>
</table>

OTHER IMPORTANT GLANDS AND THEIR HORMONES

<table>
<thead>
<tr>
<th>Thyroid</th>
<th>Releases Thyroxin- controls general metabolic rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parathyroid</td>
<td>Releases Parathormone that controls distribution of calcium and phosphates- important for bonedevolution</td>
</tr>
<tr>
<td>Adrenal Cortex</td>
<td>Glucocorticoids: regulates the metabolism of carbohydrates, proteins and fats- helps to overcome stress</td>
</tr>
<tr>
<td></td>
<td>Mineralocorticoids: prevents passage of sodium and water in the urine and increase potassium excretion</td>
</tr>
<tr>
<td>Adrenal Medulla</td>
<td>Releases Adrenaline (epinephrine)- help controlling emergencies</td>
</tr>
<tr>
<td></td>
<td>Releases Noradrenalin (norepinephrine)- help controlling emergencies</td>
</tr>
</tbody>
</table>

EXOCRINE GLANDS, THEIR HORMONES AND FUNCTIONS

<table>
<thead>
<tr>
<th>GLANDS</th>
<th>HORMONES SECRETED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pancreas</td>
<td>α-cells secrete glucagon that elevates blood glucose level</td>
</tr>
<tr>
<td>Testes</td>
<td>β-cells secrete insulin helps to lower blood glucose level</td>
</tr>
<tr>
<td>Testes</td>
<td>Secrete testosterone that controls development and maintenance of male secondary sex characteristics</td>
</tr>
<tr>
<td>Ovaries</td>
<td>Oestrogen controls female secondary sex characteristics like menstrual cycle</td>
</tr>
</tbody>
</table>

Bulk of pancreas constitutes exocrine part called pancreatic acini.
Patches of cells of islets of Langerhans is the endocrine part.
EYE

- **Ciliary Muscles**: These support the Iris & Suspensory Ligaments.
- **Iris**: It is a circular sheet consisting of two sets of muscles. Colour of eye depends upon its colour.
- **Pupil**: It is a circular opening at the centre whose size increases or decreases depending upon Iris. It may be of different colour in different people.
- **Conjunctiva**: Lines the Inner Walls of eyelids and front of the eye.
- **Aqueous Humour**: Small Chamber in front of lens filled with ‘Watery Fluid’. Large posterior chamber behind lens filled with ‘Gelatinous Matter’ called Vitreous Humour.
- **Sclera**: It is white portion of eye. It is tough, opaque & protective. Cornea is the extension of this layer, which is visible to us.
- **Choroid**: It is a thin & black membrane having a network of Capillaries. It not only nourishes eye but also prevents reflection of extra light within the eye by absorbing it. This layer ends up near Iris as Ciliary muscles. Iris is an extension of this layer.
- **Retina**: It is the light sensitive portion of eye. It consists of **Rods & Cones**. Rods are more numerous & found near the periphery of retina. These are sensitive to dim light but insensitive to colour.
- **Black Spot**: Where the optic nerve leaves the eye, retina has no rods and cones. Images falling in this area can’t be perceived.
- **Suspensory Ligaments**: Keep the lens in position and attached to ciliary muscles.
- **Fovea/ Yellow Spot**: The cones are found at the back of retina especially in Fovea. Fovea is a yellow spot. It is the region of most distinct vision responsible for (cones):
  - Bright light vision
  - Colour vision
  - Perception of detail
Important Facts about Eye

- **Selera**: Movement of eyeball in various directions
- **Rods**: 120 million (Rhodopsin); **Cones**: 6 million.
- **Eye**: Most sensitive to Blue-Green light of 5500 A; Respond to lights 4000-7000 A
- **Astigmatism**: person can’t distinguish horizontal & Vertical Lines.
- **Presbyopia**: In Old age wherein lens loses elasticity.
- **Daltonism**: Colour blindness. Ishiara Chart and Snellens Chart are used to detect it
- **Tear**: produced by **Lacrimal Gland**
- **Hypercapnia**: Increase in concentration of CO₂ in blood–Yawning, Asthma, Bronchitis
- **Hypoxia**: Low O₂ in blood – Anaemia (Blood’s Capacity reduces)

Eye and Camera

- **Similarities**: Lens Transparent; Real and Inverted Image; Control of Light.
- **Differences**
  1. Focal Length of eye lens can be changed by Ciliary Muscles
  2. Retina retains image only for 1/20 of a second after removal of object. While in camera, it is permanent.
  3. Retina can be used repeatedly for farming image while film cannot.

RESPIRATION

- Food molecules have **low energy packets** (Glucose). **Respiration** is an Energy Intensifying Process during, which ‘High Energy Packets’ (**ATPs**) are produced.
- **Tissue Respiration** involves three steps –

  | **GLYCOLYSIS** | Breaking of Glucose molecule (6 carbon) into two PyruvicMolecules (3 carbon). **Anaerobic** process (in absence of Oxygen). 2 ATP energy is released |
  | **KREBSCYCLE** | Breaking of Pyruvic Molecules into Acetyl group after entering Mitochondria. **Aerobic** process (in presence of oxygen). 30 ATP energy released |
  | **RESPIRATORYCHAIN** | Series of Enzyme-Coenzyme reactions in the Mitochondria. **Aerobic** process. 6 ATP released. |

  Net gain from Aerobic Phase = 30+6 = 36 ATP
  Net gain from Anaerobic Phase = 2 ATP
  Thus, oxidation of **1 mole of Glucose** provides = **38 ATP** of Energy

- It simply shows that **95%** of energy for our cells to work comes from **Mitochondria** i.e. **Aerobic Energy**. Organisms that live by Anaerobic Respiration can obtain only about 5% of the energy of food they consume.

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LUNGS

- **Pharynx**: Digestive & respiratory tracts cross each other here.
- **Oesophagus**: or Food Pipe – a Collapsible tube.
- **Visceral Pleura**: Thin, Smooth Epithelium.
- **Parietal Pleura**: Inner Lining of Chest.
- **Pleural Cavity**: Containing pleural fluid to lubricate lungs
- **Epiglottis**: A flap of tissue, which closes when food is swallowed.
- **Larynx**: Also called Sound Box that decides voice, pitch etc. Males have large length & short pitch – called Adonis Apple.
- **Bronchi**: One of the two divisions of Trachea entering into a lung.
- **Bronchioles**: Small tubes, part of Bronchi.
- **Right Lung**: contains three lobes, each lobe divided into millions of air sacs called alveoli. Left Lung contains two lobes.
- **Alveoli**: are the structural and functional units of Lungs. Each alveoli has a rich network of Capillaries. During breathing, only a part of air in lungs is renewed.
  - The volume of air passing in and out at normal time is called as **Tidal Volume**, which is about 500 ml each.
  - The amount of air that remains in lungs after maximum expiration is **Residual Volume**, which is about 1200ml.
  - The volume that can be breathed out by a forceful expiration after a forceful inspiration is called **Vital Capacity**, which is about 4800 ml in males and 3100 ml in females. Total Capacity = 4800+1200 = 6000 ml.
  - Thin moist membrane forming an inner lining of alveoli is **Respiratory Surface**.
The exchange of O$_2$ & CO$_2$ between Blood and Lungs takes place through **diffusion**. O$_2$ is at higher concentration in lungs than blood, so diffuses in blood and CO$_2$ is higher in blood than lungs, so diffuses in lungs.

Blood carries most of CO$_2$ from cells to lungs as **Bicarbonate Ions**.

<table>
<thead>
<tr>
<th>Affinity of gases with Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>CO &gt; O$_2$ &gt; CO$_2$</td>
</tr>
</tbody>
</table>

**Hypercapnia**: increase in concentration of CO$_2$ in blood—Yawning, Asthma, Bronchitis

**Hypoxia**: Low O$_2$ in blood – Anemia (Blood’s Capacity reduces).

Respiratory Organs in other animals –
- Earthworms, Frog – Skin.
- Insects – Trachea.
- Spiders/ Scorpions– Book Lung.
- Birds – Air Sacs.
- Prawns, Fish – Gills.

**HEART**

- **Arterial blood** carries oxygen and dissolved food while **venousblood** carries CO$_2$ and waste materials. However, the **Pulmonaryarteryandvein** are exceptions to this.
- All chambers of heart and all blood vessels are internally lined by a layer of smooth, thin flattened cells called **endothelium**, which **prevents clotting** of blood within **CirculatorySystem**.
- **Dorsaorta** is the part of aorta that supplies blood to viscera and legs.
- **Artificialvalves** are either **tissue based** (of pigs, cadaver) or **Mechanical** (Plastics, Ceramics).
- No communication between Left and Right compartments.
- Pumping rate of heart is about **70/ minute**. It may go upto 150/ minute during exercise or excitement.
- Pressure of blood **varies** from one part of the body to another.
- The pressure produced in ventricle when it contracts and empties itself into aorta and pulmonary artery is called **SystolicPressure** and equal to **120 mm** of Hg. Opposite situation, when it fills the blood, the pressure is called **DiastolicPressure** and equals **80 mm** of Hg.
- **Lymph** is another **mediumofcirculation** in body meant for **proteins**, which cannot re-enter the blood capillaries because of their size. It is **lightyellow** and not red because it **does not contain hemoglobin**. Its composition is quite similar to blood plasma. Flows in one direction i.e. tissues to heart. Contains special white cells, for fighting diseases, called **lymphocytes**.
- CO$_2$ of respiration in cells is transported both by **hemoglobin** of the blood and by water, which dissolves it. Expulsion of CO$_2$ occurs in the surface of **lungs**.
- The same circulatory system **transports** both **nutrients** and **water**. So there needs to be a special mechanism of **separating** the **two**, so that only waste is excreted and nutrients are held back. This filtering work is done by **kidneys**. These are in **two** numbers.
JOINTS

- In **hinge joints**, movement occurs in one plane only e.g. knee and elbow joints. In **ball-and-socket joints**, movement occurs in three planes e.g. hip, shoulder.
- Other joints are freely movable called **synovial joints**, example the limb joints
- Muscles are made up of Muscle **Fibre**, which in turn is made up of **Fibrillae** and further of **Filaments**.
- Filament is composed of two parts – **Actin** (thin, light and active part) and **Myosin** (thick and dark). These two are called contractile tissues.
- Smallest bone of our body – **Stapes** (in ear); **Largest bone** – **Femur** (thigh)
- Total no of muscles – 639; Total no of bones – 206
- Physiologically **more active** organ – Liver.
- **Largest endocrine** gland – Thyroid; **Smallest endocrine** gland – Pituitary
- Organ having **min. regeneration** power – Brain.
- Organ having **max. regeneration** power – Liver
**TEETH**

- The **first permanent tooth** appears when a child is about 6 to 7 years old. The last permanent tooth erupts when a person is 17 to 21 years old.
- There are 32 permanent teeth, 16, in each jaw.
- They are larger than the deciduous teeth and consist of four kinds of teeth.
- The **four kinds** are (1) incisors, (2) canines (3) premolars, (4) molars.
- Each jaw has 4 incisors, 2 canines, 4 premolars, and 6 molars.
- **Incisors** are the chief biting teeth. They have a sharp straight cutting edge. In most cases, incisors have one root. The central incisors of the lower jaw are the smallest permanent teeth.
- **Canines** are used with the incisors to bite into food. They are also used to tear off pieces of food. The canine teeth resemble a dog’s fangs. They have a sharp, pointed edge and one root. Canines are also called cupids or dogteeth. The upper canines are sometimes known as eyeteeth.
- **Premolars** are sometimes called *bicuspids* because, in most cases, they have two cusps. The premolars erupt in the place of the deciduous molars.
- **Molars**, like premolars, are used to grind food. They are shaped much like premolars but are larger. The various molars normally have 3-5 cusps and 2-3 roots.
- The permanent molars do not form beneath any of the deciduous teeth. They develop as the jaws grow, which makes space for them. Some adults lack one or more of the third molars, which are commonly called **wisdom teeth**.
- In many cases, jaws do not grow large enough to provide space for wisdom teeth.
- A tooth consists of **four kinds of tissues**—(1) pulp (2) dentine (3) enamel and (4) cementum.
- **Connective tissue** surrounds the root of the tooth. This tissue, called the **periodontal ligament**, holds the root in the socket in the jaw.
Different people think about poverty in different ways. Some people think that poverty is about being able to buy and sell but other people think about getting a fair share of education and health care or about being given respect, and having some influence over what happens in their life. Because of these differences it is useful to think about two main types of poverty - income poverty and non-income poverty.

**Income poverty** happens when a household takes in less than one US dollar per day. This means that people will not have enough food or medicine and they will have poor clothes and houses. Income poverty is due to people not having access to money or other assets. The best way to reduce income poverty is to encourage and support the development of effective businesses (small, medium and large) which make good use of our natural resources and talents to create wealth and jobs.

**Non income poverty** happens when people may have a little bit of money but otherwise the quality of their life is not good. They do not have access to affordable social and physical services (schooling, health care, medicines, safe water, good sanitation, and good transport). The best way to reduce non-income poverty is to make sure that people have access to affordable and good quality social services and infrastructure, that they feel secure in their homes, that they trust the authorities and, if they are vulnerable, that there are safety net programmes to protect them. Poverty is the deprivation of common necessities such as food, clothing, shelter and safe drinking water, all of which determine our quality of life. It may also include the lack of access to opportunities such as education and employment which aid the escape from poverty and/or allow one to enjoy the respect of fellow citizens. This is the World Bank’s definition of poverty:

Poverty is an income level below some minimum level necessary to meet basic needs. This minimum level is usually called the “poverty line”. Definition agreed by the World Summit on Social Development in Copenhagen in 1995:

- Poverty is a condition characterized by severe deprivation of basic human needs, including food, safe drinking water, sanitation facilities, health, shelter, education and information. It depends not only on income but also on access to services.
- It includes a lack of income and productive resources to ensure sustainable livelihoods; hunger and malnutrition; ill health; limited or lack of access to education and other basic services; increased morbidity and mortality from illness; homelessness and inadequate housing; unsafe environments and social discrimination and exclusion.
- It is also characterized by lack of participation in decision making and in civil, social and cultural life.
- It occurs in all countries: as mass poverty in many developing countries, pockets of poverty amid wealth in developed countries, loss of livelihoods as a result of economic recession, sudden poverty as a result of disaster or conflict, the poverty of low-wage workers, and the utter destitution of people who fall outside family support systems, social institutions and safety nets.
Poverty has many dimensions

- A **material** dimension (food, clothing etc.)
- A **psychological** dimension (respect, self-esteem, trust, fear)
- A **political** dimension (power, representation) and
- A **social** dimension (education, health, work).

The **latter 2 dimensions** point to the fact that poverty, while often suffered alone and in solitude, requires **social cooperation** if it is to be eliminated. The **material, political and social dimensions can, to some extent, be measured**, which is necessary if we want to have an idea of the importance of the problem, its evolution over time, and the effectiveness and success of policy measures aimed to combat poverty. One can measure nutrition, housing, income, access to certain services, standard of living, quality of life etc.

The **psychological dimension** is much more difficult to measure, but no less important. This dimension also shows us that poverty is not just a matter of the current state one is in, and the resources one has or doesn’t have. It is also about vulnerability, about the **future**, about trust and fear. Poverty means comparing yourself to others, feeling like a failure, humiliated, shameful etc. The **insufficiency of resources to meet basic needs**, such as nutrition, shelter, health and education can result in following **material symptoms of poverty**:

- Low income or consumption levels.
- Low average calorie intake levels.
- High infant mortality rates.
- Low life expectancy rates.
- High illiteracy rates.
- High unemployment.
- Widespread diseases, especially curable ones.
- Famine or high risk of famine.
- High rates of economic migration.

Apart from these absolute monetary and non-monetary kinds of poverty, there is also **relative poverty**: people compare themselves to others, mostly others who are relatively close by and better off. This inequality of income or consumption can result in the following **psychological symptoms of poverty**:

- Feelings of loss of dignity
- Low self-esteem
- Feelings of relative powerlessness
- Feelings of lack of participation in culture and politics
- Feelings of discrimination and resentment

A third kind of poverty is **vulnerability**, actual or perceived risk of future poverty. This vulnerability can result in following **psychological symptoms** of poverty:

- Fear, stress
- Feelings of insecurity
- Irrational precaution measures
- Family planning decisions
- Migration

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Poverty is usually measured as either **absolute** or **relative poverty** (the latter being actually an index of **income inequality**). Absolute poverty refers to a **set standard** which is consistent over time and between countries. The **World Bank** defines **extreme poverty** as living on **less than US $1.25 (PPP) per day**, and **moderate poverty** as **less than $2 a day** (but note that a person or family with access to subsistence resources, e.g. subsistence farmers, may have a low cash income without a correspondingly low standard of living- they are not living "on" their cash income but using it as a top up). It estimates that "in 2010, 1.2 billion people had consumption levels below $1 a day and 2.7 billion lived on less than $2 a day". Although the decline was slowed by the global financial crisis, the number of people living in extreme poverty is expected to fall to around 900 million by 2015, even as the population living in developing countries rises to 5.8 billion. Still, an additional 1.1 billion people will live on less than $2 a day.

