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UPPCS
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Section - II

Paper

(2nd in 6 part series)

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- G.S. 1st Paper (Section-I)
- G.S. 2nd Paper
- G.S. 3rd Paper (Section-I)
- G.S. 3rd Paper (Section-II)
- G.S. 4th Paper

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Geography
(India & World)



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Preface

Geography is included in the General Studies paper in Prelims as well as GS Paper 1 in UPPCS (Main) examination. As per the syllabus of UPPCS, Geography establishes the relevance of the existence of humans, the elements that are conducive to life, and the elements that are not conducive to human life. Hence, studying these elements would make you better positioned to safeguard the elements that are necessary for life.

The recent pattern of the UPPCS (Main) examinations has not only incorporated the basic concepts of geography but also the application based questions. Therefore, this book "UPPCS Main's Special" GS (Paper 1) Section II by Sam Samayik Ghatna Chakra is an endeavour to provide a basic understanding of the subject. This book encapsulates some of the major areas of geography like – Distribution of Global Natural Resources, Physical and Climate geography, Marine resources and its Potential for India, Population and Settlement, etc.

Frontiers and Boundaries of India, Uttar Pradesh: History, Art and Culture, Literature, Language, Festivals, Geography etc. are some of the major attractions of the book.

The book is also loaded with exam-oriented and conceptual model questions and answers, with that, the aspirant can practice their understanding of the subject.

The civil services aspirants will definitely get benefitted from this book.

"Enjoy Reading"

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UPPCS (Mains) G.S. Ist Paper

Section-2

(Geography)

DISTRIBUTION OF GLOBAL NATURAL RESOURCES

Topics Covered in this Unit

- Distribution of Natural Resources across South Asia, South East Asia and India
- Land Resources
- Water Resources
- Natural Vegetation/Forests
- Soil Resources
- Factors determining for the location of Industries.

Distribution of Global Natural Resources across South Asia, South East Asia and India

Resources

Resources are key to development. They have utility or usefulness. Their purpose is to fulfil human need or desire.

According to **Erich Zimmermann**, "Resources are not, they become." He assumed resources as cultural concept, as the culture develops, the natural substances get converted into resources.

Example

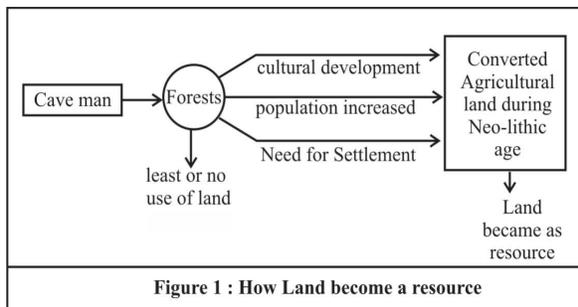


Figure 1 shows that caveman had no use for forests but as population rose, the requirement for settlement also rose. So, agriculture developed during the Neo-lithic age and forest land were converted into agricultural land.

Following are some conditions to convert substances into resource-

- (i) **Usefulness** - Substance must be usable
- (ii) **Technology** - For exploitation

- (iii) **Culture** - Human need and desire
 - (iv) **Infrastructure** - For exploitation of resource
 - (v) **Transformation** - Value addition of resource.
- Developing countries are not backward because of absence of natural substances but root cause is absence of technology.

Example - Africa has huge hydel potential because of vast number of waterfalls but due to lack of capital and technology, these waterfall are just natural substance not resource.

On the contrary "Japan" as a nation has no natural resources like oil, natural gas, coal etc. but is technologically advanced.

Classification of Resources :

The resources can be classified in following ways-

- On the basis of origin
- On the basis of exhaustiveness
- Human Resources

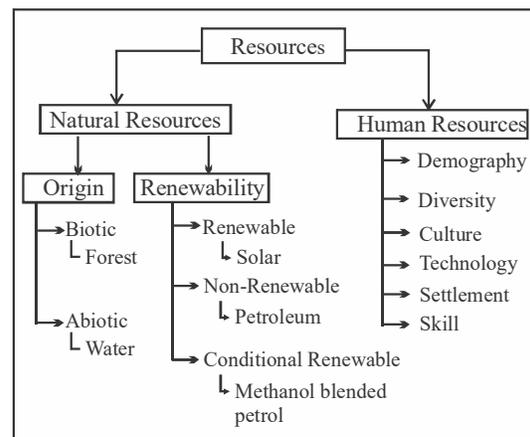


Figure 2 : Resource Classification

Figure 2 shows classification of resources into 2 categories- natural resources and human resources.

Natural resources cover lithosphere, atmosphere and hydrosphere.

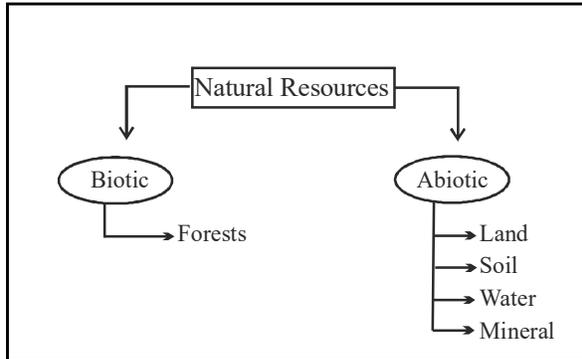


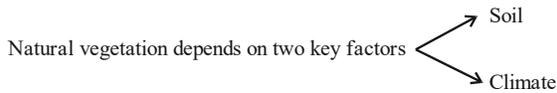
Figure 3 : Major Natural Resources

There are 2 ways to classify natural resource on the basis of life biotic and abiotic and on the basis of renewability.

Now, the focus will be on major natural resources as shown in figure 3.

Natural Vegetation/ Forest

Natural vegetation is a vital natural resource which refers to a plant community that grows naturally and left undisturbed by humans.



Soil is important determinant of vegetation. Soil provides chemicals such as mineral, water etc. and controls pH-value. Apart from this soil texture also plays major role in development of vegetation in a particular area, for example texture affects water retention capacity of soil, that's why if proportion of fine particles is relatively higher, then it is clayey soil and it does not suit 'citrus' family vegetation.

So, Edaphic factors are key determinants of vegetation. Soil favours specific type of vegetation and in turn get benefitted by those vegetation.