Global poverty has **declined significantly over the last few decades**. The number of people living on less than $1.25 a day (referred to as extreme poverty) has halved since 1990, reaching around 1 billion people in 2011, representing 14.5 percent of the entire global population. Poverty has been **more prevalent in Sub-Saharan Africa and South Asia** than in other developing regions, accounting for about 80 percent of the global poor. According to the 2011 estimates, almost three-fifths of the world’s extreme poor are concentrated in just **five countries**: Bangladesh, China, the Democratic Republic of Congo, India, and Nigeria. Adding another five countries (Ethiopia, Indonesia, Pakistan, Madagascar, and Tanzania) would encompass just over 70 percent of the extreme poor.

In **1990**, nearly half of the population in the developing world lived on **less than $1.25 a day**; that proportion dropped to 14 per cent in 2015. Globally, the number of people living in extreme poverty has declined by more than half, falling from 1.9 billion in 1990 to 836 million in **2015**. Most progress has occurred since 2000. The number of people in the **working middle class**—living on more than $4 a day—has almost tripled between **1991 and 2015**. This group now makes up half the workforce in the developing regions, up from just 18 per cent in 1991.

**6 million children die of hunger every year** - 17,000 every day. The proportion of **undernourished people in the developing regions** has fallen by almost half since 1990, from 23.3 per cent in 1990–1992 to 12.9 per cent in 2014–2015. The global under-five mortality rate has declined by more than half, dropping from 90 to 43 deaths per 1,000 live births between 1990 and 2015. Despite population growth in the developing regions, the **number of deaths of children under five** has declined from 12.7 million in 1990 to almost 6 million in 2015 globally. Since the early 1990s, the rate of reduction of under-five mortality has more than tripled globally.

**Selective Primary Health Care** has been shown to be one of the most efficient ways in which absolute poverty can be eradicated in comparison to Primary Health Care, which has a target of treating diseases. **Disease prevention** is the focus of Selective Primary Health Care, which puts this system on higher grounds in terms of preventing malnutrition and illness, thus putting an end to Absolute Poverty.

The **proportion of the developing world’s population living in extreme economic poverty** fell from 28% in 1990 to 22% in 2012. Most of this improvement has occurred in **East and South Asia**. In East Asia the World Bank reported that "The poverty headcount rate at
the $2-a-day level is estimated to have fallen to about 25% (in 2012), down from 69% in 1990. Globally, extreme poverty has declined significantly. In 2011, one billion people—14.5 percent of the world’s population—could be classified as extremely poor, down from 1.25 billion—or 18.6 percent of the world’s population—in 2008.

In the early 1990s some of the transition economies of Eastern Europe and Central Asia experienced a sharp drop in income. As a result poverty rates also increased although in subsequent years as per capita incomes recovered the poverty rate dropped from 31.4% of the population to 19.6%. World Bank data shows that the percentage of the population living in households with consumption or income per person below the poverty line has decreased in each region of the world since 1990:

<table>
<thead>
<tr>
<th>Region</th>
<th>1990</th>
<th>2002</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Asia and Pacific</td>
<td>15.40%</td>
<td>12.33%</td>
<td>12.5%</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>3.60%</td>
<td>1.28%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Latin America and the Caribbean</td>
<td>9.62%</td>
<td>9.08%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>2.08%</td>
<td>1.69%</td>
<td>2.4%</td>
</tr>
<tr>
<td>South Asia</td>
<td>35.04%</td>
<td>33.44%</td>
<td>31.0%</td>
</tr>
<tr>
<td>Sub-Saharan Africa</td>
<td>46.07%</td>
<td>42.63%</td>
<td>48.5%</td>
</tr>
</tbody>
</table>

However, there are various criticisms of these measurements. Although "a clear trend decline in the percentage of people who are absolutely poor is evident ... with uneven progress across regions...the developing world outside China and India has seen little or no sustained progress in reducing the number of poor". The World Bank report "Global Economic Prospects" predicts that in 2030 the number living on less than the equivalent of $1 a day will fall by half, to about 550 million.

Much of Africa will have difficulty keeping pace with the rest of the developing world and even if conditions there improve in absolute terms, the report warns, Africa in 2030 will be home to a larger proportion of the world’s poorest people than it is today. The reason for the faster economic growth in East Asia and South Asia is a result of their relative backwardness, in a phenomenon called the convergence hypothesis or the conditional convergence hypothesis. Because these economies began modernizing later than richer nations, they could benefit from simply adapting technological advances, which enable higher levels of productivity that had been invented over centuries in richer nations.

Relative Poverty

Relative poverty views poverty as socially defined and dependent on social context, hence relative poverty is a measure of income inequality. Usually, relative poverty is measured as the percentage of population with income less than some fixed proportion of median income. There are several other different income inequality metrics, for example the Gini coefficient or the Theil Index.

Relative poverty measures are used as official poverty rates in several developed countries. As such these poverty statistics measure inequality rather than material deprivation or hardship. The measurements are usually based on a person’s yearly income and frequently take no account of total wealth. The main poverty line used in the OECD and the

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European Union is based on "economic distance", a level of income set at 60% of the median household income.

Ultra-poverty, a term apparently coined by Michael Lipton, connotes being amongst poorest of the poor in low-income countries. Lipton defined ultra-poverty as receiving less than 80% of minimum caloric intake whilst spending more than 80% of income on food. Alternatively, a 2007 report issued by International Food Policy Research Institute defined ultra-poverty as living on less than 54 cents per day. The depth of poverty should be measured. This depth is the distance to the poverty line. Just below the poverty line or way below makes a lot of difference.

MEASURES OF POVERTY

Not all of the kinds of poverty can be easily measured. Some perhaps cannot be measured at all. Even the apparently easy ones, such as infant mortality rates or income levels, can and do pose problems, such as the availability of data (poor countries often do not have the institutional resources to generate high quality statistics), international comparability of data, definitions of data etc. However, it is important to measure the levels of poverty and their evolution as good as we can. Only if we have data can we judge the effectiveness of specific programs to alleviate specific symptoms of poverty.

Poverty is not just a philosophical problem because depending on the definition of poverty we use, our measurements will be radically different (even with an identical definition, measurements will be different because of different measurement methods). Roughly, 6 different parameters for measuring poverty are used:

- insufficient income
- insufficient consumption spending
- insufficient caloric intake
- food consumption spending above a certain share of total spending
- certain health indicators such as stunting, malnutrition, infant mortality rates or life expectancy
- certain education indicators such as illiteracy

None of these parameters is ideal, although the first and second on the list are the most widely used. A few words about the advantages and disadvantages of each are as follows:

1. **Income**: e.g. "$1 a day" level, which is the World Bank definition of extreme poverty level; moderate poverty is less than $2 a day; these levels are, of course, expressed in purchasing power parity. In developed countries, income is a common definition because it’s easy to measure. Most people in developed countries earn a salary or get their income from sources that are easy to estimate (interest payments, the value of houses, stock market returns etc.). They don’t depend for their income on the climate, crop yields etc. Moreover, developed countries have good tax data which can be used to calculate incomes.

In developing countries, however, income data tend to be underestimated because it’s difficult to value the income of farmers and shepherds. Farmers’ incomes fluctuate heavily with climate conditions, crop yields etc. Another disadvantage is that people are generally reluctant to disclose their full income. Some income may have been hidden from the tax administration or may have been earned from illegal activity such as corruption, smuggling,
drug trade, prostitution, theft etc. For this reason, using income to estimate poverty means overestimating it.

2 **Gross Domestic Product** (GDP, or total annual country income) per capita or per citizen is another measure of poverty. However, the problem with this measure is that it tells us about average and not how it is distributed over the spectrum. For example, in India, the people below poverty line are much below the average GDP per capita.

3 **Consumption:** The main advantage of using consumption rather than income to measure poverty is that consumption is *much more stable over the year and over a lifetime*. This is even truer in the case of farmers who depend on the weather for their income and hence have a more volatile income. As farmers are often relatively poor, this issue is all the more salient for poverty measurement. This is called the **lifecycle hypothesis**. Another advantage of using consumption is that people aren’t as reticent to talk about it as they are about certain parts of their income.

:: However, consumption of goods like **durable goods and housing** is difficult to measure because it’s difficult to value them. For example, if a household owns a house, it is difficult to estimate what it would cost to rent that particular house and add this to the total consumption of that household. Then the same has to be done for cars etc.

**Lifecycle Hypothesis**

:: Another difficulty in measuring consumption is that in developing countries households consume a lot of what they themselves produce on the family farm. This as well is often difficult to value correctly. And finally, **different people have different consumption needs**, depending of their age, health, work etc. It’s not clear how these different needs are taken into account when consumption is measured and used as an indicator of poverty.

4 **Calorie intake:** the problem with this is that **different people need different amounts** of calories (depending on their type of work, their age, health etc.), and that it isn’t very easy to measure how many calories people actually consume. An average adult male has to eat food representing **approximately 2000-2500 calories** per day in order to sustain the human body.
5 **Food spending as a fraction of total spending:** here the problem is that if we say people who spend more than x% of their total spending on food are considered poor, we still have to factor in **relative food prices**.

6 **Stunting as an indicator of malnutrition and hence of poverty:** stunting (height for age) is a notoriously difficult thing to measure.

7 Another measure of poverty is work out the **parameters related to education** such number of years in education, Literacy levels, drop-out rates etc.

Another issue with poverty measurement is that people may have comparable incomes or even consumption patterns, but they may face very different social or environmental conditions: an annual income of $500 may be adequate for people living in a rural environment with a temperate climate where housing is cheap, heating isn’t necessary and subsistence farming is relatively easy. However, the same income can mean deep poverty for a family living in a crowded city on the edge of a desert. The presence or absence of public goods such as quality schools, roads, running water and electricity also makes a lot of difference, but poverty measurement usually does not take these goods into account.

For other types of poverty such as income differences, traditionally used measure is the Gini coefficient although most symptoms of this kind of poverty, as well as social, psychological poverty, are intangible. The difficulties of aggregating the different available measures, together with the difficulties of measuring other indicators, result in the impossibility to establish a single, binary poverty indicator, “are you poor or not“, yes or no type of indicator. As a result, many scientists and politicians use a simplified rule to establish poverty, for example the “1 $ a day” rule, of some other kind of poverty level expressed quantitatively. It is also important to measure the time frame of poverty, i.e. incidental or chronic poverty. This difference should be taken into account when devising policies.

**POVERTY ESTIMATES IN INDIA**

Poverty in India is still rampant, with the nation estimated to have a third of the world's poor, despite an impressive economic growth. In 2011, World Bank stated, 32.7% of the total Indian people fall below the international poverty line of US$ 1.25 per day (PPP) while 68.7% live on less than US$ 2 per day. According to 2010 data from the United Nations Development Programme, an estimated 37.2% of Indians live below the country's national poverty line.

The latest UNICEF data shows that one in three malnourished children worldwide are found in India, whilst 42 percent of the nation's children under five years of age are underweight. The 2011 Global Hunger Index (GHI) Report places India amongst the three countries where the GHI between 1996 and 2011 went up from 22.9 to 23.7, while 78 out of the 81 developing countries studied, including Pakistan, Nepal, Bangladesh, Vietnam, Kenya, Nigeria, Myanmar, Uganda, Zimbabwe and Malawi, succeeded in improving hunger condition.

According to the definition by Planning Commission, poverty line is drawn with an intake of 2155 calories in rural areas and 2090 calories in urban areas. If a person is unable to get that much level of calories, then he/ she is considered as being below poverty line. The Planning Commission in March 2014 released the latest poverty estimates for the country showing a decline in the incidence of poverty from 38.2% to 29.5% and stating that anyone with

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a daily consumption expenditure of Rs. 47 and Rs. 32 in urban and rural areas respectively is above the poverty line.

- One-third of India’s women and children under the age of five are underweight and face micronutrient deficiencies. The country, however, is making progress against hunger on the Global Hunger Index (GHI), but is still trailing behind countries like Thailand, China, Ghana, Iraq, Sri Lanka and Nepal.
- Between 2005 and 2014, the prevalence of underweight children under the age of five fell from 43.5% to 30.7%. This helped improve the severity of the hunger situation in India from alarming to serious. However, India remains home to the largest number of chronically malnourished and stunted children under five.
- Under nutrition is substantially higher in rural than in urban areas. Short birth intervals are associated with higher levels of under nutrition.
- Under nutrition is more common for children of mothers who are undernourished themselves (i.e. body mass index below 18.5) than for children whose mothers are not undernourished.
- Children from scheduled tribes have the poorest nutritional status on almost every measure and the high prevalence of wasting in this group (28 per cent) is of particular concern.
- India has the highest number of low birth weight babies per year at an estimated 7.4 million.

Other Poverty Estimates For India

Income inequality in India is increasing, with a Gini coefficient of 32.5 in 1999-2000. Although the Indian economy has grown steadily over the last two decades, its growth has been uneven when comparing different social groups, economic groups, geographic regions, and rural and urban areas. Poverty rates in rural Orissa (43%) and rural Bihar (41%) are among the world’s most extreme. A study by the Oxford Poverty and Human Development Initiative using a Multi-dimensional Poverty Index (MPI) found that there were 645 million poor living under the MPI in India, 421 million of whom are concentrated in eight North India and East India states of Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, Uttar Pradesh and West Bengal. This number is higher than the 410 million poor living in the 26 poorest African nations.

A report by the state-run National Commission for Enterprises in the Unorganized Sector (NCEUS) found that 77% of Indians, or 836 million people, lived on less than 20 rupees (approximately US$ 0.50 nominal; US$ 2 PPP) per day. It is relevant to view poverty in India on a PPP basis as food etc. are purchased in Rupees. According to a recently released World Bank report, India is on track to meet its poverty reduction goals. However by 2015, an estimated 53 million people will still live in extreme poverty and 23.6% of the population will still live under US$ 1.25 per day. This number is expected to reduce to 20.3% or 268 million people by 2020.

PROBLEMS WITH EXISTING OFFICIAL POVERTY LINES

The existing all-India rural and urban official poverty lines were originally defined in terms of Per Capita Total Consumer Expenditure (PCTE) at 1973-74 market prices and adjusted over time and across states for changes in prices keeping unchanged the original 1973-74 rural and urban underlying all-India reference Poverty Line Baskets (PLB) of goods and

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services. These all-India rural and urban PLBs were derived for rural and urban areas separately, anchored in the per capita calorie norms of 2400 (rural) and 2100 (urban) per day.

However, they covered the consumption of all the goods and services incorporated in the rural and urban reference poverty line baskets. Three major criticisms of these poverty lines have been commonly aired. One, the consumption patterns underlying the rural and urban PLBs remained tied down to those observed more than three decades ago in 1973-74 and hence had become outdated. Two, crude price adjustment for prices was leading to implausible results such as proportion of total urban population below poverty line being higher than its rural counterpart in certain major states. Three, the earlier poverty lines assumed that basic social services of health and education would be supplied by the state and hence, although private expenditure on education and health was covered in the base year 1973-74, no account was taken of either the increase in the proportion of these in total expenditure over time or of their proper representation in available price indices.

CAUSES OF POVERTY IN INDIA

- **Caste system**: Dalits constitute the bulk of poor and unemployed. Casteism is still widespread in rural areas, and continues to segregate Dalits despite the steady rise and empowerment of the Dalits through social reforms and the implementation of reservations in employment and benefits. Caste explanations of poverty, however, fail to account for the urban/rural divide. However, using the UN definition of poverty, 65% of rural forward castes are below the poverty line.

- **British era**: Jawaharlal Nehru claimed "A significant fact which stands out is that those parts of India which have been longest under British rule are the poorest today." The Indian economy was purposely and severely de-industrialized, especially in the areas of textiles and metal-working, through colonial privatizations, regulations, tariffs on manufactured or refined Indian goods, taxes, and direct seizures.

- **India's economic policies**: In 1947, the average annual income in India was US$ 439, compared with US$ 619 for China. By 1999, the numbers were US$ 1,818 and US$ 3,259 respectively and by 2014 the numbers were US$ 1581 and US$ 7,590 respectively. Thus India was left far behind due to its economic policies especially the License Raj and the accompanying red tape that were required to set up and run business in India. The License Raj was a result of India's decision to have a planned economy, where all aspects of the economy are controlled by the state and licenses were given to a select few. Corruption flourished under this system. Up to 80 agencies had to be satisfied before a firm could be granted a license to produce and the state would decide what was produced, how much, at what price and what sources of capital were used.

- **Over-reliance on agriculture**: There is a surplus of labour in agriculture. While services and industry have grown at double-digit figures, agriculture growth rate has dropped from 4.8% to 2%. About 60% of the population depends on agriculture whereas the contribution of agriculture to the GDP is about 18% as compared to Industry (24.2%) and Services (57.9%).

- **High population growth rate**, although demographers generally agree that this is a symptom rather than cause of poverty. Its population growth rate is 1.2%, ranking 94th in the world.

- **High Illiteracy** (about 25% of adult population) as per 2011 census.

- **Regional inequalities**
Causes of Rural Poverty in India

- Rapid Population Growth & Excessive Population Pressure on Agriculture
- Lack of Capital
- Lack of Alternate Employment Opportunities Other than Agriculture
- Illiteracy & Child Marriage Tradition
- Regional Disparities
- Joint Family System
- Lack of proper implementation of PDS

Causes of Urban Poverty in India

- Migration of Rural Youth towards Cities
- Lack of Vocational Education / Training
- Limited Job Opportunities of Employment in the Cities
- Rapid increase in Population
- Lack of Housing Facilities
- No proper Implementation of Public Distribution System

LIBERALIZATION POLICIES AND THEIR EFFECTS

75% of poor are in rural India. There is a viewpoint that holds that the economic reforms initiated in the early 1990s are responsible for the collapse of rural economies and the agrarian crisis currently underway. P Sainath describes that the level of inequality has risen to extraordinary levels, when at the same time; hunger in India has reached its highest level in decades. He also points out that rural economies across India have collapsed, or on the verge of collapse due to the neo-liberal policies of the government of India since the 1990s.