Climate is another important factor affecting distribution of vegetation across the globe because it has following factors -

- (i) Temperature
- (ii) Rainfall

Cold Zone	90°N	Arctic or Polar Type Tundra Lichen, Moss		
	60°N			
Cool temperate Zone	45°N	British type (Deciduous Forest)	Siberian type (Coniferous Forest)	Laurentian type (Mixed Forest)
	30°N	Mediterranean type (Mediterranean Forest)	Steppe type (Temperate grassland)	China type (Warm & Wet Forest)
Hot Zone	10°N	Hot desert (Desert Vegetation)	Sudan type (Tropical grassland)	Monsoonal type (Monsoon forest)
	0°N	Hot Wet Equatorial Climate (Equatorial Rain forest)		



Figure 4: Different Climate types creating different types of natural vegetation, latitude wise

Due to temperature and rainfall variation, different types of natural vegetations are formed as shown in figure 4. So major types of vegetation are shown in figure, latitude wise.

On the basis of climate and relief, the natural vegetation of India can be divided in following types -

- (1) Tropical evergreen and semi-evergreen forests
- (2) Tropical deciduous forests
- (3) Tropical thorn forests
- (4) Mountain forests
- (5) Littoral and swamp forests



Figure 5 : Natural Vegetation in India

(1) Tropical Evergreen and Semi Evergreen Forests

- There is annual rainfall of more than 200 cms, average annual temperature above 22°C and a short dry season.
- It is found **along the Western Ghats**, certain **regions of North East India** and **Andaman and Nicobar Islands**. The **lower slope of Eastern Himalayas** and **Eastern Ghat** as well as neighbouring hills also grow this kind of vegetation.
- Due to dense growth of trees, the sunlight cannot reach the ground. These forests are hard, durable fine grained and of high economic value. The important trees are **rosewood, ebony, mahogany, rubber, cinchona, palm, cedar, hollock** etc.

(2) Tropical Deciduous Forests

- There is annual **rainfall range of 70 to 200 cm**, with mean annual temperature of about 27°C.
- These are found along **foot hills of Himalayas, Jharkhand, west Odisha, Chhattisgarh**, on the eastern slope of Western Ghat, rainier part of plateau and northern plain.
- The important trees of the moist deciduous forests are **teak, sal, shisham, sandalwood, arjun, mahua, neem, tendu** etc.

(3) Tropical Thorn Forest

- There is average annual **rainfall of less than 25 cm** and average annual temperature ranges between 25°C to 30°C, with low relative humidity.
- These forests are found in arid and semi-arid **regions of Gujarat, Rajasthan** and **Deccan plateau**.
- These trees are scattered and have long roots which penetrate deep into soil to extract moisture. The important trees of the tropical thorn forests are palm, cacti, euphorbia, babul, etc.

(4) Mountain Forest

- There are 2 types of mountain forests -
 - (i) Forests in the Himalayan ranges
 - (ii) Forests in Peninsular hill ranges

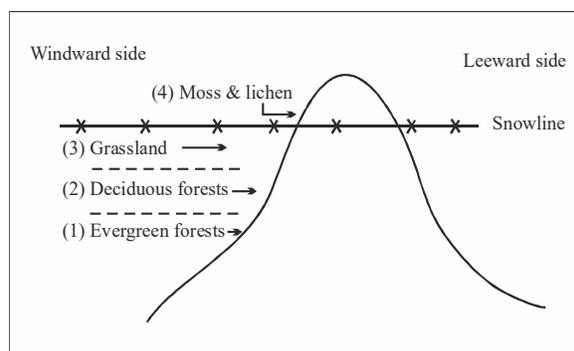


Figure 6: Variation in mountain forest

- Figure 6 shows four variants of vegetation formed due to temperature difference.
- The forests in peninsular hill ranges cover Vindhyas, Western Ghat and the Nilgiris. The temperate forests are called '**Sholas**' which are considered as climatic climax vegetation.

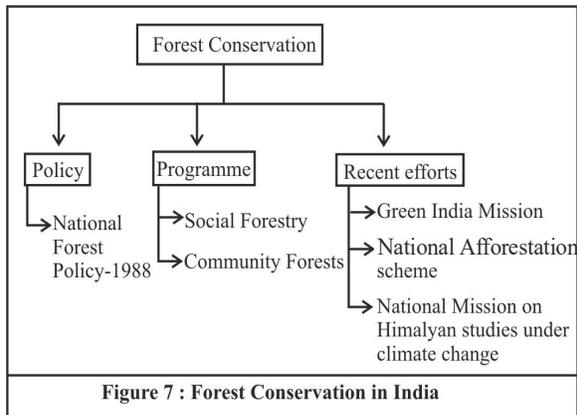
(5) Littoral and Swamp Forests

- These forests are found in deltaic regions of major rivers and are prone to tidal influence. Mangroves grow along the coast in salt marshes, tidal creeks and estuaries especially in Sunderbans of West Bengal, Andaman and Nicobar Islands.

As this ecosystem lies between land and sea, it protects the coast against erosion due to wind, wave and currents.

Forest Conservation in India : The forests have close relationship with life and environment, they provide various direct and indirect benefits to humanity. However, due to over-exploitation, pollution and human greed, these forests have suffered a lot.

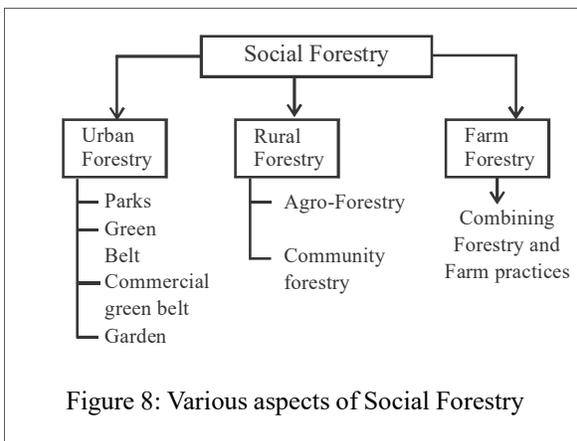
- **The conservation of forest is** very important for survival and prosperity of humankind. Realising this, **Article 51A(g)** of the Indian Constitution states that it shall be fundamental duty of every citizen to protect and improve the natural environment including forests and wildlife.
- The Government of India has taken several administrative and legislative steps for conserving the forests like-



- National Forest Policy-1988** has following aims–
- (i) Bringing 33% of the geographical area under forest cover.
 - (ii) Sustaining environmental stability and to restore those forests where ecological balance has been disturbed.
 - (iii) Conserving the natural heritage of the country.
 - (iv) Keep check on soil erosion, extension of the desert land and reduction in the incidence of flood and droughts.
 - (v) Encourage social forestry and afforestation.
 - (vi) Encourage people for planting trees and stop felling of trees.
 - (vii) Increasing productivity of existing forests to yield timber, fuel, fodder etc.