The human cost of the "liberalization" has been very high. The huge wave of farm suicides in Indian rural population from 1997 to 2015, which exceeded 200,000, according to official statistics. Commentators have faulted the policies pursued by the government, which, according to Sainath, resulted in a very high portion of rural households getting into the debt cycle, resulting in a very high number of farm suicides. Government policies encouraging farmers to switch to cash crops, in place of traditional food crops, has resulted in an extraordinary increase in farm input costs, while market forces determined the price of the cash crop. Sainath points out that a disproportionately large number of affected farm suicides have occurred with cash crops, because with food crops such as rice, even if the price falls, there is food left to survive on.

He also points out that inequality has reached one of the highest rates India has ever seen. During the time when Public investment in agriculture shrank to 2% of the GDP, the nation suffered the worst agrarian crisis in decades, the same time, as India became the nation of second highest number of dollar billionaires. Sainath argues that Farm incomes have collapsed. Hunger has grown very fast. Non-farm employment has stagnated. Only the National Rural Employment Guarantee Act has brought some limited relief in recent times. Millions move towards towns and cities where, too, there are few jobs to be found.
SUCCESS OF EFFORTS TO ALLEVIATE POVERTY

Since the early 1950s, government has initiated, sustained, and refined various planning schemes to help the poor attain self-sufficiency in food production. Probably the most important initiative has been the supply of basic commodities, particularly food at controlled prices, available throughout the country as poor spend about 80 percent of their income on food.

Eradication of poverty in India is generally only considered to be a long-term goal. Poverty alleviation is expected to make better progress in the next 50 years than in the past, as a trickle-down effect of the growing middle class. Increasing stress on education, reservation of seats in government jobs and the increasing empowerment of women and the economically weaker sections of society, are also expected to contribute to the alleviation of poverty. It is incorrect to say that all poverty reduction programmes have failed. The growth of the middle class (which was virtually non-existent when India became a free nation in August 1947) indicates that economic prosperity has indeed been very impressive in India, but the distribution of wealth is not at all even.

CONTROVERSY OVER EXTENT OF POVERTY REDUCTION

While total overall poverty in India has declined, the extent of poverty reduction is often debated. With the rapid economic growth that India is experiencing, it is likely that a significant fraction of the rural population will continue to migrate toward cities, making the issue of urban poverty more significant in the long run.

While absolute poverty may not have increased India remains at an abysmal rank in the UN Human Development Index. India in recent years remained at lowest position in the index compared to last 10 years. It can even be argued that the situation has become worse on critical indicators of overall well-being such as the number of people who are undernourished (India has the highest number of malnourished people, at 230 million), and the number of malnourished children (43% of India's children under 5 are underweight (BMI<18.5), the highest in the world) as of 2008.

Persistence of malnutrition among children

The World Bank, citing estimates made by the World Health Organization, states that "About 49% of the world's underweight children, 34% of the world's stunted children and 46% of the world's wasted children, live in India." The World Bank also noted that "while poverty is often the underlying cause of malnutrition in children, the superior economic growth experienced by South Asian countries compared to those in Sub-Saharan Africa, has not translated into superior nutritional status for the South Asian child". A special commission to the Supreme Court has noted that the child malnutrition rate in India is twice as great as sub-Saharan Africa.

TENDULKAR COMMITTEE REPORT

There has been a growing concern on the official estimates of poverty. In view of this, Planning Commission set up an expert group under the chairmanship of Suresh Tendulkar to examine the issue and suggest a new poverty line and estimates. Following are the salient features of the proposed poverty lines:

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The expert group has also taken a conscious decision to move away from anchoring the poverty lines to a calorie intake norm in view of the fact that calorie consumption calculated by converting the consumed quantities in the last 30 days as collected by NSS has not been found to be well correlated with nutritional outcomes observed from other specialized surveys either over time or across space (i.e. between states or rural and urban areas).

NSSO has decided to shift to Mixed Reference Period (MRP) for all its consumption surveys in future, namely, 365-days for low frequency items (clothing, footwear, durables, education and institutional health expenditure) and 30-days for all the remaining items. This change captures the household consumption expenditure of the poor households on low-frequency items of purchase more satisfactorily than the earlier 30-day recall period. The Expert Group decided to adopt the MRP-based estimates of consumption expenditure as the basis for future poverty lines as against previous practice of using Uniform Reference Period estimates of consumption expenditure.

The new poverty lines have been arrived at after assessing the adequacy of private household expenditure on education and health, while the earlier calorie-anchored poverty lines did not explicitly account for these.

It may be noted that although those near the poverty line in urban areas continue to afford the original calorie norm of 2100 per capita per day, their actual observed calorie intake from 61st Round of NSS of is 1776 calories per capita. This actual intake is very close to the revised calorie intake norm of 1770 per capita per day currently recommended for India by the Food and Agriculture Organization (FAO). Actual observed calorie intake of those near the new poverty line in rural areas (1999 calories per capita) is higher than the FAO norm.

Separate allowance for private expenditure on transport and conveyance has been made in the recommended poverty lines. For rent and conveyance, actual expenditure share for these items were used to adjust the poverty line for each state.

ENTRENCHED FACTORS ASSOCIATED WITH POVERTY

- **Scarcity of basic needs**: Rise in the costs of living makes poor people less able to afford items. Poor people spend a greater portion of their budgets on food than richer people. As a result, poor households and those near the poverty threshold can be particularly vulnerable to increases in food prices.

- **Third World debt**: Third World debt plays a large part in international inequality and poverty. The World Bank and the IMF, as primary holders of Third World debt, attach structural adjustment conditionalities to loans. These conditionalities generally push for economic liberalization, including reducing barriers to trade, elimination of state subsidies, Union busting, privatization of state assets and services etc. As a result of such policies, developing countries need to spend a large proportion of their budgets to repay foreign debt.

- **Barriers to opportunities**: lack of economic freedom inhibits entrepreneurship among the poor. New enterprises and foreign investment can be driven away by the results of inefficient institutions, notably corruption, weak rule of law and excessive bureaucratic burdens. Lack of financial services, as a result of restrictive regulations, such as the requirements for banking licenses, makes it hard for even smaller micro-savings programs to reach the poor. In India, businesses had to bribe government officials even for routine activities, which were, in effect, a tax on business. Lack of opportunities can further be caused by the failure of governments to provide essential infrastructure.

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- **Colonial Histories**: One of the most important barriers to development in poor countries is lack of uniform, basic infrastructure, such as roads and means of communication. Some development scholars have identified colonial history as an important contributor to the current situation. In most countries with a history of colonization, the colonizers developed local economies to facilitate the expropriation of resources for their own economic growth and development.

- **Centralization of Power**: In many developing countries, political power is disproportionately centralized. Instead of having a network of political representatives distributed equally throughout society, in centralized systems of governance one major party, politician, or region is responsible for decision-making throughout the country. This often causes development problems. For example, in these situations politicians make decisions about places that they are unfamiliar with, lacking sufficient knowledge about the context to design effective and appropriate policies and programs.

- **Corruption**: Corruption often accompanies centralization of power, when leaders are not accountable to those they serve. Most directly, corruption inhibits development when leaders help themselves to money that would otherwise be used for development projects. In other cases, leaders reward political support by providing services to their followers.

- **Warfare**: Warfare contributes to more entrenched poverty by diverting scarce resources from fighting poverty to maintaining a military. Take, for example, the cases of Ethiopia and Eritrea. The most recent conflict over borders between the two countries erupted into war when both countries faced severe food shortages due to drought.

- **Environmental degradation**: Awareness and concern about environmental degradation have grown around the world over the last few decades, and are currently shared by people of different nations, cultures, religions, and social classes. However, the negative impacts of environmental degradation are disproportionately felt by the poor. Throughout the developing world, the poor often rely on natural resources to meet their basic needs through agricultural production and gathering resources essential for household maintenance, such as water, firewood, and wild plants for consumption and medicine. Thus, the depletion and contamination of water sources directly threaten the livelihoods of those who depend on them.

- **Social Inequality**: One of the more entrenched sources of poverty throughout the world is social inequality that stems from cultural ideas about the relative worth of different genders, races, ethnic groups, and social classes. Ascribed inequality works by placing individuals in different social categories at birth, often based on religious, ethnic, or 'racial' characteristics. In South African history, apartheid laws defined a binary caste system that assigned different rights (or lack thereof) and social spaces to Whites and Blacks, using skin color to automatically determine the opportunities available to individuals in each group.

**EFFECTS OF POVERTY**

:: The effects of poverty may also be causes, thus creating a "poverty cycle" operating across multiple levels, individual, local, national and global.

**Health**

- **Hunger, disease, and less education** describe a person in poverty. One third of deaths - some 18 million people a year or 50,000 per day - are due to poverty-related causes: in total 270 million people, most of them women and children, have died as a result of poverty since 1990. Those living in poverty suffer disproportionately from hunger or even starvation and disease. Those living in poverty suffer lower life expectancy.
According to the World Health Organization, hunger and malnutrition are the single gravest threats to the world's public health and malnutrition is by far the biggest contributor to child mortality, present in half of all cases.

Women who have born children into poverty may not be able to nourish the children efficiently and provide adequate care in infancy. The children may also suffer from disease that has been passed down to the child through birth. Asthma and rickets are common problems children acquire when born into poverty.

Education

There is a high risk of educational underachievement for children who are from low-income housing circumstances.

This often is a process that begins in primary school for some less fortunate children. For children with low resources, the risk factors are similar to excuses such as juvenile delinquency rates, higher levels of teenage pregnancy, and the economic dependency upon their low income parent or parents.

Poverty often drastically affects children's success in school. A child's "home activities, preferences, mannerisms" must align with the world and in the cases that they do not these students are at a disadvantage in the school and most importantly the classroom. Children who live at or below the poverty level will have far less success educationally than children who live above the poverty line.

Poor children have a great deal less healthcare and this ultimately results in many absences from the academic year. Additionally, poor children are much more likely to suffer from hunger, fatigue, irritability, headaches, ear infections, flu, and colds. These illnesses could potentially restrict a child or student's focus and concentration.

Housing

Slum-dwellers, who make up a third of the world's urban population, live in poverty no better, if not worse, than rural people, who are the traditional focus of the poverty in the developing world, according to a report by the United Nations.

Most of the children living in institutions around the world have a surviving parent or close relative, and they most commonly entered orphanages because of poverty.

Violence

According to a UN report on modern slavery, the most common form of human trafficking is for prostitution, which is largely fueled by poverty.

In Zimbabwe, a number of girls are turning to prostitution for food to survive because of the increasing poverty.

Also there are also many effects of poverty closer to home. For example after dropping out of school children may turn to violence as a source of income i.e mugging people, betting during street fights etc.

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ADDRESSING THE UNDERLYING CAUSES OF POVERTY

:: Building a more widespread commitment to overcoming poverty is an essential first step in overcoming poverty, and actions to address this are discussed below.

- **Share the benefits of economic growth** through an emphasis on more widespread employment: The phenomenon of jobless economic growth that increases income inequalities and generates too few jobs for low income groups poses a serious threat to the well-being of many nations, both North and South. **Government policies** should consider not only aggregate economic impact but also the distribution of employment. **Socially responsible venture capital and microcredit initiatives** can foster employment-generating businesses that complement the local culture and environment.

- **Root out corruption**, which harms society as a whole: Corruption, both in government and business, places heavy cost on society. Businesses should enact, publicize and follow codes of conduct banning corruption on the part of their staff and directors. Citizens must demand greater transparency on the part of both government and the corporate sector and create reform movements where needed.

- **Broaden access to education and technology** among marginalized groups, and especially among girls and women: The educational attainment of women has strong bearing on the well-being of their families, and efforts to improve education for women and girls must be strengthened. At the same time, steps should be taken to ensure that the current revolution in information technology benefits marginalized groups. This must begin in school.

- Improve **government capacity to provide universal access** to essential goods and services, including potable water, affordable food, primary health care, education, housing and **other social services**: Governments around the world have made commitments to this through the 20/20 Initiative, which calls for 20% of national budgets and 20% of foreign aid to be spent on human services. But raising adequate resources through effective taxation and other mechanisms is often politically difficult. New mechanisms for **public policy dialogue** that enable citizens of all classes to recognize the benefit of universal access to key services must be put in place. Nonprofit groups and even corporations can provide essential support here, helping articulate a vision of a healthy society. These nongovernmental actors can also help in the actual provision of services.

- **Investments in human capital** in the form of health, is needed for economic growth. Nations do not necessarily need wealth to gain health. Cheap water filters and promoting hand washing are some of the most cost effective health interventions and can cut deaths from diarrhea and pneumonia. Knowledge on the cost effectiveness of healthcare interventions can be elusive but educational measures to disseminate what works are available, such as the disease control priorities project.

- **Human capital**, in the form of education, is an even more important determinant of economic growth than physical capital. **De-worming children** costs about 50 cents per child per year and reduces non-attendance from anemia, illness and malnutrition and is only a twenty-fifth as expensive to increase school attendance as by constructing schools.

- **Good Infrastructure**, such as roads and information networks, helps market reforms to work. It was the technology of the steam engine that originally began the dramatic decreases in poverty levels. **Cell phone technology** brings the market to poor or rural sections. With crackIAS.com
necessary information, remote farmers can produce specific crops to sell to the buyers that bring the best price. Such technology also makes financial services accessible to the poor. Those in poverty place overwhelming importance on having a safe place to save money, much more so than receiving loans. Also, a large part of microfinance loans are spent on products that would usually be paid by a checking or savings account.

- Aid in its simplest form is a basic income grant, a form of social security periodically providing citizens with money. Some aid, such as Conditional Cash Transfers, can be rewarded based on desirable actions such as enrolling children in school or receiving vaccinations. Another form of aid is microloans, made famous by the Grameen Bank, where small amounts of money are loaned to farmers or villages, mostly women, who can then obtain physical capital to increase their economic rewards. Aid from non-governmental organizations may be more effective than governmental aid; this may be because it is better at reaching the poor and better controlled at the grassroots level.

- Good Institutions: Efficient institutions that are not corrupt and obey the rule of law make and enforce good laws that provide security to property and businesses. Efficient and fair governments would work to invest in the long-term interests of the nation rather than plunder resources through corruption. Examples of good governance leading to economic development and poverty reduction include Thailand, Taiwan, Malaysia, South Korea, and Vietnam, which tends to have a strong government, called a hard state or development state.
INCLUSION

Inclusion is when all people have the freedom to do what anyone else can do, access to anyplace that anyone else can go, where full participation is available to everyone and all people embrace differences, and feel accepted, valued and respected for who they are. When considering the concept of inclusion one needs to be aware of the source of exclusion.

Inclusion is recognizing our universal "oneness" and interdependence. Inclusion is recognizing that we are "one" even though we are not the "same". We were all born "in". The act of inclusion means fighting against exclusion and all of the social diseases exclusion gives birth to - i.e. racism, poverty, hunger, etc. The difference between inclusion and exclusion lies not with the individual, but within the society where the person lives. With this knowledge, the causes and strategies used to achieve inclusion the onus must fall upon societies. The causes and challenges of exclusion result from social barriers that exist within society as such; society is where the problems must be addressed.

WHY BE CONCERNED WITH INCLUSION?

- First, there are serious negative effects for people who experience exclusion. Exclusion creates division within a community and separation of people causes vulnerability among the excluded groups, whether it is because of disability, race or class. This vulnerability puts people at risk of negative experiences in their lives.
- Lack of inclusion also leads to and exacerbates social disparity, which, furthers the devaluation of these groups and reduces their quality of life. A lack of inclusion within a community creates an atmosphere of inequality, which prevents people from having equal access to all things that should be available to them in their society.
- This prevents those who are excluded from getting what they need to live effectively. The areas often affected include access to employment and as a result, reduced financial status which creates the risk of people not being capable of acquiring their basic needs.
- Those who are excluded are at increased risk of participation in many types of unhealthy behaviors and reduced overall health. Beyond the implications of exclusion on the individual and groups in society, there are also effects, which touch society as a whole in a negative way.
- A reduced level of inclusion leads to the marginalization and segregation of groups, which emphasize differences, and creates separation within a community. A community divided in this way, is a weaker society in its humanity.
- Separation also leads to power differentials, which create divisions, segregation and inequality within a community. These concerns develop into power imbalances and oppression of groups in communities.

WHAT ARE THE CONTRIBUTING FACTORS TO EXCLUSION?

- There are a number of issues which contribute to exclusion. The biggest contributing factor is attitudinal barriers held about a group of people because of difference such as disability, race, or gender.
- This type of barrier has been identified as leading to lack of acceptance perpetuation of negative stereotypes and adherence to certain norms, habits and societal rules. These rules are crackIAS.com
designed by and for the dominant group in society and the belief that if people do not fit they should not be included. Finally, attitudinal barriers are the root cause of a number of other factors which contribute to exclusion such as access barriers, power imbalance, superficial service inclusion and policy barriers.