Social forestry

Social forestry refers to the management and protection of forests and afforestation of degraded lands with the purpose of helping the ecological, social and rural development.



Urban Forestry refers to raising and management of trees on public and private owned lands.

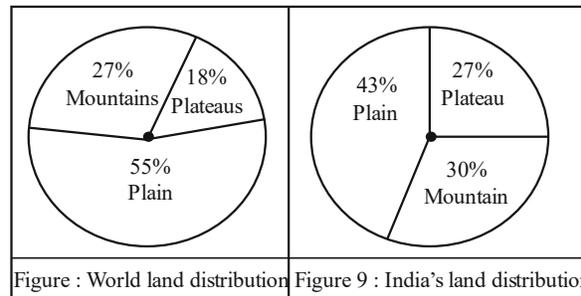
Rural forestry focuses on agro-forestry and community forestry. Agro-forestry is hybrid of both agriculture and forestry, thus producing 'crop' as well as 'wood'.

Whereas **community forestry** refers to forest management activities undertaken either individually or cooperatively by local people, either on their own or on leased private lands or community lands. It also aims at providing benefits to the society as a whole.

Farm forestry aims to plant suitable type of trees in farm area like bamboo, teak, cashew, babool etc.

LAND RESOURCES

90% of world population lives on 30% of land area thus leaving 70% of land area mostly uninhabited.



Based on the utility the land can be divided into following types-

- (i) **Forest land** - It can be deciduous or evergreen forests.
- (ii) **Wasteland** - It is barren land where, there is no agriculture cultivation.
- (iii) **Cultivable wasteland** - Agricultural activity is done once in five years.
- (iv) **Fallow** : It refers to uncultivated land - agricultural activity is done once in two years.
- (v) **Mining land** - Mining activity is done in coal, iron fields.
- (vi) **Settlement** - Human created areas like buildings, roads, schools etc.

Above categorisation of 'land use' is controlled by both physical factors (Soil, Climate, Water) and human factors (Population, Technology).

There are following problems associated with land resource

- (i) Land Degradation
- (ii) Land Slide
- (iii) Soil Erosion
- (iv) Desertification
- (v) Over-Contamination
- (vi) Soil Contamination
- (vii) Mining activities
- (viii) Over-grazing

Above factors lead to change in the chemical properties of land, such as salinity, alkalinity etc. The ideal ratio of NPK (Nitrogen : Phosphorus : Potassium) is 4 : 3 : 1, but due to land contamination, actual ratio is 6.10 : 2.46 : 1 (which is very dangerous).

Such imbalances in 'NPK' adversely impact the texture of the soil, due to which land resource loses its value.

Following are the land conservation methods which can be employed -

- (i) Afforestation
- (ii) Shelter belt of plant
- (iii) Land Reclamation
- (iv) Regulated use of chemicals
- (v) Stabilisation of sand dunes
- (vi) Wasteland Management
- (vii) Hazard Mapping using GIS (Geographical Information System) at landslide areas.

Soil Resources

Land and soil are closely related. Soil is a valuable natural resource that determines crop intensity and agricultural productivity.

Soil is **defined as top thin layer of crust**, which consists of weathered and eroded parent rock as well as organic matter.

Following factors affect soil formation-

1. **Parent Material** : It is deposited by streams or derived from in-situ weathering. In this stage, soil inherits many properties like mineral composition, colour, particle size, and chemical elements. For example - Black soil-derives its colour from lava rock.
2. **Climate** : It is one of the important factors in the formation of soil because it affects the rate of weathering of the parent rock.

3. **Role of Precipitation** : The variability in the precipitation modifies the composition of the soil. For example - areas with little rainfall and a high rate of evaporation lead to the accumulation of salts in the soil.
4. **Biota (Flora, Fauna, and Microorganisms)** : Biota, in conjunction with climate modifies parent material to produce soil, for example - leguminous plants (such as beans, peas, and groundnuts) have nitrogen-fixing bacteria. These plants take the nitrate ions directly from these nitrogen-fixing bacteria. It improves the fertility of the soil by fixing atmospheric nitrogen to ammonia or ammonium.
5. **Role of temperature** : It also plays an important role because fluctuations in temperature cause shrinking and swelling, frost action, and general weathering in soil.
6. **Topography (Relief, Altitude, and Slope)** : It is considered a passive factor in modifying the effects of climate because it affects soil processes, soil distribution, and the type of vegetation.
7. **Time** : The formation of the soil is not one day process but requires many years to form. Newer formations of soil have some characteristics from their parent material, but as they age, the addition of organic matter, exposure to moisture, and other environmental factors may change its features.

Pedogenesis is the natural process of soil formation that includes a variety of processes such as weathering, leaching, laterization, podzolization, calcification, capillary action etc.

Soil profile :-

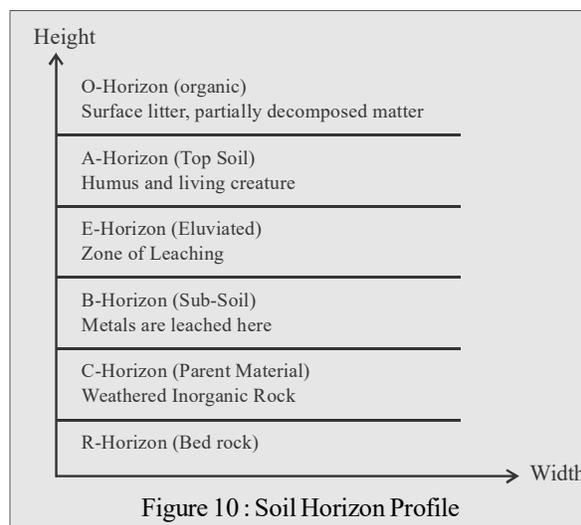


Figure 10 : Soil Horizon Profile

Figure 10 shows various Soil Horizons such as-

- (i) **O-Horizon** - It has leaves, needles, twigs, moss lichen etc. So it is dominated by organic material. However it can also be mineral soil.
- (ii) **A-Horizon**- This layer is depleted of iron, clay, aluminum, organic compound and other soluble constituents.
- (iii) **E-Horizon**- This represents significant leaching of clay, iron and aluminum oxides. It is present only in older and well developed soil.
- (iv) **B-Horizon** - Iron, clay, aluminum and organic accumulate in this horizon.
- (v) **C-Horizon** - It has weathered parent material
- (vi) **R-Horizon**- It is a continuous mass of hard rock usually under 50 feet beneath the surface.

Types of Soils :

Since soil depends on parent material, relief, climate and biological factors, there are, different types of soil.

On the basis of particle size, there are 3 types of soil-

- (i) **Sandy Soil** - If soil contains greater proportion of big particles, it is known as sandy soil.
- ii) **Loamy soil** - If soil contains equal proportion of large and fine particles, it is loamy soil.
- (iii) **Clayey soil** - If soil contains greater proportion of fine particles, it is known as clayey soil.

In Indian context, soils are divided into following categories.

- (i) **Alluvial Soil**
- (ii) **Black Soil**
- (iii) **Red Soil**
- (iv) **Laterite Soil**
- (v) **Mountain-Forest Soil**
- (vi) **Arid and Desert Soil**
- (vii) **Saline and Alkaline soil**
- (viii) **Peaty and Marshy soil**

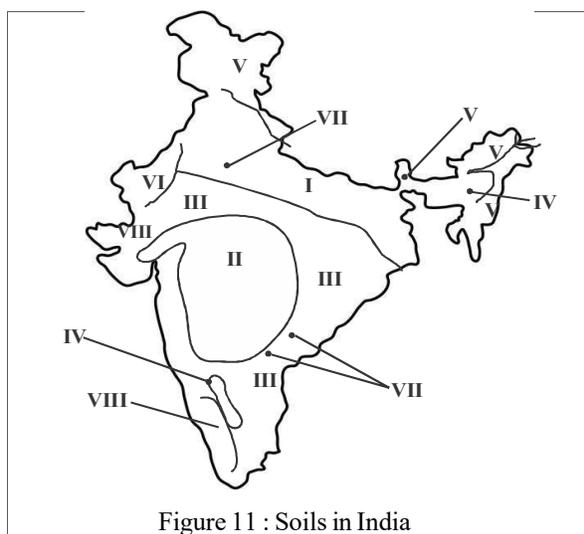


Figure 11 : Soils in India

(i) Alluvial Soil

- These are formed mainly due to silt deposited by Indo-Gangetic-Brahmaputra rivers.
- These soils are immature, loamy, porous and have weak profile due to recent origin.
- It has good proportion of iron oxide and lime but deficient in nitrogen.
- This soil is formed in river plain area as well as in delta region of rivers.
- It is conducive for growing rice, wheat, sugarcane, cotton, vegetable, fruits etc.

(ii) Black Soil

- The parent material is basaltic lava region of deccan trap.
- The soil has extra-ordinary fertility and high capacity of moisture retention. In summer, soil shrinks and develops deep cracks.
- The soil is low in phosphates, nitrogen and humus.
- This soil is distributed in Deccan trap area like Madhya Pradesh, Maharashtra, Karnataka, Gujarat, Telangana and Tamil Nadu.
- These soils are best suited for cotton crop hence called **regur** or **black cotton soil**.
- Other crops for which this soil is suitable are wheat, jowar, tobacco, millet etc.

(iii) Red Soil

- The parent rocks are granite, gneisses and quartzites.
- These soils are acidic in nature and poor in lime, phosphate, nitrogen and humus but fairly rich in potassium.
- These soils cover 'black soils' region like a circle. These are prominently found in Tamil Nadu.
- These soils are mostly loamy, so can not retain water. Hence proper use of fertilizer and irrigation technique is required to receive good yield of cotton, wheat, rice, pulses, millet etc.

(iv) Laterite Soil

- These are formed in areas with high temperature and high rainfall with alternate wet and dry period.
- There is leaching of soil, so nutrients get washed away by water. That's why it is poor in lime, potash and nitrogen. However they are rich in bauxite or iron oxides.

- It is distributed along Western Ghats, Eastern Ghats and across North East India and hilly region of Deccan plateau.
- Laterite soil needs manuring and irrigation and is more suitable for plantation crops like tea, coffee, coconut, rubber etc.
- Laterite soil is end product of leaching so it can not be weathered further and is durable so it can be used as valuable for building material like bricks.

(v) Forest and Mountain Soil

- These are heterogeneous forms of soil found on foot hills covered by forest.
- These soils mainly found in Himalayan region, Western Ghats and Eastern Ghats.
- The soil is rich in humus and deficient in potash, phosphorus and lime.
- It is suitable for plantation of tea, coffee, spices and tropical fruits.

(vi) Arid and desert soil

- This is mainly aeolian sand with some clay.
- The sand is blown from Indus basin and coast by prevailing South-West monsoon winds, thus covering arid and semi-arid regions of Rajasthan, Punjab and Haryana.
- These soils create wasteland. However, there is possibility of reclaiming these soils if proper irrigation facilities are available.

(vii) Saline and Alkaline Soil

- The top layer of soil is covered with salt particles.
- These soils are found in canal irrigated areas and in areas of high water table, such as Rajasthan, Uttar Pradesh, Bihar, Punjab, Haryana and Maharashtra.
- This is mainly due to side effects of improper or excess irrigation. This soil is infertile and unfit for agriculture.

(viii) Peaty and Marshy Soil

- These soils are found in most humid regions. These are black, heavy and highly acidic.
- These soils are deficient in potash and phosphate.
- These are found near foot hills, coastal areas like Sundarban.

Soil Degradation

Soil degradation refers to the decline in soil quality caused by various factors such as natural calamity or improper use of agricultural methods as shown in figure 12.

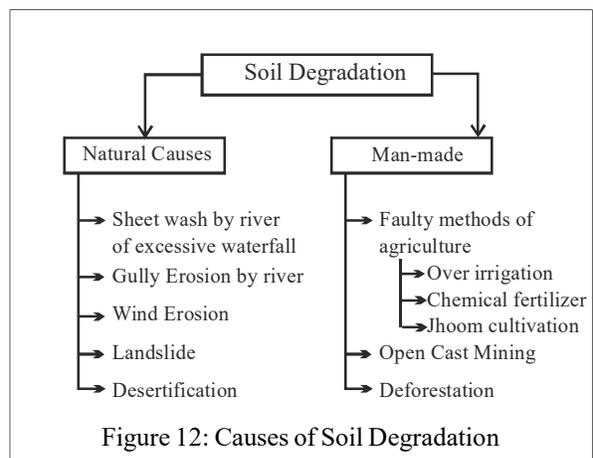


Figure 12: Causes of Soil Degradation

80 million hectares, which is one-fourth of our total land area, is exposed to wind and water erosion. We lose 'fertile soil' and there is growing extension of wasteland. Various impacts of soil degradation or erosion are shown in figure 13.