- One of the barriers that are caused by the presence of attitudinal barriers is **lack of accommodation of differences**.
- This includes physical barriers that prevent access. **Lack of accommodation** and accessibility contribute directly to the exclusion of people. Not only are these physical barriers an issue as they exist, but they also affect efforts to remove them and stifle willingness to prevent future barriers from being created.
- Voluntary measures are limitedly successful. Project and policy directives need to be put in place to assist with the elimination of barriers, so an environment of inclusion can occur.
- **Power imbalances** also result from attitudinal barriers and contribute to exclusion. People within the dominant group make decisions, as they possess the power to do so, for those outside the dominant group there is often a lack of support needed and feelings of inequality develop.
- When power is held by one dominant group those outside are more likely to be excluded and their needs are left unheard and unmet. Attitudinal barriers about the excluded contribute to superficially inclusive services and systems.
- These types of systems may have the best intentions but a **lack of belief in and respect for people** leads to the excluded being silent recipients of services. This superficial type effort often leads to generic approaches which are ineffective for everyone.
- This also applies to segregated programs which do not provide an opportunity to promote inclusion and perpetuates the separation of people and the belief that they are different and should not be part of the mainstream of society.
- Service language of benevolence and gifting sends very strong messages to the people served and to the community. This perspective can lead to perpetuation of attitudinal barriers, **negative self-images**, and negatively impacts on the service and community environment.
- The final area where attitudinal barriers affect **exclusion of people is around policy barriers**. Commonly held negative attitudes influence the political agendas that support negative policy development for excluded groups. Outcome of this type of policy development is patchwork ineffective programs that do not address the needs of the people they were created to support.
- It is these barriers which prevent adequate funds and resources from being directed to the efforts of inclusion in service and accessibility supports. Negative attitudes and beliefs have a major effect on the production of **legislative disincentives** in their programs, which put up another barrier for the excluded to overcome.

**INCLUSION IN “INDIAN CONTEXT”**

In Indian context it implies, an **equitable allocation of resources** with benefits accruing to every section of society- A growth process which yields **broad-based benefits** and ensures **equality of opportunity** for all. It is concerned with the **Pro-poor growth**, growth with equity. It is aimed at **poverty reduction, human development, health** and provide opportunity to work and be creative. In order to achieve inclusion, the allocation of resources must be focused on the indented short and long terms benefits and economic linkages at large and not just equitable mathematically on some regional and population criteria.
THE INCLUSION INVOLVES FOUR ATTRIBUTES

- **The Opportunity** attribute focuses on generating more and more opportunities to the people and focuses on increasing their income.
- **The Capability** attribute concentrates on providing the means for people to create or enhance their capabilities in order to exploit available opportunities.
- **The Access** attribute focuses on providing the means to bring opportunities and capabilities together.
- **The Security** attribute provides the means for people to protect themselves against a temporary or permanent loss of livelihood.

All together it is a process in which economic growth measured by a sustained expansion in GDP contributes to an enlargement of the scale and scope of all four dimensions.

NEED FOR INCLUSION IN INDIA

- India is the 7th largest country by area and 2nd by population. The **Economy of India** is the seventh-largest in the world by nominal GDP and the third-largest by purchasing power parity (PPP). Yet, India is far away from the development of the neighborhood nation, i.e., China.
- The exclusion in terms of low agriculture growth, low quality employment growth, low human development, rural-urban divides, gender and social inequalities, and regional disparities etc. are the problems for the nation.
- Studies estimated that the cost of corruption in India amounts to over 10% GDP. Corruption is one of the ills that prevent inclusive growth.
- Although Child labour has been banned by the law in India and there are stringent provisions to deter this inhuman practice. Still, many children in India are unaware of education as they lives are spoiled to labour work.
- Literacy levels have to rise to provide the skilled workforce required for higher growth.
- Economic reforms in the country are overwhelmed by out dated philosophies and allegations by the politicians and opposition parties in India.
- Even at international level also, there is a concern about inequalities and exclusion and now they are also taking about inclusive approach for development.

ELEMENTS OF INCLUSION-ORIENTED GROWTH

The key components of the inclusion oriented growth strategy included a sharp increase in investment in rural areas, rural infrastructure and agriculture spurt in credit for farmers, increase in rural employment through a unique social safety net and a sharp increase in public spending on education and health care. The five interrelated elements of inclusion oriented growth are:

1. Poverty Reduction and increase in quantity and quality of employment.
2. Agriculture Development
3. Social Sector Development
4. Reduction in regional disparities
5. Protecting the environment.

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For a developing country like India, the need of inclusion-oriented growth is vital to achieve the overall progress of the country. Though it is positive for macro-economic stability, 2008-09 resulted a relative growth slowdown, mostly from the spillover effects of the weakening of the global economic momentum and volatile financial markets. The following problems are the major concerns for developing countries like India to achieve the inclusive growth. They are:

- Poverty
- Employment
- Agriculture
- Problems in Social Development
- Regional Disparities
- Poverty
- Percent of population living under the poverty line, which is 356.35 rupees or around $7 a month in rural areas.

A proportionally large share of poor is lower castes. Many see the caste system as a system of exploitation of poor low-ranking groups by more prosperous high-ranking groups. In many parts of India, land is largely held by high-ranking property owners of the dominant castes that economically exploit low-ranking landless labourers and poor artisans, all the while degrading them with ritual emphases on their so-called god-given inferior status.

EMPLOYMENT

- Employment considered as one of the big problems for inclusion-oriented growth in India. Raising population at a great speed after independence showed its impact on employment. The unemployment became the big worry to the development of the country.
- Since poverty is much higher than unemployment, employment is the only source to eradicate poverty. The quality and quantity of employment in India is very low due to illiteracy and due to over dependency on agricultural employment. The quality of employment is also a problem.
- Unorganized employed people in India are around 85%. Workers in this sector do not have social security. The generation of productive employment for labour force in the economy, as employment is a key to inclusion-oriented growth is the toughest task for the country.
- The country is also facing in employment generation in all sectors, regions and for all socio economic groups particularly for poorer sections of population, backward regions, lagging sectors and SC/ST/OBC/women etc.

AGRICULTURE

- Traditionally, India is considered as the agricultural based country. As the majority of Indians are engaged in agriculture for employment, the recent developments in the other sectors decreased this major sector’s growth. Some of the problems in Indian agriculture are:
  - Long term factors like steeper decline in per capita land availability, shrinking of farm size.
  - Slow reduction in share of employment.
  - Low labour productivity in agriculture and the gap between agriculture and non-agriculture sector is widening.
  - Decline in yield growth due to land and water problems, vulnerability to world commodity prices, farmer’s suicides.
Disparities in growth across regions & crops, i.e., growth rate declined more in rainfed areas.

Thus these problems became the hurdles in the key area for the economic development of the nation, i.e., agriculture.

PROBLEMS IN SOCIAL DEVELOPMENT

Social development is also one of the key concerns in inclusion oriented growth. The social development became the hot criteria in the recent past in India. Social development is also facing some problems making the path critical to inclusion-oriented growth in the country. Some of the problems in social sector are:

- Significant regional, social and gender disparities.
- Low level and slow growth in public expenditures particularly on health.
- Poor quality delivery systems.
- Achievement of 127th rank among 170 countries on Human Development index.
- Social indicators are much lower for scheduled castes and scheduled tribes.
- Malnutrition among children is one major problem.
- Since BPO brought the multi culture environment in India, this sector is facing under savior pressure due to global recession.

REGIONAL DISPARITIES

Regional disparities are also a major concern for India due to different culture and traditions. Traditional cultures, caste system and the rich & poor feelings favored some specific groups as a result, the regional disparities raised in India before and after independence. And also, due to the development in agriculture and industrial sector some regions in India developed fast and some other places still are facing the scarcity. The National Income (measured as Net National Income at market prices) and Per Capita National Income (measured as Per Capita Net National Income at market prices) of the country has been increasing during the last three years. The State/UT-wise estimates of Per Capita Income (measured as Per Capita Net State Domestic Product) at current prices are given as below:

<table>
<thead>
<tr>
<th>State/UT</th>
<th>Per Capita Income at current prices (2013-14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andhra Pradesh</td>
<td>81397 Manipur</td>
</tr>
<tr>
<td>Arunachal Pradesh</td>
<td>85468 Meghalaya</td>
</tr>
<tr>
<td>Assam</td>
<td>44263 Mizoram</td>
</tr>
<tr>
<td>Bihar</td>
<td>31199 Nagaland</td>
</tr>
<tr>
<td>Chhattisgarh</td>
<td>58547 Odisha</td>
</tr>
<tr>
<td>Goa</td>
<td>224138 Punjab</td>
</tr>
<tr>
<td>Gujarat</td>
<td>106831 Rajasthan</td>
</tr>
<tr>
<td>Haryana</td>
<td>133427 Sikkim</td>
</tr>
<tr>
<td>Himachal Pradesh</td>
<td>92300 Tamil Nadu</td>
</tr>
<tr>
<td>Jammu &amp; Kashmir</td>
<td>58593 Telangana</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>46131 Tripura</td>
</tr>
<tr>
<td>Karnataka</td>
<td>84709 Uttar Pradesh</td>
</tr>
<tr>
<td>Kerala</td>
<td>103820 Uttarakhand</td>
</tr>
<tr>
<td>Madhya Pradesh</td>
<td>51798 West Bengal</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>114392 Andaman &amp; Nicobar Islands</td>
</tr>
<tr>
<td>Delhi</td>
<td>219979 Chandigarh</td>
</tr>
<tr>
<td></td>
<td>Puducherry</td>
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</tbody>
</table>

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CHALLENGES BEFORE INCLUSION-ORIENTED GROWTH STRATEGIES IN INDIA

The key components of the inclusion-oriented growth strategy included a **sharp increase in investment in rural areas**, rural infrastructure and agriculture spurt in credit for farmers; increase in rural employment through a unique **social safety net** and sharp **increase in public spending on education and health** care. The government also should go for a variety of legislative interventions to empower the disadvantaged. Some of the challenges and opportunities before inclusion-oriented growth strategies in India are:

1. **Poverty alleviation** is one of the big challenges for India. Eradication of poverty in India is generally only considered to be a long-term goal. Poverty alleviation is expected to make better progress in the next 50 years than in the past, as a trickle-down effect of the growing middle class. **Increasing stress on education, reservation of seats** in government jobs and the increasing empowerment of women and the economically weaker sections of society, are also expected to contribute to the alleviation of poverty.

2. **For agricultural growth**, the private players can participate in to bridge the gap including providing micro finance. **Contract farming**, setting up **storage facilities** for agro-produce, and producing them from farmers. The private sector could also develop heritage sites and tourist spots and encourage the **promotion of traditional arts** and crafts in **joint ventures with rural enterprises**. The government of India should also increase its present moratorium on interest payments, lowering of farm credit rates for increase in agricultural growth.

3. **Government schemes** should target eradication of both poverty and unemployment (which in recent decades has sent millions of poor and unskilled people into urban areas in search of livelihoods) attempt to solve the problem, by providing **financial assistance** for setting up businesses, skill honing, setting up public sector enterprises, reservations in governments, etc. The decreased role of the public sector after liberalization has further underlined the need for focusing on **better education** and has also put political pressure on further reforms.

4. **Child labor** is a complex problem that is basically rooted in poverty. The Indian government is implementing the **world’s largest child labor elimination program**, with primary education targeted for around 250 million. Numerous non-governmental and voluntary organizations are also involved.

5. Special investigation cells have been set up in states to enforce existing laws **banning employment of children** (under 14) in hazardous industries. Failure to implement the law and poor rehabilitation policies need urgent attention which is a big challenge for India to achieve inclusive growth. Social development is possible through achieving **Women Empowerment** and eradicating the regional disparities.

6. Though the Government is giving the women empowerment by giving special reservations, the women’s advancement in India is still not matched the expectations for inclusive growth. Presently, the **women** are dealing with the **top posts** in India like President, Lok Sabha Speaker and Railway Minister.

7. To bring in inclusive growth, it is necessary to enhance the capabilities of women by providing education, so that they get the opportunity of getting employed and be self sustainable. Government of India has stepped up for inclusion-oriented growth by launching **many initiatives** with features that are innovative, flexible and reform oriented such as:
   - Rural Infrastructure(Bharat Nirman)
   - Employment(National Rural Employment Guarantee Scheme)

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Regional Development (backward District Development Program)
Education (Sarva Shiksha Abhiyan)
Rural Health (National Rural Health Mission)
Urban Infrastructure (National Urban Renewal Mission)

LATEST SCHEMES OF GOVERNMENT ON FINANCIAL INCLUSION

1. **Pradhan Mantri Jan Dhan Yojana**: it is *National Mission for Financial Inclusion* to ensure access to financial services, namely Banking Savings & Deposit Accounts, Remittance, Credit, Insurance, and Pension in an affordable manner. This inclusion campaign was launched by the Prime Minister Narendra Modi on 28 August 2014. Run by **Department of Financial Services**, Ministry of Finance, on the inauguration day, 1.5 Crore (15 million) bank accounts were opened under this scheme. Guinness World Records Recognizes the Achievements made under PMJDY. By 13 January 2016, over 20 crore (200 million) bank accounts were opened and 300 billion (US$ 4.4 billion) were deposited under the scheme. The scheme has been started with a target to provide *universal and clear access to banking facilities* starting with "Basic Banking Accounts" with **overdraft facility of Rs. 5,000 after six months and RuPay Debit card** with inbuilt accident insurance cover of 1 lakh and RuPay Kisan Card. In next phase, micro insurance & pension etc. will also be added. Under the scheme:
   1. Account holders will be provided **zero-balance bank** account with RuPay debit card, in addition to accidental insurance cover of Rs. 1 lakh (to be given by 'HDFC Ergo').
   2. Those who opened accounts by 26 January 2015 over and above the Rs. 1 lakh accident claim were also given **life insurance cover** of Rs. 30,000 (to be given by LIC).
   3. After Six months of opening of the bank account, holders can avail Rs. 5,000 **overdraft** from the bank.
   4. With the introduction of new technology introduced by **National Payments Corporation of India** (NPCI), a person can transfer funds, check balance through a normal phone which was earlier limited only to smart phones so far.
   5. Mobile banking for the poor would be available through **National Unified USSD Platform** (NUUP) for which all banks and mobile companies have come together

2. **Pradhan Mantri Jeevan Jyoti Bima Yojana (PMJJBY)** is a *group life insurance* pure term scheme that costs Rs. 330 a year for a life cover of Rs.2 lakh. People between ages of 18 and 50 can enter. The cover continues till age 55. There is a case to extend the cover till age 60 or 65 at least, and not terminate at age 55, given that the average Indian age is now 68. Life Insurance Corp. of India, or any other willing insurance company, can offer the scheme through a bank.

3. **Pradhan Mantri Suraksha Bima Yojana (PMSBY)** is an *accident insurance* scheme that gives Rs.2 lakh if the policy holder dies in an accident or is disabled due to an accident. Premium is Rs.12 per year.

4. **Atal Pension Yojana (APY)** will give a *defined benefit contribution* of a maximum of Rs. 5,000 for defined contributions. This is a watered down version of the National Pension System-Swavalamban (NPS-S), whose subscribers will automatically be migrated to APY. But an opt-out is there for those who want to continue with NPS-S.
INDIAN RIVER SYSTEM
DETAILS ABOUT INDIAN RIVERS

- Himalayan Rivers are formed by melting snow & glaciers and flow throughout year.
- **Deccan** Rivers are rain-fed and therefore fluctuate in volume. Many of these are non-perennial. Coastal streams, especially on the west coast are short in length and most of them are non-perennial.
- The streams of inland drainage basin of western Rajasthan are few and far apart. Most of them are of an ephemeral character.
- About 77% of drainage is towards Bay of Bengal and rest is towards Arabian Sea.
- Bhagirathi and Alaknanda join at **Dev Prayag** to form the River Ganga. Ganga traverses through Uttarakhand, Uttar Pradesh, Bihar and West Bengal.
- **Indus** rises near Mansarover in Tibet and finally falls in the Arabian Sea near Karachi.
- Indus is known as Shiquan in Tibet
- Son is the largest tributary of Ganga from south. Gandhi Setu on Son River near Patna is highest bridge in Asia.
- **Brahmaputra** is known as Tsangpo in Tibet, Dihang in Arunachal, and Jamuna in Bangladesh.
- Near Passighat the Debang and Lohit join the river Brahmaputra crosses into Bangladesh downstream of Dhubri.
- It becomes Padma after meeting Ganga & finally discharges as Meghna in Bay of Bengal.
- Principal tributaries of Brahmaputra are Subansiri, Jia Bhareli, Dhansiri, Puthimari, Pagladiya and the Manas.
- **Barak** River, the Head Stream of Meghna, rises in the hills in Manipur. It continues in Bangladesh till the combined Ganga - Brahmaputra join it near Bhairab Bazar.
- Lohit makes delta in reverse when it joins Brahmaputra from south. **Majuli (Assam)** in Brahmaputra is the largest Riverine Island in the world. It has been declared world heritage site by UNESCO.
- **Chambal** is known for its Badland topography
- **Dhaunadar Falls** or Marble Falls lie on River Narmada near Jabalpur
- Godavari has the second largest river basin covering 10 per cent of the area of India.
- A few rivers in Rajasthan do not drain into the sea. Few of them drain into the Salt lakes while others like Luni, Machhu, Rupen, Saraswati, Banas and Ghaggar are lost in the desert.
- **Narmada** forms traditional boundary between North and South India, and drains M.P., Gujarat and Maharashtra. Existing irrigation projects in the Narmada are Matiyari, Rani Avantibai Sagar, Barna, Tawa and Sukta- all in Madhya Pradesh, and Karjan project in Gujarat. Important Projects under implementation are Kolar, Man, Omkareshwar, Maheshwar and Sardar Sarovar.
- **Tapi** drains M.P, Maharashtra and Gujarat. Kakrapara, Utsai are major projects, alongwith Hatnur Dam in Maharashtra and Ukai Dam in Gujarat. Tapi is known as the twin or hand-made of Narmada
- The **Godavari River** has a drainage area in six states- Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh, Chattisgarh and Orissa. It has "Sriramsagar project" in Nizamabad District. Aruthur Cotton, Trimbakeshwar are Waterfalls on it. Godavari is called as Ganga of South or Bridh Ganga.
### IMPORTANT RIVERS OF INDIA

#### INDUS SYSTEM

<table>
<thead>
<tr>
<th>INDUS</th>
<th>Sources</th>
<th>Important Tributaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indus</td>
<td>Snow ranges of Himalayas at an altitude of 5000 m in Tibet, near Mansarover Lake.</td>
<td>The <strong>Zanskar</strong> is its left bank tributary in Ladakh. In the plains, its left bank tributary is the <strong>Chenab</strong> which itself has four major tributaries, namely, the Jhelum, the Ravi, the Beas and the Sutlej. Its principal right bank tributaries are the <strong>Shyok, the Gilgit, the Kabul, the Gomal and the Kurram.</strong></td>
</tr>
</tbody>
</table>

- The Indus River is a major river in Asia which flows through **Pakistan, India and Tibet.** After flowing for >700 km in India, flows in Pakistan
- Originating in the **Tibetan Plateau** in the vicinity of Lake Mansarovar, the river runs a course through the Ladakh region of Jammu and Kashmir, towards Gilgit and Baltistan and then flows in a southerly direction along the entire length of Pakistan to merge into the **Arabian Sea** near the port city of Karachi in Sindh.
- The total length of the river is 3,180 km (1,980 mi).
- It is **Pakistan's longest river.**
- The river is the 21st largest river in the world in terms of annual flow.
- The Indus forms the delta of Pakistan and India mentioned in the Vedic Rigveda as Sapta Sindhu and the Iranian Zend Avesta as Hapta Hindu (both terms meaning "seven rivers").