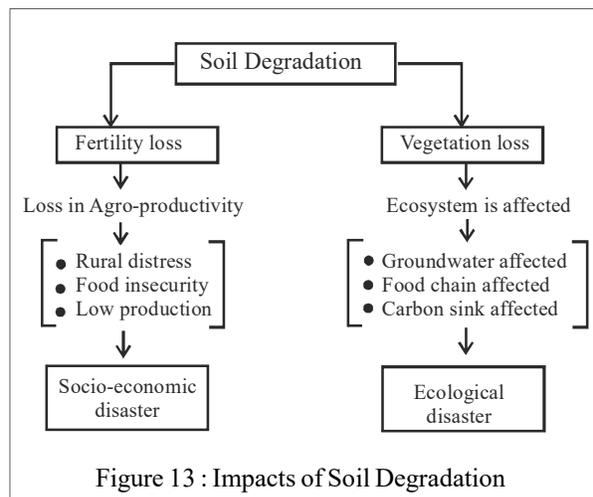


Figure 13 : Impacts of Soil Degradation

In order to address above problems, there are following soil conservation methods

- Afforestation and reforestation** to increase forest cover.
- Contour ploughing** in which cultivation is done against the direction of the wind.
- Growing shelterbelt** of plant at field boundary.
- Effective implementation of **land reclamation programmes**.
- Regulated use of chemical** fertilizer and pesticide.
- Ensuring micro-nutrients supply to plants using **soil health cards**.
- Hazard mapping** of 'Land Degraded Area' using GIS technique.

(viii) Promoting '**Organic Farming**' and spreading awareness of wasteland management.

Soil not only provides nutrients to plants but also protects them from weathering and erosion so we must focus on soil conservation methods.

Water Resources

Water is a valuable resource used in agriculture, industries and domestic sphere. Water is a cyclic resource with abundant supply.

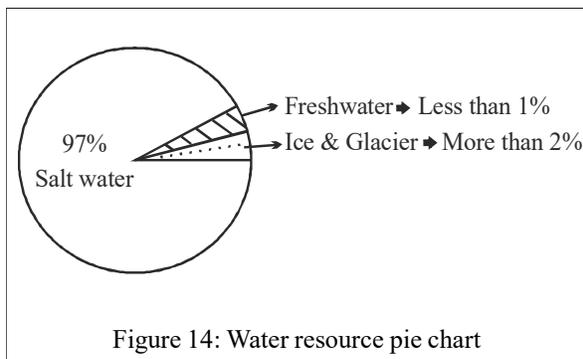


Figure 14: Water resource pie chart

However, as figure 14 shows less than 1% of water is freshwater out of which one-third is ground water and rest in lakes, ponds, rivers etc. With increasing population, there is growing water scarcity.

India has about 17% of world population and 4% of world's water resources. The total usable water resource in India is 1,122 cubic km.

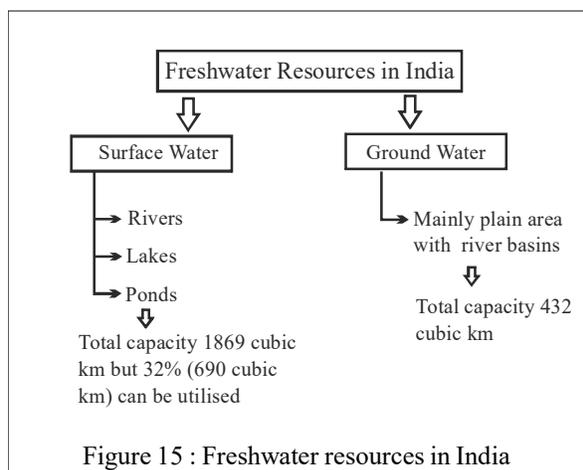


Figure 15 : Freshwater resources in India

There are various problems arising with respect to water such as–

(i) **Water Pollution** – Over-withdrawal of ground water in some states like Rajasthan and Maharashtra has led to high fluoride concentration in ground

water while in some states like Bihar and West Bengal it has led to high arsenic concentration.

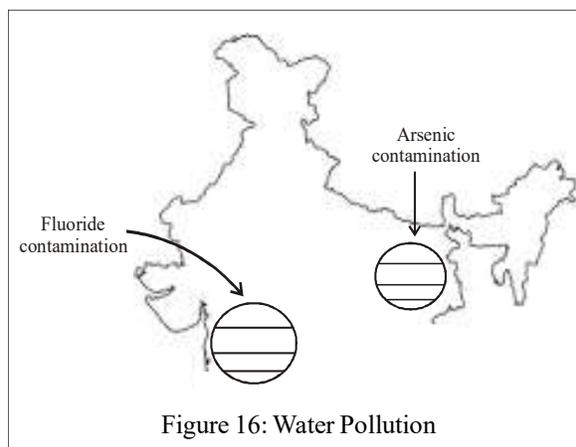


Figure 16: Water Pollution

Further, water gets polluted by foreign matters such as micro-organism, industrial, chemicals and other wastes. These pollutants also seep into and pollute groundwater.

(ii) **Water Availability** - More than 50% of population has no access to safe drinking water. Recently released **NITI Aayog**, Composite Water Management Index report says that 6% of GDP will be lost by 2050 because of these issues.

Further, the per capita availability of water is dwindling each day due to increase in population, whereas water is getting even more polluted.

In order to resolve above mentioned issues, we need an inclusive approach for sustainable use of water resources. There is need to encourage watershed development, rainwater harvesting, water recycling and reusing.

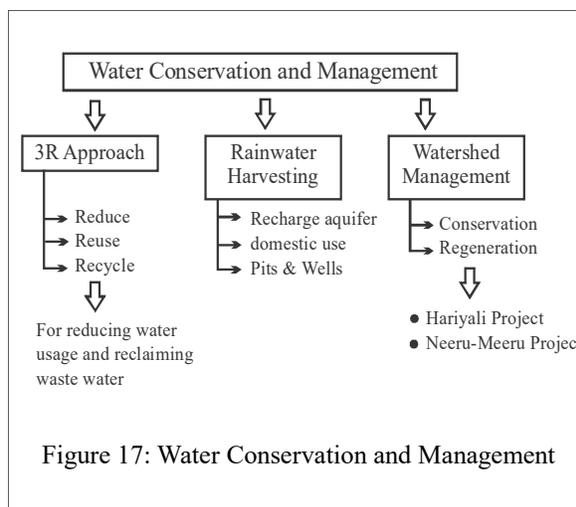


Figure 17: Water Conservation and Management

3R Approach focuses on following measures -

- (i) **Reducing wastage** of water by using less water such as using bucket instead of shower for bathing.
- (ii) **Reusing the water** such as using water coming from 'RO' purifier as waste water for garden.
- (iii) **Recycling water** : using water pumps, filters, chlorine and alum for purifying waste water in bulk amount for its recycling.