<table>
<thead>
<tr>
<th>Jhelum</th>
<th>Sources</th>
<th>Important Tributaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jhelum</td>
<td>The river Jhelum rises from Verinag Spring situated at the foot of the Pir Panjal in the south-eastern part of the valley of Kashmir in India.</td>
<td>The <strong>Neelum River</strong>, the largest tributary of the Jhelum, joins it, at Domel Muzaffarabad, as does the next largest, the <strong>Kunhar River</strong> of the Kaghan valley.</td>
</tr>
</tbody>
</table>

- It flows through **Srinagar and the Wular Lake** before entering Pakistan through a deep narrow gorge.
- It also connects with rest of Pakistan and Azad Kashmir on Kohala Bridge east of Circle Bakote. It is then joined by the **Poonch River**, and flows into the **Mangla Dam** reservoir in the district of Mirpur.
- The Jhelum enters the Punjab in the Jhelum District. From there, it flows through the plains of Pakistan's Punjab, forming the boundary between the **Chaj and Sindh Sagar Doabs.**
- It ends in a confluence with the Chenab at Trimmu in District Jhang.
- The **Chenab merges with the Sutlej** to form the Panjnad River which joins the Indus River at Mithankot.

<table>
<thead>
<tr>
<th>Chenab</th>
<th>Sources</th>
<th>Important Tributaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chenab</td>
<td>Bara Lacha La Pass; originating from H.P, it goes towards north to enter J&amp;K &amp; then turns towards south</td>
<td>- Also called <strong>Chandrabhaga.</strong> The total length of the Chenab is approximately 960 kilometres.</td>
</tr>
</tbody>
</table>

- It flows from the Jammu region of Jammu and Kashmir into the plains of the Punjab, forming the **boundary between the Rechna and Jech interfluves** (Doabs in Persian).
- It is joined by the **Jhelum River** at Trimmu and then by the **Ravi River** Ahmedpur Sial.
- It then **merges with the Sutlej** River near Uch Sharif, Pakistan to form the **Panjnad or the 'Five Rivers',** the fifth being the **Beas River** which joins the Sutlej near Ferozepur, India.

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• The Chenab then joins the Indus at Mithankot.

<table>
<thead>
<tr>
<th>Ravi</th>
<th>Near Rohtang Pass (Bara Bhangal)</th>
<th>Buddha Nala</th>
</tr>
</thead>
</table>

• It flows into the south-west, near Dalhousie, and then cuts a gorge in the Dhauladhar Range, before entering the Punjab plain near Madhopur and Pathankot.
• It then flows along the Indo–Pak border for 80 kilometres (50 mi) before entering Pakistan and joining the Chenab River.
• The total length of the river is about 725 kilometres.
• Ujh River is another major tributary of the Ravi River.

<table>
<thead>
<tr>
<th>Beas</th>
<th>Near Rohtang Pass</th>
<th>The chief tributaries are Parbati, Bain, Banganga, Luni and Uhal. The Sutlej continues into Pakistani Punjab and joins the Chenab River at Uch near Bahawalpur to form the Panjnad River; the latter in turn joins the Indus River at Mithankot. The waters of the Beas and Sutlej rivers are allocated to India under the Indus Waters Treaty between India and Pakistan.</th>
</tr>
</thead>
</table>

• The river rises on the southern face of Rohtang Pass in Kullu.
• Near Reh in Kangra District it divides into three channels, which reunites after passing Mirthal, 1,000 feet above sea-level.
• After touching the Jullundur district for a few miles the river forms the boundary between Amritsar and Kapurthala district.
• Finally the Beas joins the river Satulej at the south-western boundary of Kapurthala district of Punjab after a total course of 290 miles.

| Satluj        | Mansarover – Rakas Lakes           | The Sutlej is the longest of the five rivers that flow through the historic crossroad region of Punjab in northern India and Pakistan. 
The Sutlej is the easternmost tributary of the Indus River. 
The waters of the Sutlej are allocated to India under the Indus Waters Treaty between India and Pakistan, and are mostly diverted to irrigation canals in India. 
There are several major hydroelectric projects on the Sutlej, including the 1,000 MW Bhakra Dam, the 1,000 MW Karcham Wangtoo Hydroelectric Plant, and the 1,530 MW Nathpa Jhakri Dam. |
|---------------|-----------------------------------|---------------------------------------------------------------|

From north to south, these are Indus, Jhelum, Chenab, Ravi, Beas and Satluj

<table>
<thead>
<tr>
<th>Ganga System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ganga consists of 2 headstreams</td>
</tr>
</tbody>
</table>

• Ganga after entering Bangladesh, the main branch of the Ganges is known as the Padma.
• The Padma is joined by the Jamuna River, the largest distributary of the Brahmaputra.
• Further downstream, the Padma joins the Meghna River, the second largest distributary of the Brahmaputra, and takes on the Meghna's name as it enters the Meghna Estuary, which empties into the Bay of Bengal.
• The Ganges Delta, formed mainly by the large, sediment-laden flows of the Ganges and Brahmaputra rivers, is the world's largest delta, at about 59,000 km2 (23,000 sq mi).
Only the Amazon and Congo rivers have a greater average discharge than the combined flow of the Ganges, the Brahmaputra, and the Surma-Meghna river system.

<table>
<thead>
<tr>
<th>Yamuna</th>
<th>Yamunotri</th>
<th>Chambal, Sind, Betwa, Ken.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starting catchment area of river lies in Himachal Pradesh, and an important tributary draining the Upper Catchment Area is the Tons, Yamuna's largest and longest tributary.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other tributaries in the region are the Giri, Rishi Ganga, Kunta, Hanuman Ganga and Bata tributaries, which drain the Upper Catchment Area of the vast Yamuna basin.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After passing the Sikh pilgrimage town of Paonta Sahib, it reaches Tajewala in Yamuna Nagar district, of Haryana, where a dam built in 1873, is the originating place of two important canals, the Western Yamuna Canal and Eastern Yamuna Canal, which irrigate the states of Haryana and Uttar Pradesh.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Yamuna also creates natural state borders between the Himachal Pradesh and Uttarakhand states, and further down between the state of Haryana and Uttar Pradesh.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ramganga</th>
<th>Near Nainital in Garhwal Distt.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Ramganga River flows to south west from Kumaon Himalaya.</td>
<td></td>
</tr>
<tr>
<td>It is a tributary of the river Ganges, originates from the high altitude zone of 800m-900m.</td>
<td></td>
</tr>
<tr>
<td>Ramganga flows by the Corbett National Park near Ramnagar of Nainital district from where it descends upon the plains.</td>
<td></td>
</tr>
<tr>
<td>Bareilly and Badaun city of Uttar Pradesh is situated on its banks.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ghaghra</th>
<th>From Central Himalyas</th>
<th>In Nepal it is known as Narayani.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ghaghra is a perennial trans-boundary river originating on the Tibetan Plateau near Lake Mansarovar.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It cuts through the Himalayas in Nepal and joins the Sarda River at Brahmaghat in India.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Together they form the Ghaghra River, a major left bank tributary of the Ganges.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With a length of 507 kilometres it is the largest river in Nepal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is the largest tributary of the Ganges by volume and the second longest tributary of the Ganges by length after Yamuna.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Kosi</th>
<th>From Tibet Nepal Border</th>
<th>Arun and Tamur.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Kosi River drains the southern slopes of the Himalayas in Nepal and is formed by three main streams: the Tamur Koshi originating from Mt. Kanchenjunga in the east, Arun Koshi from Mt. Everest in Tibet, and Sun Koshi from Mt. Gosainthán farther west.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From their confluence north of the Chatra Gorge onwards, the Kosi River is also known as Saptakoshi.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After flowing through the Chatra Gorge the Sapta Kosi is controlled by the Koshi Barrage before it drains into the Gangetic plain.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Son</th>
<th>Amarkantak Plateau</th>
<th>Rihand, Gopat, North Koel</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Son parallels the Kaimur hills, flowing east-northeast through Uttar Pradesh, Jharkhand and Bihar states to join the Ganges just above Patna.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geologically, the lower valley of the Son is an extension of the Narmada Valley, and the Kaimur Range an extension of the Vindhya Range.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dehri on son is the major town situated on Son River.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chambal</th>
<th>Near Mhow (M.P) in Janapao Hills in Vindhayas</th>
<th>Banas (from Aravalli), Parbati and Kali Sindh</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Chambal River is a tributary of the Yamuna River in central India, and forms part of the greater Gangetic drainage system.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The river forms the boundary between Rajasthan and Madhya Pradesh before turning southeast to join the Yamuna in Uttar Pradesh state.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Chambal and its tributaries drain the Malwa region of northwestern Madhya Pradesh, while its tributary, the Banas, which rises in the Aravalli Range, drains southeastern...</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Rajasthan.

From **west to east**, Rivers are Ramganga, Gomti, Sarda, Ghaghra, Gandak and Kosi
From **west to east**, Rivers are Banas, Chambal, Kali Sindh, Parbati, sind, Betwa, Ken & Son

### BRAHMAPUTRA SYSTEM

<table>
<thead>
<tr>
<th>Brahmaputra</th>
<th>Rises from Chema-Yungdung glacier in Tibet</th>
<th>Dibang &amp; Lohit from south; Subansiri, Tista &amp; Manas from north.</th>
</tr>
</thead>
</table>

- It flows southwest through the Assam Valley as **Brahmaputra** and south through Bangladesh as the **Jamuna** (not to be mistaken with Yamuna of India).
- In the vast Ganges Delta it **merges with the Padma**, the main distributary of the Ganges, then the **Meghna**, before emptying into the Bay of Bengal.
- The average depth of the river is **124 feet** (38 m) and maximum depth is 380 feet (120 m).
- The river is prone to **catastrophic flooding** in spring when the Himalayan snows melt.
- It is a classic example of a **braided river** and is highly susceptible to channel migration and avulsion.
- This river is often called **Tsangpo-Brahmaputra river**.

### PENINSULAR RIVERS (WEST FLOWING)

<table>
<thead>
<tr>
<th>Narmada</th>
<th>Amarkantaka Plateau, Shahdol district (M.P.)</th>
<th>Burhner, Tawa (biggest), Sher, Dudhi, Barna, Hiran, Lohar</th>
</tr>
</thead>
</table>

- The Narmada is **5th longest** river in the Indian subcontinent.
- It forms the **traditional boundary between North India and South India**.
- It is the one of the rivers in India that flows in a **rift valley**, flowing west between the **Satpura and Vindhya ranges**.
- It flows through the states of **Madhya Pradesh** and Maharashtra, then along the border between Madhya Pradesh and Maharashtra and the border between **Madhya Pradesh and Gujarat** and in Gujarat.

<table>
<thead>
<tr>
<th>Tapi</th>
<th>Multai in Betul (M.P.)</th>
<th>Purna River (Major tributary), Girna River, Panzara, Waghur, Bori, Aner, Kolar. Amravati, Betul, Veghai</th>
</tr>
</thead>
</table>

- The Tapti River is **one of the major rivers of peninsular India**.
- The river rises in the **eastern Satpura Range** of southern Madhya Pradesh state, and flows westward, draining **Madhya Pradesh's Nimar region**, Maharashtra's **Kandesh** and east **Vidarbha** regions in the northwest corner of the Deccan Plateau and south Gujarat, before emptying into the **Gulf of Cambay** of the Arabian Sea, in the Surat District of Gujarat.
- The river, along with the northern parallel Narmada River, **forms the boundaries** between North and South India.
- The Western Ghats or **Sahyadri range** starts south of the Tapti River near the border of Gujarat and Maharashtra.

<table>
<thead>
<tr>
<th>Luni</th>
<th>Emerges from Annasagar (Ajmer). Only salty river in India.</th>
<th>Patki, Jojri, Sukri.</th>
</tr>
</thead>
</table>

- The Luni is a **river of western Rajasthan state**, India.
- It originates in the **Pushkar valley** of the Aravalli Range, near Ajmer and ends in the marshy lands of Rann of Kutch in Gujarat, after travelling a distance of 495 km.
- It is first known as **Sagarmati**, then after passing Govindgarh, it meets its tributary Sarsuti.
which originates from Pushkar Lake, and from then on it gets its name Luni.

<table>
<thead>
<tr>
<th>Sabarmati</th>
<th>Rises from the Jai Samand lake of Udaipur</th>
<th>Sabar, Hathmathi, Vakul.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Sabarmati River is a river in western India and one of the biggest rivers of north Gujarat.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>River Sabarmati is one of the major West flowing river of Gujarat</td>
<td></td>
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<tr>
<td></td>
<td>It meets the Gulf of Cambay of Arabian Sea after travelling 371 km from the origin.</td>
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<tr>
<td></td>
<td>The Sabarmati basin has a maximum length of 300 km. and maximum width of 105 km.</td>
<td></td>
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<tr>
<td></td>
<td>The catchment area lies in Rajasthan and Gujarat State.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mahi</th>
<th>Vindhayas</th>
<th>Drains Gujarat Plains, parts of M.P &amp; Rajasthan. Empties into Gulf of Khambhat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Mahi is a river in western India.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>It rises in Madhya Pradesh and, after flowing through the Vagad region of Rajasthan, enters Gujarat and falls into the sea.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>It has given its name to the Mahi Kantha agency of Bombay, and also to the mehwasis, marauding highlanders often mentioned in Arabian chronicles.</td>
<td></td>
</tr>
</tbody>
</table>

PENINSULAR RIVERS (EAST FLOWING)

<table>
<thead>
<tr>
<th>Mahanadi</th>
<th>Dandkaranaya near Sihawa in Raipur District (Chhattisgarh)</th>
<th>Sheonath, Hasdo, Mand.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Like many other seasonal Indian rivers, the Mahanadi too is a combination of many mountain streams and thus its precise source is impossible to pinpoint.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>However its farthest headwaters lie 6 km from Pharsiya village 442 m above sea level south of Nagri town in Dhamtari district of Chhattisgarh.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The hills here are an extension of the Eastern Ghats and are a source of many other streams which then go on to join the Mahanadi.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Brahmini</th>
<th>Sorrow of Orissa</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Brahmani is a major seasonal river in the Odisha state of Eastern India.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The Brahmani is formed by the confluence of the Sankh and South Koel rivers, and flows through the districts of Sundargarh, Kendujhar, Dhenkanal, Cuttack and Jajapur.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Together with the rivers Mahanadi and Baitarani, it forms a large delta before entering into the Bay of Bengal at Dhamra.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Godavari</th>
<th>From Trambak plateau in Nasik.</th>
<th>From north– Penganga, Wardha, Wainganga, Indravati and Sabari (arranged west to east). Parvara &amp; Manjra join from south. Others are Pranahita, Kinnerasani, Sileru, Bindusar, Moosi, Taliperu</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The Godavari is a river in the south-central India.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>It starts in the western state of Maharashtra and flows through the southern state Andhra Pradesh before reaching the Bay of Bengal.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>It forms one of the largest river basins in India.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>With a length of 1465 km, it is the second longest river in India, after the The Ganges, and the longest in southern India.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>It flows east across the Deccan Plateau into the Bay of Bengal near Yanam and Antarvedi in East Godavari district of Andhra Pradesh.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Krishna</th>
<th>Rises near Mahabaleshwar</th>
<th>Koyna, Yerla, Musi, Panchganga, Dudhganga, Ghatprbha, Malprabha, Bhima,</th>
</tr>
</thead>
</table>
### The Krishna River

- **The Krishna River** is the third longest river in India after the Ganges and the Godavari.
- It flows through the **state of Karnataka** before entering **Andhra Pradesh**.
- The delta of this river is one of the most fertile regions in India and was the home to ancient Satavahana and Ikshvaku Sun Dynasty kings. Vijayawada is the largest city on the River Krishna.
- **Sangli is the biggest city** on the river Krishna in Maharashtra state.

<table>
<thead>
<tr>
<th>Tungbhadra</th>
<th>Rises near Gomantak Peak</th>
<th>Tunga, Bhadra, Hagari</th>
</tr>
</thead>
</table>
- The Tungabhadra River is formed by the confluence of the Tunga River and the Bhadra River which flow down the eastern slope of the Western Ghats in the state of Karnataka.
- The rivers originate in Chikmagalur District of Karnataka along with the Nethravathi (west-flowing river, joining the Arabian Sea near Mangalore), the Tunga and the Bhadra rise at Gangamoola, in Varaha Parvata in the Western Ghats forming parts of the Kuduremukh Iron Ore Project, at an elevation of 1198 metres.
- The Bhadra river flows through the industrial city Bhadravathi.

<table>
<thead>
<tr>
<th>Cauvery</th>
<th>Brahmagiri Hills. The river thrice forks into 2 streams &amp; reunites a few miles farther on, thus forming the islands of Srirangapattnam, Sivasamudram and Srirangam in the eastern part of Tamil Nadu.</th>
</tr>
</thead>
</table>
- The origin of the river is traditionally placed at Talakaveri, Kodagu in the Western Ghats in Karnataka, flows generally south and east through Karnataka and Tamil Nadu and across the southern Deccan plateau through the southeastern lowlands, emptying into the Bay of Bengal through two principal mouths.
- The river's basin covers 4 states and Union Territories - Karnataka (34,273 km2), Tamil Nadu (43,856 km2), Kerala (2,866 km2) and Puducherry (160 km2).
- Rising in southwestern Karnataka, it flows southeast some 800 km to enter the Bay of Bengal.
- East of Mysore it forms the island of Shivasamudra, on either side of which are the scenic Shivasamudra Falls that descend about 320 ft (100 m).

---

### Catchment Areas of River Basins

| Ganga > Godavari > Indus > Krishna > Brahmaputra > Mahanadi > Narmada > Cauvery |

### Lengths of Rivers

| Ganga > Godavari > Krishna > Yamuna > Mahanadi > Narmada = Cauvery > Brahmaputra > Ghagra > Chambal |
## COMPARISON OF HIMALAYAN AND PENINSULAR RIVERS

<table>
<thead>
<tr>
<th>HIMALAYAN RIVERS</th>
<th>PENINSULAR RIVERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. These are <strong>antecedent rivers</strong> i.e. these flowed before the rise of Himalayas and kept cutting them with time, as evident from the existence of deep gorges.</td>
<td>1. These are <strong>consequent rivers</strong> i.e. these start flowing after the rise of peninsular landmasses. There are no deep gorges here.</td>
</tr>
<tr>
<td><img src="image1.png" alt="Diagram of antecedent rivers" /></td>
<td><img src="image2.png" alt="Diagram of consequent rivers" /></td>
</tr>
<tr>
<td>2. Characterised by <strong>waterfalls</strong>, rapids, cataracts etc. Therefore have a <strong>pronounced relief</strong>.</td>
<td>2. These have graded profiles and lack these characteristics.</td>
</tr>
</tbody>
</table>
3. These have **meandering courses**, thereby forming the **Ox-bow lakes**

![Ox-bow lake diagram](image)

4. These rivers have **large basins**
   - Indus > 11 lac sq km
   - Ganga > 10 lac sq km
   - Brahmaputra > 5 lac sq km

![River basins](image)

5. These are in **Young stage**. These make **V-shaped valleys** because of their high erosive power

![V-shaped valley](image)

6. **Erosive power is high** due to their young age, thus carry huge sedimentary load. These have resulted in great alluvial deposits, forming the **North Indian Plains**. The sediment load is further added due to soft nature of sedimentary rocks that make Himalayas.

7. These are **perennial rivers** due to high rainfall and snow melt from snow covered peaks of Himalayas.

8. These carry high value vis-à-vis **irrigation**

---

3. **Linear & straight courses** with smooth long profiles. Hard rocks prevent any sort of meandering.

![Linear & straight course diagram](image)

4. Comparatively smaller basins
   - Narmada / Tapi < 1 lac sq. km
   - Godavari / Krishna 2-3 lac sq km

![River basins](image)

5. These are in **Mature stage** of development. These have subdued gradient with **lateral erosion and shallow valleys**.

![Mature stage diagram](image)

6. Hard rocks of peninsula made up of volcanic extrusions restrict the erosive power of rivers. Further the gradual slope of Deccan plateau and lesser erosive power result in low amount of **sediment loads**

7. These are **seasonal rivers** due to less rainfall in their catchment areas. Even the big rivers like Godavari and Krishna dry up in summers. The lesser rainfall is because these rivers emanate from the points which lie on the **leeward side** of Western Ghats.

8. These are not that good for irrigation
due to their perennial nature. A network of canals has been laid in the northern plains of Punjab, Haryana, UP and Bihar to fetch their potential. This has led to the green revolution in these areas making them the granary of India.

9. **More navigable** owing to their flat topography and perennial nature. This is true in the middle and lower courses of these rivers and not in the upper course where these rivers have steep slopes. **National Waterway-1** links Allahabad – Haldia covering a distance of 1620 km. national Waterway-2 links Sadia–Dubri.

10. These have high **HEP potential**—perennial nature and steep slopes. Indian Himalayan Region (IHR), also known as the water tower of the world, hold potential of 1,48,700 MW.

11. **HEP development** lesser compared to peninsula; of huge potential, just around 22.4% has been utilized

10. West flowing rivers have more potential due to more water and steep slopes.

11. More, because of greater economic development & more demand.
### IMPORTANT HYDROELECTRIC PLANTS IN INDIA

<table>
<thead>
<tr>
<th>States</th>
<th>Name of the Hydroelectric Plants</th>
</tr>
</thead>
<tbody>
<tr>
<td>J&amp;K</td>
<td>Lower Jhelum, Uri, Salal and Dulhasti</td>
</tr>
<tr>
<td>Punjab and H.P.</td>
<td>Bhakara Nangal <em>(Satluj)</em>, Pong on Beas, Rongtong, Nathpa Jhakri <em>(biggest hydel power project in India)</em> on river <em>Satluj</em>, Chamera and Thien on Ravi.</td>
</tr>
<tr>
<td>Uttarakhand</td>
<td>Tehri Dam on <em>Bhagirathi</em></td>
</tr>
<tr>
<td>U.P.</td>
<td>Rehand, Khodri on Tons.</td>
</tr>
<tr>
<td>Rajasthan</td>
<td>Rana Pratap Sagar and Jawahar Sagar on <em>Chambal</em>.</td>
</tr>
<tr>
<td>M.P.</td>
<td>Gandhi Sagar on <em>Chambal</em>, Pench, Sardar Sarovar on <em>Narmada</em>.</td>
</tr>
<tr>
<td>Bihar</td>
<td>Kosi</td>
</tr>
<tr>
<td>Jharkhand</td>
<td>Subarnrekha; Maithon, Panchet, Tilaiya, (all three under <em>DVC</em>).</td>
</tr>
<tr>
<td>W.B.</td>
<td>Panchet</td>
</tr>
<tr>
<td>Orissa</td>
<td>Hirakud on <em>Mahanadi</em>, Balimela.</td>
</tr>
<tr>
<td>North East</td>
<td>Loktak (Manipur), Kopili (Assam), Khandong (Meghalya)</td>
</tr>
<tr>
<td>Gujarat</td>
<td>Ukai and Kakarapara <em>(Tapi)</em>, Kadana <em>(Mahi)</em></td>
</tr>
<tr>
<td>Maharashtra</td>
<td>Koyana Bhivpuri <em>(Tata Hydroelectric Works)</em></td>
</tr>
<tr>
<td>A.P.</td>
<td>Sileru, Nizamsagar <em>(Manjra)</em>, Nagarjun Sagar &amp; Srisailam <em>(Krishna)</em></td>
</tr>
<tr>
<td>Karnataka</td>
<td>Tungabhadra, Sharavati, Mahatma Gandhi <em>(Jog Fall)</em>, Siva Samudram <em>(Kaveri)</em>, Lungnamakki.</td>
</tr>
<tr>
<td>Kerala</td>
<td>Idukki <em>(Periyar)</em>, Sabarigiri, Ponniar.</td>
</tr>
<tr>
<td>T.N.</td>
<td>Mettur, Papanasam, Kundah</td>
</tr>
<tr>
<td>MP, UP and Bihar</td>
<td>Banasagar Project (On Son river)</td>
</tr>
<tr>
<td>India and Bhutan</td>
<td>Chukka Project</td>
</tr>
<tr>
<td>J&amp;K</td>
<td>Dui Hasti (On the rive Chenab)</td>
</tr>
<tr>
<td>Bihar and UP</td>
<td>Gandak Project (On the river Gandak)</td>
</tr>
<tr>
<td>Karnataka (Bijapur)</td>
<td>Ghatalaprabha Valley</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>Jayakwadi Project (On rive Godavari)</td>
</tr>
<tr>
<td>Gujarat</td>
<td><em>Kakrapara</em> Project (On <em>Tapi</em> River)</td>
</tr>
<tr>
<td>Karnataka (Belgaum)</td>
<td>Malaprabha Project (Malaprabha river)</td>
</tr>
<tr>
<td>TN and Kerala</td>
<td>Parambikulam Aliyar</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td><em>Poochampad</em> (On river <em>Godavari</em>)</td>
</tr>
<tr>
<td>MP &amp; UP</td>
<td>Rajghat Dam Project (On Betwa River)</td>
</tr>
<tr>
<td>J&amp;K</td>
<td>Salal Project (Chenab)</td>
</tr>
<tr>
<td>Hoshangabad district <em>(MP)</em></td>
<td>Tawa Project (Tawa river, a tributary of the <em>Narmada</em>)</td>
</tr>
<tr>
<td>Tamil Nadu</td>
<td><em>Papanasam</em> Scheme <em>(Tambraparni</em> river)</td>
</tr>
<tr>
<td>Kerala, TN</td>
<td>Sholayar Project (Sholayar River)</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>Srisailam power project (Krishna River)</td>
</tr>
<tr>
<td>Andhra Pradesh and Orissa</td>
<td>Balimela Hydro-Electric Project (Sileru River)</td>
</tr>
<tr>
<td>Meghalaya</td>
<td>Umiam Project (Umiam River)</td>
</tr>
</tbody>
</table>

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### MULTIPURPOSE PROJECTS OF INDIA

<table>
<thead>
<tr>
<th>Location Of Dams</th>
<th>Special Features (Note The Purposes Served)</th>
</tr>
</thead>
</table>
| **Bhakra Nangal (Satluj)** | • Joint venture of Punjab, Haryana and Rajasthan. **2 dams** – Bhakra and Nangal. **Power** houses with combined installed capacity of 1204 MW.  
• Bhakra canal system of **irrigation**.  
• One of the highest Gravity Dams in the world (226m).  
• Huge reservoir (Gobind Sagar Lake in Bilaspur District of Himachal Pradesh). |
| **Bhakra Nangal** | **Joint venture of Punjab, Haryana and Rajasthan.** **2 dams** – **Bhakra and Nangal.** **Power** houses with combined installed capacity of 1204 MW.  
• Bhakra canal system of **irrigation**.  
• One of the highest Gravity Dams in the world (226m).  
• Huge reservoir (Gobind Sagar Lake in Bilaspur District of Himachal Pradesh). |
| **Damodar Valley Project (Damodar)** | • Damodar also called as River of sorrow, or **sorrow of Bengal,** Tributary of **Hugli;** drains the Chotanagpur plateau.  
• This was the **First** multipurpose river project in India.  
• In **1948** – Project executed on the model of **TVA** (Tennessee Valley River Project) of USA.  
• Durgapur Barrage – created for the storage of **irrigation** water.  
• Bakaro and Durgapur Thermal **Power** Stations are the important link to DVC Power Station System, another purpose is **Flood control** |
| **Tilaiya (R. Barakar)**  
Maithon (R. Barkar)  
Konar (Konar River)  
Panchet Hill (R. Damodar) | **Joint venture of Punjab, Haryana and Rajasthan.** **2 dams** – **Bhakra and Nangal.** **Power** houses with combined installed capacity of 1204 MW.  
• Bhakra canal system of **irrigation**.  
• One of the highest Gravity Dams in the world (226m).  
• Huge reservoir (Gobind Sagar Lake in Bilaspur District of Himachal Pradesh). |
| **Hirakund (Mahanadi)** | • One of the longest dams in the world (4,801m long)  
• Two other dams on Mahanadi are at Tikrapara and Naraj.  
• 3 canals have been taken out for **irrigation**.  
• It also provides for **navigation** facility besides **power** generation. |
| **Rihand (Tributary Of Son)** | • Most important multipurpose project in U.P.  
• **Gobind Ballabh Pant Sagar** is largest man made reservoir in India. |
| **Gandhinagar (M.P)**  
Rana Pratap Sagar (Rajasthan)  
Jawahar Sagar (Rajasthan) | • Gandhinagar – long masonry gravity dam.  
• Rana Pratap masonry dam at Rawat Bhatia.  
• Jawahar Sagar is also called Kota Dam |
| **Gandak** | **Joint venture of U.P. and Bihar,** though Nepal also get **irrigation** and **power** facilities. |
| **Balmikinagar (Bihar)** | **Joint venture of U.P. and Bihar,** though Nepal also get **irrigation** and **power** facilities. |
| **Tungbhadra (Tributary Of Krishna River)** | **Joint venture of Andhra Pradesh and Karnataka.**  
• Masonry Dam. |

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<table>
<thead>
<tr>
<th>River</th>
<th>Location</th>
<th>Object of Project</th>
<th>States/Beneficiary States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kosi</td>
<td>Hanumannagar</td>
<td>irrigation, flood control, power generation, land reclamation, fishing and navigation.</td>
<td>Madhya Pradesh, Gujarat, Maharashtra, Rajasthan</td>
</tr>
<tr>
<td>Narmada Valley</td>
<td>Sardar Sarovar Project on lower Narmada Valley in Gujarat. Narmada Sagar Dam Project at Narmada in Madhya Pradesh.</td>
<td>Joint venture of Madhya Pradesh, Gujarat and Maharashtra, Rajasthan is Beneficiary States.</td>
<td>Most controversial project in India. Narmada has the largest no. of tributaries.</td>
</tr>
<tr>
<td>Nagarjunasagar Project (River Krishna)</td>
<td>Nalgonda Distt. (Andhra Pradesh)</td>
<td>Lal Bahadur Canal had been taken off from it besides the Jawahar Canal</td>
<td></td>
</tr>
<tr>
<td>Tehri Project Confluence Of Bhagirathi And Bhilganga</td>
<td>Garhwal District (Uttarakhand)</td>
<td>One of the controversial projects in India.</td>
<td></td>
</tr>
</tbody>
</table>
FEW FACTS BEFORE WE START

- India falls in the 10th position in the world and 4th in Asia in plant diversity.
- The vascular flora in India comprises of 15,000 species, of which more than 35 per cent is endemic and so far not reported anywhere in the world.
- From about 70 per cent geographical area surveyed so far, over 46,000 species of plants have been described by the Botanical Survey of India.
- Ethno-botanical study deals with the utilization of plants and plant products by ethnic races. More than 800 plant species of ethno-botanical interest have been collected.
- About 20 species of higher plants are categorized as possibly extinct as these have not been sighted during the last 6-10 decades. BSI brings out an inventory of endangered plants in the form of a publication titled Red Data Book.

<table>
<thead>
<tr>
<th>Botanical Survey of India</th>
<th>Kolkata</th>
<th>Surveys floral resources in India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zoological Survey of India</td>
<td>Kolkata</td>
<td>Surveys faunal resources in India</td>
</tr>
</tbody>
</table>

- According to the National Forest Policy (1952) about 33% of the geographical area should be under forest.
- Forest cover in India is 6,78,333 sq. Km, that is 20.64% of its geographical area.
- The forest area in India is much below the world average of 34.5% and that of Brazil (57%), Sweden (58%), USA (42%), Germany (41%), and Canada (36%).
- Similarly, the head forest area in India is only 0.07 hectares as against the world average of 1.10 hectares, Canada at 23 hectares, Brazil 8.6 hectares, Australia 5 hectares, Sweden 4 hectares, and USA 3.5 hectares per head of population.
- Of this very dense forest constitutes (1.56%), moderately dense constitutes (10.32%) and open forest (8.76%).
- Mangrove cover in the country occupies 0.14% of the geographic area of which the very dense mangroves comprises (26% of mangrove cover).
- About 5 to 6% of the total forest area of the country is under the category of degraded forests.
- The total tree cover from the country (national area with 70% canopy density) has been estimated as about 3%.
- National Forestry Action Programme (NFAP) has also been formulated as a comprehensive strategic long-term plan for the next 20 years. Objective of NFAP is to bring one-third of the area of the country under tree/forest cover and to arrest deforestation.