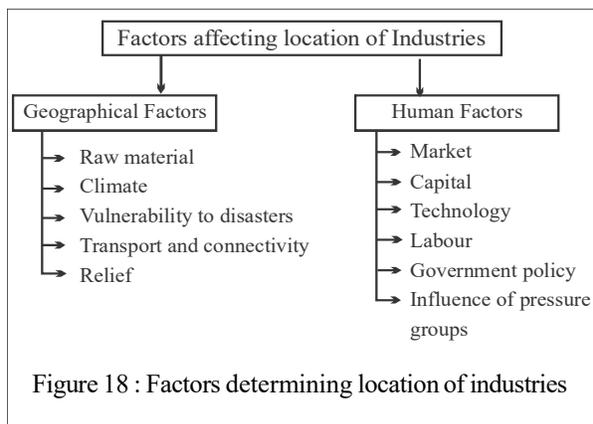
Watershed is a 'drainage basin' which is an area where surface water and rainwater meet. Watershed management refers to integrated planning for land and water with various methods like percolation tank, recharge wells. For example, **Hariyali Project is a watershed development project** which aims at enabling the rural population to conserve water for drinking, irrigation, fisheries and afforestation.

Rainwater harvesting is a method to store rainwater for various usage such as washing, gardening, recharging groundwater. It is a low cost and eco-friendly technique to increase water availability.

Urban areas can take advantage of rainwater harvesting whereas rural areas should have watershed management at various levels.

Factors Determining the Location of Industries (with Special reference to India)

Industries are not evenly distributed because they tend to concentrate at certain locations due to favourable locational factors.



Following are the geographical factors determining location of industries -

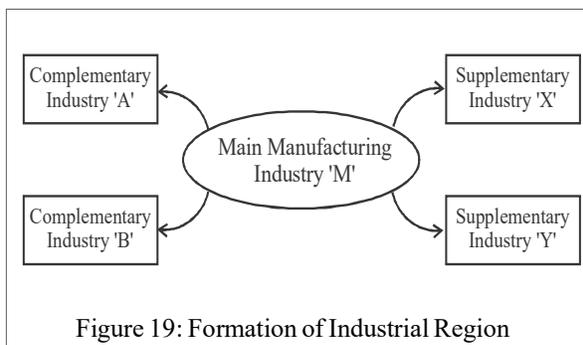
- (i) **Raw Material** - The availability of natural resources such as 'iron ore' for iron and steel industry.
- (ii) **Climate** - The temperature and humidity should be favourable for product, for example, humid climate favours cotton textile industry because fibres do not break in this climate.
- (iii) **Vulnerability to disaster** - The location of industry should not be in earthquake-prone zones, or volcanic or flood prone areas, so that production can happen without being affected.
- (iv) **Transport and connectivity** - There should be natural way of transport like river or sea transport because it could also be important "human factors", for e.g., railways, roadways etc.
- (v) **Relief** - Highly uneven reliefs like mountain or hills are not good for industries because of weak transport and vulnerability so a stable or plain area is preferred.

Following human factors determine location of industries-

- (i) **Market** - There should be market for 'forward' or 'backward' linkage or end consumer, as near as possible.
- (ii) **Capital** - Most Industries require huge investment so the role of investor, banking institution etc. becomes important.
- (iii) **Technology** - To convert natural substance into resource and bring effectiveness in harnessing resource.
- (iv) **Labour** - Human resource in the area in the form of skilled labour as a factor in business.
- (v) **Government policy** - The government's policy must support the industries and with the ease in land acquisition, taxation policies etc., the government should increase the ease of doing business.
- (vi) **Influence of Pressure Groups** - They seek to influence political and corporate decision makers so co-operation plays a major role.

Major Industrial Regions in India

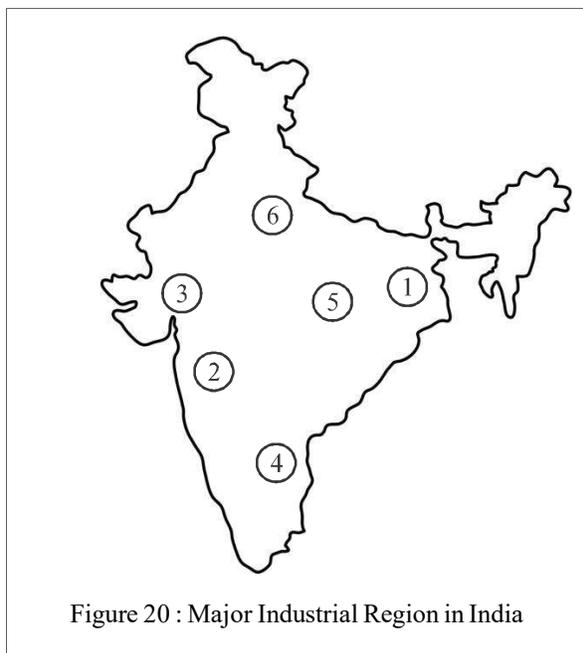
There are 6 major industrial regions in India formed due to inter-play of locational factors affecting location of industries. The manufacturing industries mainly incorporate '**agglomerative effect**' which attracts other industries and clusters are formed.



For example, since '**Iron and Steel**' is used as raw material in other products and is heavy so it attracts other industries like automobile industry.

There are following 6 Industrial Regions-

- (1) Hooghly-Industrial Region
- (2) Mumbai-Pune Industrial Region
- (3) Ahmedabad - Vadodara Region
- (4) Madurai - Coimbatore - Bengaluru Region
- (5) Chhotanagpur Plateau Region
- (6) Agra-Mathura - Gurgaon - Ambala Industrial Region



(1) Hooghly Industrial Region

There are following factors which led to development of Industries

- (i) **Raw Material** - Tea from Assam and Darjeeling, jute from delta region and coal-iron from Chhota Nagpur plateau.
- (ii) **Labour** - Cheap labour easily available from out-migrating states of Bihar and Odisha.
- (iii) **Capital** - British investment during colonial era and rich class of Bengal ready to invest.
- (iv) **Transport** - The river Ganga and Hoogly provide connectivity which was later supplemented and augmented by rail and road.

However, at present this region is facing many problems such as lack of raw material since jute producing region went to Bangladesh during Partition there is silting at Kolkata port and due to over population, there is land scarcity.

(2) Mumbai-Pune Industrial Region

There are following factors which led to development of industries -

- (i) **Raw material** - Easy availability of raw cotton from black soil area.
- (ii) **Climate** - Coastal humid climate which is ideal for weaving and spinning.
- (iii) **Power** - Easy availability of electricity from Western Ghat hydro-power projects.
- (iv) **Market** - Location of port on west coast which ensured easier access to western market.
- (v) **Capital** - British investment and rich class ready to invest.

Further, opening of Suez Canal in 1865 established closer link with Europe. Not only textile but chemical, engineering, ship-building, electrical, drugs etc. became major industries with time.

However, after Partition 80% of long staple cotton growing area went to Pakistan. Further congestion is a serious issue so land prices are high.

(3) Ahmedabad - Vadodara Industrial Region

There are following factors which led to development of industries -

- (i) **Raw material** - 'Cotton' producing region of black soil.

- (ii) **Market** - After Partition, Karachi port went to Pakistan so there was need to develop 'Kandla' port to access market.
- (iii) **Transport** - Easy connectivity to north Indian plains as compared to Mumbai-Pune Industrial region.
- (iv) **Potential of new industries** - The petro-chemical industry around Vadodara and Ankaleshwar developed after oil was discovered in the Gulf of Cambay.

Further, this region has diversified into manufacture of diesel engine, textile machinery, pharmaceuticals and food processing.

(4) Madurai - Coimbatore - Bengaluru Region

There are following factors which led to development of industries -

- (i) **Raw material** - There is a cotton growing tract and other raw materials for agro-industries like coffee, oil, leather, sugar, rubber etc.
- (ii) **Market** - There is a large domestic market.
- (iii) **Labour** - Cheap and skilled labour.
- (iv) **Power** - Regular supply of power from Mettur, Sivasamudram and Sharavathi projects.

So, it was originally, predominantly cotton and sugarcane growing region and further silk textile, sugar, chemicals, machine tools and leather goods industries.

(5) The Chhota Nagpur Plateau Region

There are following factors which led to development of Industries-

- (i) **Raw material** - Discovery of coal and iron in Chhota Nagpur mineral region.
- (ii) **Power** - Easy power availability from the Damodar valley project and from coal based thermal power projects.
- (iii) **Labour** - Availability of cheap migrant labour from Bihar, Odisha and eastern U.P.
- (iv) **Market** - Proximity to domestic markets as well as port location.

(6) Agra-Mathura- Gurgaon - Ambala Industrial Region

There are following factors which led to development of industries-

- (i) **Raw material** - Agro-based raw material from near agricultural belt like sugarcane, cotton etc.

- (ii) **Power** - Hydel power from Bhakra and thermal power from Harduaganj and Faridabad.

- (iii) **Market** - National Capital Region of Delhi and northern plain area.

It has various nodal centres which support different industries like **Agra for glasswork & leather goods, Mathura for oil refinery and petro-chemicals, Faridabad for engineering and electronics, Saharanpur for papermill and Meerut for sugar.**

Model Q & A

Q. India has many types of soil. Discuss the role of soil health card in this context.

- A.** Soil is the most valuable resource as it ensures food security, agro-based industries and forward-backward linkages in right order.

Soil is affected by relief, landforms, climate, vegetation and parent material. Since India has rich geological and climatological diversity, there are many types of soil such as- alluvial which lies in flood plains of northern India, black soil covers the Deccan plateau region, red soil covers the boundary of Deccan plateau, arid soil in western part of country and forest soil in foothills and forests.

The soil health card ensures better utilisation of land resources. The sample of soil is collected from farmer's land.

	Nutrient Required	Fertilizer Required
Crop ₁	NPK	Urea
Crop ₂	Micro-nutrient	Company ₁
⋮		
⋮		

Figure 1: Soil Health Card

Soil Health Card carries crop-wise recommendations of nutrients and fertilizer. Each crop has its own demand for nutrients.

All soil samples are tested in various soil testing labs across the country. The expert analyses soil for its strength and weakness and gives rating like poor (1-3),

fair (4-6) and good (7-9) based on soil structure, pH-value, earthworm, diversity of macro-life, ease of penetration etc.

To boost the health of soils across the country, ministry of Agriculture and Farmers, Welfare launched Soil Health Card Scheme on December 5, 2015.

There is a need for increasing awareness about it, to make it more accessible to the farmer's in need.

Q. Discuss importance of Himalayan Watershed. Analyse the vulnerability of this region.

A. Watershed - A watershed is an independent hydrological unit. It can be a drainage basin or catchment area of a particular stream or river.

Himalayan Watershed - It covers all Himalayan rivers and streams but major one are Indus, Ganga and Brahmaputra.