- States and UTs in the decreasing order of their forest cover (% wise) are:
  - Lakshadweep (84.38%)
  - Andamian and Nicobar Islands (84.01%)
  - Mizoram (82.98%)
  - Arunachal Pradesh (81.25%)
  - Nagaland (80.49%)
  - Manipur (75.81%)
- Of the total area of India, M.P. has largest forest area followed by Arunachal Pradesh, Chhattisgarh and Maharashtra.
- The lowest %age of forest area in Haryana (3.97%) followed by Rajasthan, Punjab (4.8%).

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· **Social forestry** is aptly described as forestry of the people, by the people, for the people, for the first time by the National Commission on Agriculture in 1976, to denote tree raising programmes to supply firewood, small timber and minor forest produce to rural population.
· This programme was formally launched in 1978 and it became the integral part of 6th Five Year Plan in 1980.

<table>
<thead>
<tr>
<th>Geographical region</th>
<th>% of total forest area of India</th>
</tr>
</thead>
<tbody>
<tr>
<td>Himalayan Region</td>
<td>18</td>
</tr>
<tr>
<td>The Great Plain of India</td>
<td>5</td>
</tr>
<tr>
<td>Peninsular Plateau and Hills</td>
<td>57</td>
</tr>
<tr>
<td>Western Ghats and Coastal Plains</td>
<td>10</td>
</tr>
<tr>
<td>Eastern Ghats and Easter Coastal Plains</td>
<td>10</td>
</tr>
</tbody>
</table>

**THE NATIONAL FOREST POLICY**

:: India is one of the very few countries of the world where forest policy is in operation since 1894. In 1952 and 1998, revisions were made in the forest policy of 1894. The National Forest Policy 1952 classified the forests of the country into 4 categories:
1. **Protected forests** essential for physical and climatic needs.
2. **National forests** to be utilized for the economic needs of the country.
3. **Village forests** to meet the fuel and domestic needs of villages and neighbouring towns.
4. **Tree lands**: The policy envisaged the annual organisation of Van-Mahotsava and tree plantation week in the month of July/August.

**BIODIVERSITY**

- India is one of the 17 mega diverse countries which together possess 60 to 70 per cent of the world’s biodiversity.
- India ratified the International Convention on Biodiversity (CBD) in 1994. CBD is an international legal instrument for promoting conservation and sustainable use of biological diversity taking into account the need to share cost and benefit between developed and developing countries and the ways and means to support innovation by local people.
- CBD is the first comprehensive global agreement which addresses all aspect relating to biodiversity.
- CBD has near universal membership with 189 countries as its partners.
- National Biodiversity Authority set up at Chennai in 2003.
- Cartagena Protocol on Bio-safety, first international regulatory framework for safe transfer, handling and use of Living Modified Organism (LMOs) was negotiated under the aegis of the convention on Biological Diversity.

**WETLANDS**

- Wetlands are lands transitional between terrestrial and aquatic system where the water table is usually or near the water surface and land is covered by shallow water.
- **The main functions performed by wetlands are**
  1. **Filtration**: Wetlands aid in water filtration by removing excess nutrients, slowing the water allowing particulates to settle out of the water which can then be absorbed into plant roots. Without these functions, the waterways would continually increase their
nutrient & pollutant load, leading to an isolated deposit of high concentrations further down the line. Wetlands can even filter out and absorb harmful bacteria from the water.

2 **Storage:** Wetlands can store approximately 1-1.5 million gallons of floodwater per acre. By storing and slowing water, wetlands allow groundwater to be recharged. And combining the ability of wetlands to store and slow down water with their ability to filter out sediments, wetlands serve as strong erosion buffers.

3 **Biological Productivity:** Through wetlands ability to absorb nutrients, they are able to be highly biologically productive (able to produce biomass quickly). Freshwater wetlands are even comparable to tropical rainforests in plant productivity. Their ability to efficiently create biomass may become important to the development of alternative energy sources.

4 **Wildlife Habitat:** It is important not only for the preservation of species but also for a number of recreational opportunities.

**How are they threatened?**

- Wetlands are increasingly facing several anthropogenic pressures. The rapidly expanding human population, large scale changes in land use/land cover and burgeoning development projects and improper use of watersheds, discharge of industrial effluents, fertilizers and pesticides and uncontrolled siltation and weed infestation have wiped out or severely damaged over 1/3rd of India’s wetlands.

**Ramsar Convention**

- Ramsar Convention defines wetlands as areas of marsh or fen, peat land or water whether artificial or natural, permanent or temporary with the water that is static or flowing a fresh brackish or salt including areas of marine water the depth of which at low tide does not exceed 6 meters.
- It sets the criteria for identification of wetlands. A Programme on conservation of Wetlands was initiated in 1987. So far 94 have been identified.
- Mangroves, Corals, Estuaries, Bays, Creeks, Flood Plains, Sea grasses, Lakes etc. are covered under this definition
- **Identification criterion:** -
  - When an area is permanently or periodically inundated.
  - When an area supports hydrophytic vegetation.
  - When an area has hydric soils that are saturated or flooded to become anaerobic.

**The Ramsar Convention is an international treaty signed in Ramsar, Iran for conservation and wise use of wetlands.** The agreement was signed in February 1971 and came into force in December 1975. It is one of the oldest specific conventions that deal not only with the conservation of the wetlands but also its wise use. There are at present 158 contracting parties for this convention. About 1831 wetlands of international importance have been listed as Ramsar sites.

- To undertake immediate remedial measures against pollution or ecological degradation, wetlands are included under Monteux Record. In India, the convention on wetlands came into force on February 1st 1982. Initially 3 lakes namely Chilka (Orissa), Loktak (Manipur) and Keoladeo lakes (Rajasthan) were included in the Monteux Record for remedial measures and monitoring. Later on Chilka was removed, as the Government had claimed an improvement in the ecology.

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# INDIAN SITES UNDER RAMSAR CONVENTION

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Name of Wetland</th>
<th>Date of declaration</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Kolleru Lake</td>
<td>19/08/02</td>
<td>Andhra Pradesh</td>
</tr>
<tr>
<td>2</td>
<td>Deepor Beel</td>
<td>19/08/02</td>
<td>Assam</td>
</tr>
<tr>
<td>3</td>
<td>Chandertal Wetland</td>
<td>08/11/05</td>
<td>Himachal Pradesh</td>
</tr>
<tr>
<td>4</td>
<td>Pong Dam Lake</td>
<td>19/08/02</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Renuka Wetland</td>
<td>08/11/05</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Hokera Wetland</td>
<td>08/11/05</td>
<td>Jammu and Kashmir</td>
</tr>
<tr>
<td>7</td>
<td>Surinsar-Mansar Lakes</td>
<td>08/11/05</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Tsomoriri</td>
<td>19/08/02</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Wular Lake</td>
<td>23/03/90</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Ashtamudi Wetland</td>
<td>19/08/02</td>
<td>Kerala</td>
</tr>
<tr>
<td>11</td>
<td>Sasthamkotta Lake</td>
<td>19/08/02</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Vembanad-Kol Wetland</td>
<td>19/08/02</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Bhoj Wetland</td>
<td>19/08/02</td>
<td>Madhya Pradesh</td>
</tr>
<tr>
<td>14</td>
<td>Loktak Lake MR</td>
<td>23/03/90</td>
<td>Manipur</td>
</tr>
<tr>
<td>15</td>
<td>Bhitaranika Mangroves</td>
<td>19/08/02</td>
<td>Orissa</td>
</tr>
<tr>
<td>16</td>
<td>Chilika Lake</td>
<td>01/10/81</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>Harike Lake</td>
<td>23/03/90</td>
<td>Punjab</td>
</tr>
<tr>
<td>18</td>
<td>Kanjli</td>
<td>22/01/02</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Ropar</td>
<td>22/01/02</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Keoladeo National Park MR</td>
<td>01/10/81</td>
<td>Rajasthan</td>
</tr>
<tr>
<td>21</td>
<td>Sambhar Lake</td>
<td>23/03/90</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Point Calimere</td>
<td>19/08/02</td>
<td>Tamil Nadu</td>
</tr>
<tr>
<td>23</td>
<td>Rudrasagar Lake</td>
<td>08/11/05</td>
<td>Tripura</td>
</tr>
<tr>
<td>24</td>
<td>Upper Ganga River (Brijghat to Narora)</td>
<td>08/11/05</td>
<td>Uttar Pradesh</td>
</tr>
<tr>
<td>25</td>
<td>East Calcutta Wetlands</td>
<td>19/08/02</td>
<td>West Bengal</td>
</tr>
</tbody>
</table>

# WETLANDS CLASSIFICATION SCHEME

**Inland Wetlands**
- Lakes/Ponds
- Ox-bow lakes
- Cut-off meanders
- Waterlogged areas
- Playas/ Swamp/ marsh

**Coastal Wetlands**
- Estuary
- Lagoon/ Creek
- Backwater (Kayal)
- Bay
- Tidal flat/ Split/ Bar
- Coral reef
- Rocky coast
- Mangrove forest
- Salt marsh/marsh vegetation
- Other vegetation

**Man-made**
- Reservoirs/ Tanks
- Waterlogged areas
- Abandoned quarries/ Ash pond
- Salt pans
- Aquaculture
CONSERVATION

Wetland conservation has been accorded a high priority in India. Since 1987, the National Wetlands Conservation Programme of India has been financially supporting wetland conservation activities all over India. Under the Programme, 115 wetlands have been identified for conservation & management till date. India is also a party to the Ramsar Convention under which 25 wetlands from India are included in the list of wetlands of international importance.

The Wetlands (Conservation & Management) Rules, 2010 is a positive step towards conservation of wetlands in India. Under the Rules, wetlands have been classified for better management & easier identification. Central Wetland Regulatory Authority has been set up to ensure proper implementation of the Rules and perform all functions for management of wetlands in India.

MANGROVES

- These are those that survive high salinity, tidal extremes, strong wind velocity, high temperature & muddy anaerobic soil- a combination of conditions hostile for other plants.
- Mangroves not only protect the postal communities from the fury of cyclones and coastal storms, but also promote sustainable fishers and prevent sea erosion.
- Mangrove Conservation Programme in 1987. So far identified 38 mangrove areas for intensive conservation and management. These mangrove areas are identified on the recommendation of National Committee on Mangroves and Coral Reefs.
- National Mangrove Genetic Resources Centre is located at Orissa.
- Two mangrove species are endemic to India; one is Rhizophora annamalayana occurring in Pichavaram, Tamil Nadu and Heritiera kanikensis that exists only in Bhitarkanika of Orissa.
- The Coastal Regulation Zone notification 1991 under the Environmental Protection Act, 1986 recognizes the mangrove and coral reef areas as ecologically sensitive and categorize them as CRZ – (i) implying that these areas are afforded protection of the highest order.
- The National Environment policy, 2006 recognizes the mangroves and coral reef as important coastal environmental resources.
- Mangrove in India account for about 5 % of the World’s mangrove vegetation and are spread over on area of about 4500 square kilometers along the coastal states / UTs of the country. Sunderbans in West Bengal account for a little less than half of the total area under mangrove in India.

<table>
<thead>
<tr>
<th>Wetland</th>
<th>State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pichola</td>
<td>Rajasthan</td>
</tr>
<tr>
<td>Ujni</td>
<td>Maharashtra</td>
</tr>
<tr>
<td>Kabar</td>
<td>Bihar</td>
</tr>
<tr>
<td>Nalsarovar</td>
<td>Gujarat</td>
</tr>
<tr>
<td>Sukhna</td>
<td>Chandigarh</td>
</tr>
</tbody>
</table>
Extent of Mangrove Forest in Different States in sq. km

<table>
<thead>
<tr>
<th>State</th>
<th>Area (sq. km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All India</td>
<td>4461 (0.14%)</td>
</tr>
<tr>
<td>West Bengal</td>
<td>2119</td>
</tr>
<tr>
<td>Andaman &amp; Nicobar Islands</td>
<td>970</td>
</tr>
<tr>
<td>Andhra Pradesh</td>
<td>389</td>
</tr>
<tr>
<td>Gujarat</td>
<td>395</td>
</tr>
<tr>
<td>Orissa</td>
<td>190</td>
</tr>
<tr>
<td>Maharashtra</td>
<td>110</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MANGROVES IN INDIA</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mangrove</td>
<td>State</td>
</tr>
<tr>
<td>Northern Andaman and Nicobar Islands</td>
<td>Andaman and Nicobar</td>
</tr>
<tr>
<td>Sunderbans</td>
<td>West Bengal</td>
</tr>
<tr>
<td>Bhitar Kanika</td>
<td>Orissa</td>
</tr>
<tr>
<td>Lorinag</td>
<td></td>
</tr>
<tr>
<td>Krishna Estuary</td>
<td>Andhra Pradesh</td>
</tr>
<tr>
<td>Godavari Delta</td>
<td></td>
</tr>
<tr>
<td>Mahanadi Delta</td>
<td>Orissa</td>
</tr>
<tr>
<td>Pichavaram</td>
<td>Tamil Nadu</td>
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<tr>
<td>Point Calimere</td>
<td></td>
</tr>
<tr>
<td>Goa</td>
<td>Goa</td>
</tr>
<tr>
<td>Gulf of Kutch</td>
<td>Gujarat</td>
</tr>
<tr>
<td>Coondapur</td>
<td>Karnataka</td>
</tr>
<tr>
<td>Achra</td>
<td>Maharashtra</td>
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<tr>
<td>Ratnagiri</td>
<td></td>
</tr>
<tr>
<td>Vembanad</td>
<td>Kerala</td>
</tr>
</tbody>
</table>

CORAL REEFS

- Coral reefs are shallow-water tropical marine ecosystems, characterized by high biomass production and rich floral and faunal diversity.
- Fringing reefs are found in Gulf of Mannar and Palk Bay as well as A&N Islands.
- Platform reefs are along Gulf of Kachchh
- Atoll reefs mainly along Lakshadweep Archipelago.
- Four coral reefs, namely, Gulf of Mannar, A&N Islands, Lakshadweep Islands and Gulf of Kachchh have been identified for intensive conservation & management.
- Gulf of Mannar coral reef area in Tamil Nadu has been included in the world list of biosphere reserves of UNESCO.
- The Indian reef area is estimated to be 2,375 sq. km
- National Coral Reef Research Center is located at Port Blair in the Andaman & Nicobar Islands.

FORESTS RESOURCES OF INDIA

Classification of Forests

1. On the basis of administration, the forests have been classified into the following 3 categories:

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a. **Reserved Forests** (53%): These are under the direct supervision of government & no public entry is allowed for collection of timber or grazing of cattle.

b. **Protected Forests** (29%): these forests are looked after by the government, but the local people are allowed to collect fuel-wood/timber & graze their cattle without causing serious damage to the forests.

c. **Unclassified Forests** (18%): The unclassified forests are those in which there is no restriction on the cutting of trees and grazing of cattle.

2 In **Constitution of India**, forests have been classified under following categories:

a. **State Forest** (94%): These are under the full control of the government (State/ Central) and include almost all the important forest areas of the country.

b. **Commercial Forests** (5%): these forests are owned and administered by the local bodies (municipal corporations, municipal boards, town areas, district boards, and village Panchayats).

c. **Private Forests** (1%): These are under private ownership.

3 On the basis of **merchantability**, Indian forests may be grouped under 2 categories.

a. Merchantable (82%): those which are accessible.

b. Non-Merchantable (18%): These are not accessible- being situated in high mountainous areas with inaccessible topographical features.

4 **Based on Composition**: Based on composition & types of leaves, Indian forest fall into 2 broad groups:

a. **Conifer** Forests: These are temperate forests occupying about 6% of the total forest area of the country.

b. **Broad leaf** Forests (94%): These are tropical and subtropical monsoon forests.

5 **Based on Exploitability**:

a. **Exploitable**: these forests contribute 58% of the total forest area of the country.

b. Potentially exploitable (22%): these forests are reserved to be utilized in future.