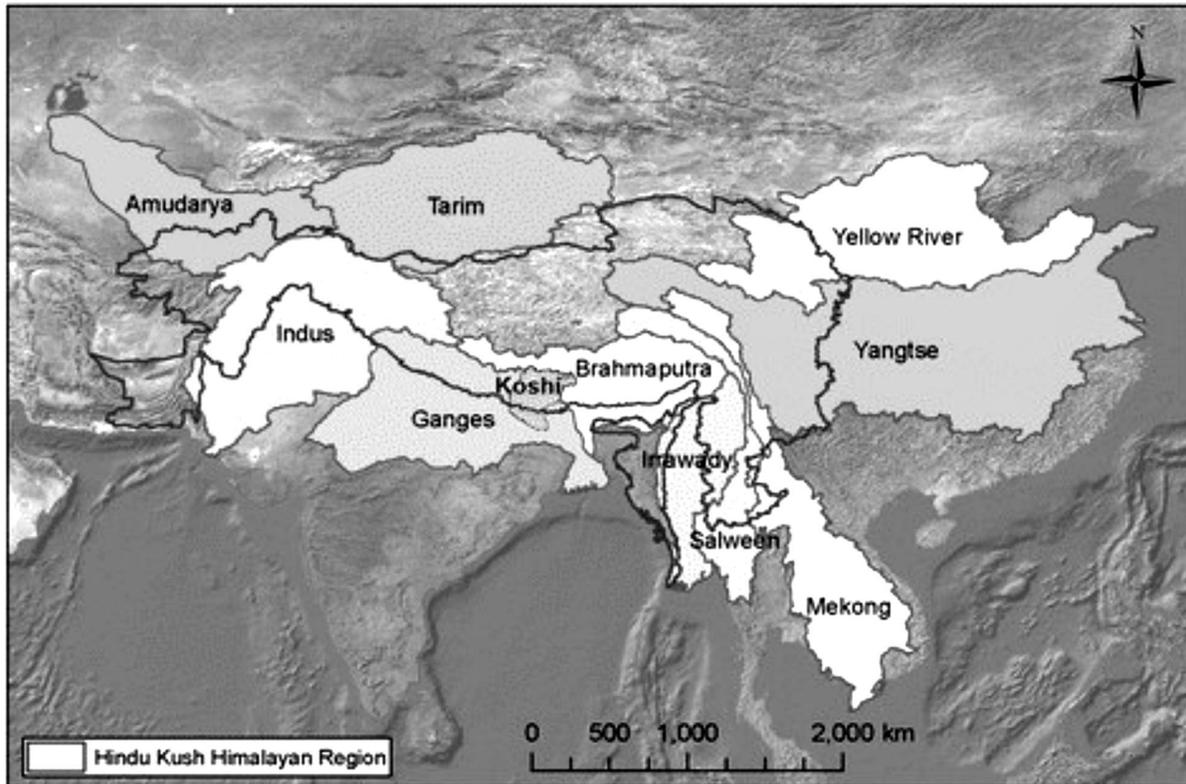


Figure 1 : Himalayan Watershed

There are following salient features of Himalayan Watershed.

- (i) **Water Supply** - For domestic, agricultural and industrial purpose, there is equal and sustainable distribution of water.
- (ii) **Protection and conservation of land resources**, such as, checking soil erosion.
- (iii) **Flood control** through small multi-purpose reservoirs and other water storage structures.
- (iv) **Hydro electricity production**, so that run off water is utilised for power.

Himalayan watershed region is facing following vulnerabilities-

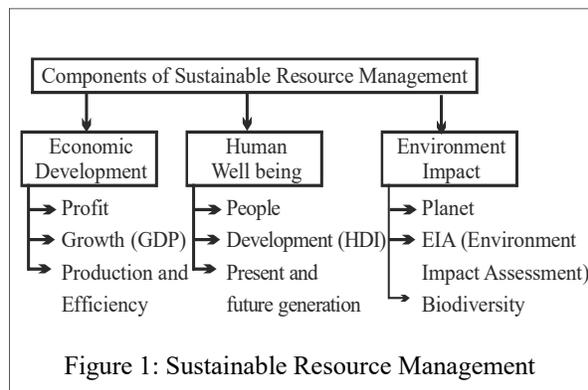
- (i) **Climate change** - The global warming is the biggest threat to Himalayan ecosystem. Many species of flora and fauna have lower capacity to bear higher temperature.
- (ii) **Infrastructural Activities** - Increasing human activities by way of construction of roads, bridges and dams make this region more ecologically vulnerable.
- (iii) **Industrial Activities** - Increasing pollution especially burnt of acid and chemical rain.
- (iv) **Tourist Activities** - The number of cars, bikes etc. have been increased many fold.

Above activities resulted in melting of glacier. We need integrated watershed **management** project with environmental approach.

Q. What do you understand by sustainable resource management? Discuss with suitable examples.

A. Sustainable resource management is a way to utilise resources so that not only its economic viability is maintained but also the need of present and future is also taken care of.

'**World Wildlife Funds**' (WWF) The Living Planet Report says exploding human consumption is the main reason behind anthropocene extinction of biodiversity.



These sustainable resource management components are based on **3P-Bottomline (People, Profit and Planet)** which is the basis of all businesses.

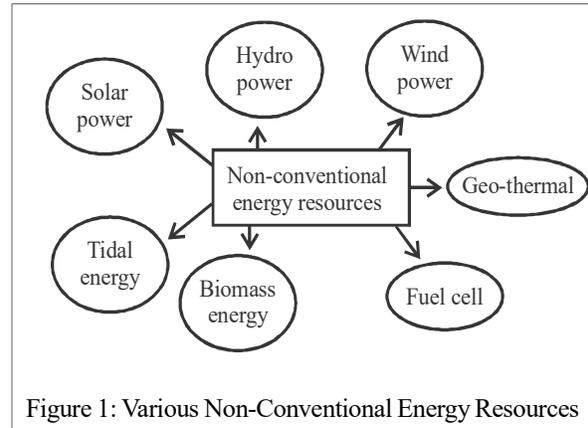
The resource utilisation should increase profit, production, employability and efficiency. But people's well being is also important like their needs for education, health, skills and happiness. This management should be well balanced with planet. **Intergovernmental Panel on Climate Change report** says we are in the endgame of fighting climate change.

We need to work towards-

- (i) Development of green technology, clean energy, carbon neutral projects, electric and hybrid vehicle etc. to save our environment.
- (ii) Development of those industries providing more employment, requiring less skill & capital and spreading less pollution.
- (iii) Taking participation in Global Energy Governance, International Solar Alliance, etc.

Q. What do you understand by non-conventional energy resources? Discuss initiative's taken by government in utilising its potential.

A. Non-conventional energy resources are different from conventional energy resource like coal, petroleum, as it utilises 'clean energy' like solar, hydro etc.



We need these renewable resources because of exhaustability of fossil fuel, pollution and global warming, political instability in gulf region etc.

Renewable energy now constitutes over **24%** of the country's installed power capacity and around over 26% of the electric energy generation. If hydro power is included, the share of renewable energy in electric installed capacity would be over 36% and over 26% of the electric energy generation (on Dec. 2020). Following steps were taken by government in this regard.

- (i) **National Green Corridor Programme** - aims to synchronise electricity produced from renewable sources such as solar, wind etc. in the grid.
- (ii) **National Clean Energy Fund** - To provide funding for research and innovation in clean energy technology.
- (iii) **Development of solar park, Rooftop Solar Project, and National Solar Mission** - There would be 25 solar parks and 100 GW solar capacity would be achieved by 2022, creation of qualified workforce as 'Suryamitra'.
- (iv) **Small Hydropower Programme** - To have 7000 MW installed capacity.
- (v) **National Biogas and Manure Management Programme** to set up family type biogas plants in rural and semi-urban areas.
- (vi) **National Offshore Wind Energy Policy** - To set up wind farm in EEZ (Exclusive Economic Zone) using PPP (Public Private Partnership) model.