6 Based on **Average Annual Rainfall**: on the basis of average annual rainfall, Indian forests have been classified into the following 4 categories:

<table>
<thead>
<tr>
<th>Vegetation Type</th>
<th>Average Annual Rainfall (cm)</th>
<th>Zone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evergreen forests</td>
<td>Above 200</td>
<td>Humid</td>
</tr>
<tr>
<td>Monsoon forests</td>
<td>100-200</td>
<td>Semi Humid</td>
</tr>
<tr>
<td>Dry forests</td>
<td>50 -100</td>
<td>Dry</td>
</tr>
<tr>
<td>Desert forests</td>
<td>Below 50</td>
<td>Very dry (desert)</td>
</tr>
</tbody>
</table>
## Natural Vegetation of India

<table>
<thead>
<tr>
<th>Climatic Regime</th>
<th>Location</th>
<th>Special Characteristics</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tropical Wet Evergreen Forest (8%)</strong></td>
<td>North-East States, A&amp;N Islands, Western parts of Eastern Ghats, lower slopes of Himalayas, Orissa, along the foot hills of Himalayas, Bhabar and Terai regions.</td>
<td>Timber of these forests is <strong>hard &amp; durable</strong> and of high <strong>commercial</strong> value. Composed of <strong>tall trees</strong> like epiphytes, parasites, lianas and rattans. These trees do not shed their leaves annually and are hence evergreen.</td>
<td>White cedar, Toon, Dhup, palaquinum, mesua, collophyllum, hopea and canes, Gurjan, chaplas, agro, muli, and bamboo.</td>
</tr>
<tr>
<td>Annual Rainfall (R) &gt; 250 cm, Annual Temp (T) = 25-27°C</td>
<td></td>
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<tr>
<td><strong>Tropical Semi-Evergreen Forest (6%)</strong></td>
<td>Upper Assam, lower Eastern Himalayas, Orissa, A&amp;N Islands.</td>
<td>These are less dense than the wet evergreen forest and represent a <strong>transition</strong> from wet evergreen to deciduous forests.</td>
<td>Champs, Kadam, benteak, Canes, Orchids, Semul, Laurel, Rosewood, aini, mundane, kadam, haldu, kanju, champa &amp; mesua</td>
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<tr>
<td>R = 200-250 cm, T = 24-27°C</td>
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<tr>
<td><strong>Tropical Moist Deciduous Forest (Monsoon Forest) (37%)</strong></td>
<td>Siwalik Hills, Shayadris, the north eastern parts of the peninsula.</td>
<td>These <strong>drop their leaves</strong> for about 6 to 8 weeks during spring and early summer.</td>
<td>Sal, Teak, Khair, Palas, Axlewood Sandalwood, Shisham, Hurra</td>
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<tr>
<td>R ≈ 150-200 cm, T = 23-27°C</td>
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<tr>
<td><strong>Tropical Dry Evergreen</strong></td>
<td>Along coast of Tamil Nadu</td>
<td>They have short trees up to 12 m height with complete canopy.</td>
<td>Kirni, Jamun, Kokko, Ritha, Tamarind, Neem</td>
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<td>R ≈ 100 cm (Oct-Dec), T ≈ 28°C</td>
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<tr>
<td><strong>Tropical Dry Deciduous Forest (28%)</strong></td>
<td>Himalayan foothills to Kanyakumari west of 100 cm isohyets.</td>
<td>They have closed &amp; rather uneven canopy, composed of mixed species of deciduous trees rising to a ht. of 12 m.</td>
<td>Bijasal, Teak, Khair, Palas, Axlewood, Jamun</td>
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<td>R ≈ 90-130 cm, T ≈ 23-27°C</td>
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<tr>
<td><strong>Tropical Thorny Forest</strong></td>
<td>Peninsular India, Rajasthan, Haryana, Punjab, western Uttar Pradesh, Kachchh, Madhya Pradesh and the foothills of the Himalayas.</td>
<td>Trees are low (6 to 10 m) and are widely scattered.</td>
<td>Acacias, Wild date, Khair, Babul, Thor, Khejra, Kanju, Neem</td>
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<tr>
<td>R ≈ 50-70 cm, T ≈ 25-27°C</td>
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</table>
**RIPARIAN FOREST**

| Wetlands, rainfall below 50 cm. | Wetland in the interior location, along canals and rivers. | Neem, Shisam, Pipal, Babul, Tamarind. |

**SUBTROPICAL BOARD LEAVED HILL FOREST**

| R ≈ 75 - 125 cm T ≈ 18 - 21 °C | Highlands of Bastar, Pachmari, Palni Hills, Khasi Hills, West Bengal, 1000-2000 m altitude of Himalayas (except in Ladakh and Kashmir) | At altitudes varying from 1000 to 2000 m. They are "stunted rain forest" and are not as luxuriant as the true tropical evergreen. | Evergreen species **shola forests** of Nilgiris (**imp. for oil**), Including Chir (main tree) Oaks & chestnut of Himalayas. |

**MONTANE WET TEMPERATE FOREST**

| R ≈ 160-300 cm T ≈ 11-14 °C | Found in the entire Himalayas from Jammu & Kashmir to Arunachal Pradesh between altitudes of 1500 m to 3300 m | These are closed evergreen forests with trees short and branchy. Branches are closed with mosses, ferns and their epiphytes. | Oaks, Magnolia, Chilauni, Birch, Deodar, Hemlock, fir, spruce, cedar, chestnut, cedar, |

**ALPINE FOREST**

| R ≈ 150-250 cm T ≈ 12 °C-19 °C | Altitude of 2880-3700 m. Alpine area of Himalayas. | Mixture of coniferous and broadleaved trees attaining height about 30 m and green nutritious grasses. | Pine, Fir, Birch, Rhododendrons, Juniper, Kail, Honeysuckle |

**LITTORAL FOREST (TIDAL FOREST OR DELTA FORESTS)**

| R ≈ 100-150 cm T ≈ 22-25 °C | Tidal Creek and along delta of rivers Ganga, Mahanadi, Godavari. Their main concentration is found in areas where tides are frequent. | Provides useful fuel wood. Densest in **Sunderbans** in Ganga Delta. | **Sundari** (Heritiera minor) in Sunderbans, Rhizophora, Nipa, Fruitican, Palm, Canes. |

**GRASSLANDS**

| R ≈ 100-150 cm T ≈ 14-18 °C | Altitude of 1,000 m and above in Himalayas | Grasslands equivalent to **steppe, pampas or savannah** are absent in India. Locally these are found on wet soils and in forests pockets in Sal belt & in the hills. | Grasses and small shrubs. |

**FLORISTIC REGION OF INDIA**

Depending on the geo-climatic conditions, the flora of India differs from region to region & altitude to altitude. India has 8 distinct-floristic-regions including:

[crackIAS.com](http://crackIAS.com)
1 **Eastern Himalayan Region**– Stretching over the hilly regions of Sikkim, West Bengal and Arunachal Pradesh recording over 200 cm of average annual rainfall. Species of plants vary from **tropical to temperate and Alpine**. The **main trees** are sal, oak, chestnut, magnolia, pyrus, bamboo, silver fir, pine, birch, rhododendrons, and alpine grasses.

2 **North Western Himalayan Region**– Stretches over J&K, HP and Uttarakhand. This region records **relatively less rainfall & temperatures**. Here again, one finds the subtropical (up to 1525 m), temperate (1525-3650 m) and Alpine (3650-4575 m) vegetation. In the **sub-Montane** region the main vegetation is Sal, Semul, and savanna type. Among the **temperate** vegetation are Chir (pine), oak, deodar, alder, birch, and conifers. At higher altitudes, trees are replaced by **alpine** pastures and trees like juniper, silver fir, birch and larch are seen.

3 **Assam Region**– Includes the whole of north east including Assam, Meghalaya, Nagaland, Manipur, Mizoram and Tripura. This region is rich in various types of **bamboos and palms** with Nilgiri type of grasslands at higher altitude.

4 **Gangetic Region**– The vegetation type ranges between the **semi-arid shrubs** of the Aravallis region to **evergreen mangroves** of the Sunderbans Delta. Sal and Arjun of the Terai region of Bihar and West Bengal are the representative species of the Primordial vegetation. The vegetation of **Uttar Pradesh** is mainly dry deciduous type which changes to moist deciduous type, in Bihar and West Bengal. Sheesham, neem, mahuwa, Jamun, acacia, ber, etc. are the example of this type of vegetation.

5 **Indus Plain**– This region spreads over Punjab, Haryana, Rajasthan, West of the Aravallis, Kachchh, and north western parts of Gujarat. Average **annual rainfall** is less than 75 cm. Acacias, cacti, wild palms, Khejra and palas etc. are the main trees of this region.

6 **Deccan Region**– This region covers the greater part of Peninsular India. This region has Teak, Tendu, Sal, palm and thorny shrubs.

7 **Malabar Region**– This region stretches all along the western coast from the Gulf of Kambhat to cape Camorin (Kanyakumari). The vegetation type ranges from **moist tropical evergreen to broad leaved mixed and monsoon deciduous type**. The Nilgiri hills show temperate forests at higher altitudes. The region also contains several species of plants of the Malay origin.

8 **Andaman & Nicobar**: The Andaman and Nicobar Islands are covered by the equatorial forests of heavy wood.

**IMPORTANT SPECIES OF TREES**

1 **Woods from the Evergreen Forests**
   a. **Rosewood**: It grows well along the slopes of the Western Ghats (Tamil Nadu, Karnataka, and Kerala) and in some parts of Orissa, Jharkhand and Chhattisgarh. The wood from these forests is **hard and fine grained**, dark purple in colour is widely used in the manufacture of furniture, floor boards and ornamental ply boards.
   b. **Gurjan**: The wood is dull reddish to brown in colour. It is extensively used for internal construction work of houses. It is also used for packing cases, tea boxes, flooring and wagons.
   c. **Telsur or Irupu**: Its wood is very hard, strong and durable which are largely used for the manufacturing of boats, bridges, piles, masts, carts and railway sleepers.
   d. **Toon**: It is obtained from the foothills of the Himalayas. Although its wood is not very hard, it is durable.
   e. **Ebony (Diospyros Ebenum)**: Its wood is lightly yellowish grey and often streaked with black. It has a metallic luster when smoothed. It is one of the most valuable woods as it...
is resistant to attack by insects. It is used for ornamental carving and decoration. It is also used for veneers, musical instruments, sports goods, piano keys, and caskets.

f. **Chaplas**: Its timber is strong and durable and hence, is in great demand for ship building, furniture making and packing boxes.

g. **Nahar**: It is found in Assam and the Malabar Coast. The wood is fairly strong and durable.

h. **Poon**: Its wood is very hard, can be easily seasoned and is mainly used as structural timber for house making.

2 **Woods of the Monsoon Forests**

a. **Sal (Shorea Robusta)**: Its wood is very heavy, hard and durable. Sal forests occupy 11.6 lakh hectares, accounting for about 16% of the total forest area of the country.

b. **Teak (Tectona Grandis)**: Its wood is moderately hard, durable, easy to work and takes a good polish. It is an expensive timber used for doors, cupboards, and furniture. Teak forests cover about 9 million hectares of the total area of the country.

c. **Shisham (Dalbergia Sissoo)**: On account for its great strength, elasticity and durability, its wood is mainly used in furniture making, musical instruments, and agricultural equipment.

d. **Haldu**: Its wood is hard, durable, and light in colour. It is used for toy making and wood carving.

e. **Palas**: Its leaves are used for rearing shellac worms.

f. **Arjun**: It is used for the making of agricultural equipment and bullock carts.

g. **Mahua (Madhuca Indica)**: Its fruits are used for the extraction of oil and flowers for wine making.

h. **Semul**: Its timber is soft and white and is used for toy making, packing cases, match boxes, and plywood. Its fruits yield soft fibre for pillows and lihafs.

i. **Mulberry**: It grows widely in monsoon areas. Its wood is soft and durable used mainly for the manufacture of sports goods (hockey, cricket bats, tennis rackets, badminton and squash rackets, and cricket stumps).

j. **Jamun (syzygium cumini)**: It is a large tree of monsoon region. Its timber is moderately strong and used for the construction of houses and furniture. Its fruits are highly beneficial in controlling diabetes and high blood pressure.

3 **Woods from the high Altitudinal Forests of the Himalayas**

a. **Chir (Pinus Longifolia)**: It occurs in the Himalayas between 900 m and 1800 m. It is used for furniture, for making tea boxes, match industry, and railway sleepers. It yields resins, gums, and turpentine oils.

b. **Deodar (Cedrus Decodara)**: It grows in the north western Himalayas in the states of Jammu and Kashmir, Himachal Pradesh, and Uttarakhand, between the heights of 1500 m and 2500 m. Its wood is of **light brown to yellow colour**. The timber is used for construction work & for railway sleepers. It is also suitable for beams, floor boards, ports, doors, window frames, light furniture and shingles.

c. **Blue Pine** (Pinus Excelsa)

d. **Silver Fir** (Abies)

e. **Spruce** (Picea Mithiana)

f. **Walnut** (Juglans Regia): Once dried it does not shrink, swell, or split. The wood is used for musical instruments, gun butts and cabinet works.

g. **White Willow** (Salix Alba): Small tree found in north western Himalayas including the Kashmir Valley. Its twigs are used for making baskets. The wood is used for making cricket bats and other sports goods.
h. **Indian Birch:** It is obtained from the higher slopes of the Himalayas. It is largely used for making of furniture plywood, and radio cabinets.

i. **Cypress:** It mostly occurs in Uttarakhand.

**SOCIAL FORESTRY**

:: Social forestry refers to the forests (trees) planted by the people of a society. It has been defined as ‘the forestry of the people, for the people, by the people’. The significance of social forestry has been emphasized in the National Forest Policy 1952 and 1988. The main objective of social forestry is to reduce pressure on traditional forests by plantation of fuel wood, fodder, timber, and grasses. The 2 types of social forestry include:

1. **Community Forestry:** It involves the raising of trees on community lands with the set objective to benefits to the community as a whole.

2. **Agro Forestry:** is a type of social forestry in which individual farmer undertakes tree farming and grows fodder plants, grasses and legumes on his own land. In agro forestry, trees (forest) are considered as a crop and they (trees) become a part of crop combinations. It involves both the big and the small farmers. It fetches additional income to farmers, improves their income and thereby, their standard of living and provide them employment during lean agricultural seasons.

**The main advantages of agro forestry are:**

1. The absentee landlords go for agro forestry to retain title of the land and to increase their income.
2. To manage the agricultural land even without the availability of family labour.
3. To ensure better land use.
4. To generate employment.
5. To conserve soil moisture.
6. To meet the needs of fuel wood, fodder and timber.
7. To protect the arable land from winds and water erosion.

**Some of its shortcomings are given below:**

1. The market oriented trees are preferred resulting in a kind of monoculture which ultimately damages the ecosystem. Instead of popular and eucalyptus, the farmers should go for the plantation of Neem, Mahua, Karanj, Arjun, and acacia. Fuel wood and fodder trees are generally neglected.
2. The exotic varieties planted by the farmers in the form of agro forestry are water exhaustive. Consequently, the underground water table is adversely affected.
3. The land under agro forestry becomes unproductive as the roots of trees become so dense that their digging and removal to bring the land under cultivation becomes very difficult unless heavy investment is made in the digging and removing of roots.
4. In the fields along which trees have been planted, the productivity per unit area decreases, as at least in about 2 metres from the trees the moisture content in the soil is significantly low.
5. The trees become the habitat of many pests and diseases, adversely affecting the crops.
6. Unscientific method of spacing of trees
PROBLEMS OF INDIAN FORESTRY

1 **Low Forest cover:** The forest cover in India is only **22.5%** as against the world average of about 35%. The overall desired forest area as recommended in the National Forest Policy of India 1952, should be **33%** (25% in plains and 60% in hilly regions) of the total geographical area of the country. Also:
   a. About 40% of the total forest area is not easily accessible.
   b. In about 50% of the total forest area, tribals have been given the rights of free grazing and cutting fuel wood.
   c. Feeling of trees
   d. Inadequate trained personnel in forestry.
   e. Inadequate protection against forest fire, insects, pests and plant diseases.

2 **Open Grazing:** Extensive damage to the Indian forests is being done by the grazing of cattle, sheep and goats.

3 **Shifting Cultivation**

4 **Growing Demand for Agricultural Land**

5 **Urbanisation** and Industrialisation

6 **Construction of Multipurpose projects** in the vicinity submerges huge forest lands.

7 **Commercial Activities:** Like resin extraction, mining, quarrying, oil extraction, plantation, orchard development have also led to large scale deforestation.

### INSTITUTIONS RELATED TO ENVIRONMENT

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<td>Salim Ali Centre for Ornithology and Natural History</td>
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<td>Central Arid Zone Research Institute (CAZRI)</td>
<td>Jodhpur</td>
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### CONSERVATION

- **National Afforestation Programme** is the **flagship scheme** of National Afforestation and Eco Board (set up in 1992) in so much as it provides support, both in physical and capacity building terms, to the Forest Development Agencies.

- **Eco-Development Forces** implemented through **Ministry of Defence** for ecological restoration of terrains rendered difficult due to severe degradation or remote location.

- **UN Convention to Combat Desertification:** World Day to Combat Desertification and Drought was celebrated on 17 June to raise awareness among people, policy planners and shareholders of the country.

- **G.B. Pant Institute of Himalayan Environment and Development, Almora** established by the Ministry in **1988** as an **autonomous** research and development institute of the Ministry has emerged as a **leading institution** for fostering scientific knowledge,
formulation of policy guidelines and development of efficient strategies for conservation and management of natural resources of Himalayan Region.

- **Indian Council of Forestry Research and Education** is the apex body in the national forestry research system to develop holistic forestry research.
- **Indian Institute of Forest Management, Bhopal**, also provides training in forest management and allied subjects to persons from the Indian Forest Service.
- **Wildlife Institute of India, Dehradun**, provides in-service training to forest officers, wildlife ecologists and other professionals for conservation and management of the wildlife resources of the country.
- **National Museum of Natural History, Delhi** for the promotion of non-formal education in the area of various aspects of environment.
- **Indira Gandhi National Forest Academy, Dehradun** imparts in-service training to IFS professionals.
- India is a party to the UN Convention to Combat Desertification (UNCCD). **Six Thematic Programme Networks (TPN)** have been identified for the purpose.
- **India is host country for TPN-2 “Agro-forest and Soil Conservation in Arid, Semi-arid and Dry Sub-humid Areas”**
  - **TPN1** - Desertification Monitoring & Assessment
  - **TPN3** - Range and Pasture Management
  - **TPN4** - Water Resources Management for Agriculture in Arid, Semi-arid & Sub-humid areas
  - **TPN5** - Drought Preparedness & Mitigation in the Context of Climate Change