Natural Resources Conservation

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Third level - Environmental Sciences Students (Credit Hours)

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Contents

Natural Resources

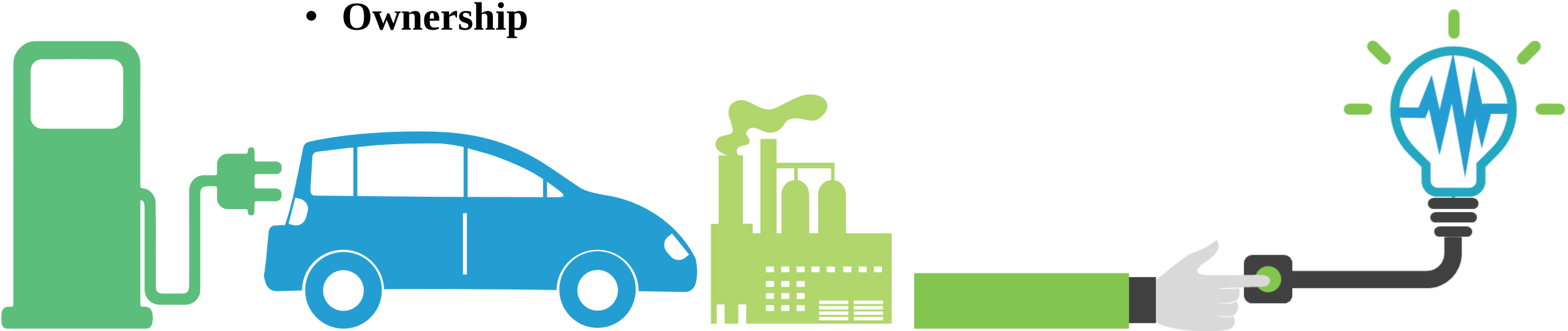
- are resources that are drawn from nature and used with few modifications. This includes the sources of valued characteristics such as commercial and industrial use, aesthetic value, scientific interest and cultural value
- **Natural resources includes** air, water, forests, animals, fishes, marine life, biomass, fossil fuels, like coal, petroleum and natural gases, wildlife, renewable energy sources like solar energy, wind energy, biomass energy, geothermal energy etc
- **Prosperity of a nation** is dependent on the natural resources available in the nation

Natural Resources Classification

There are various criteria of classifying natural resources..

These include

- **The source of origin**
- **Stages of development**
- **Renewability**
- **Ownership**



Natural Resources Classification

- **The source of origin**

Biotic: Resources that originate from the biosphere and have life such as flora and fauna, fisheries, livestock

Abiotic: Resources that originate from non-living and inorganic material. These include land, fresh water, air, rare-earth elements, and heavy metals

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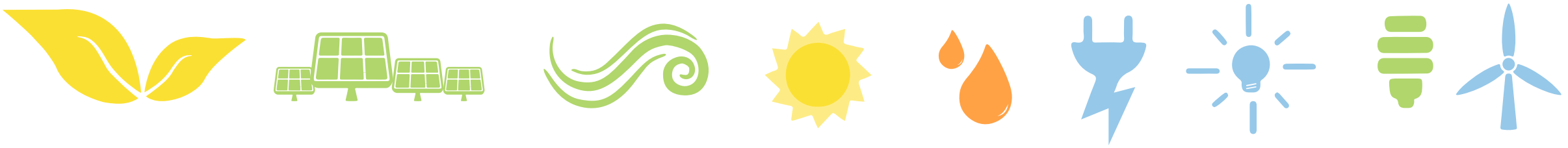


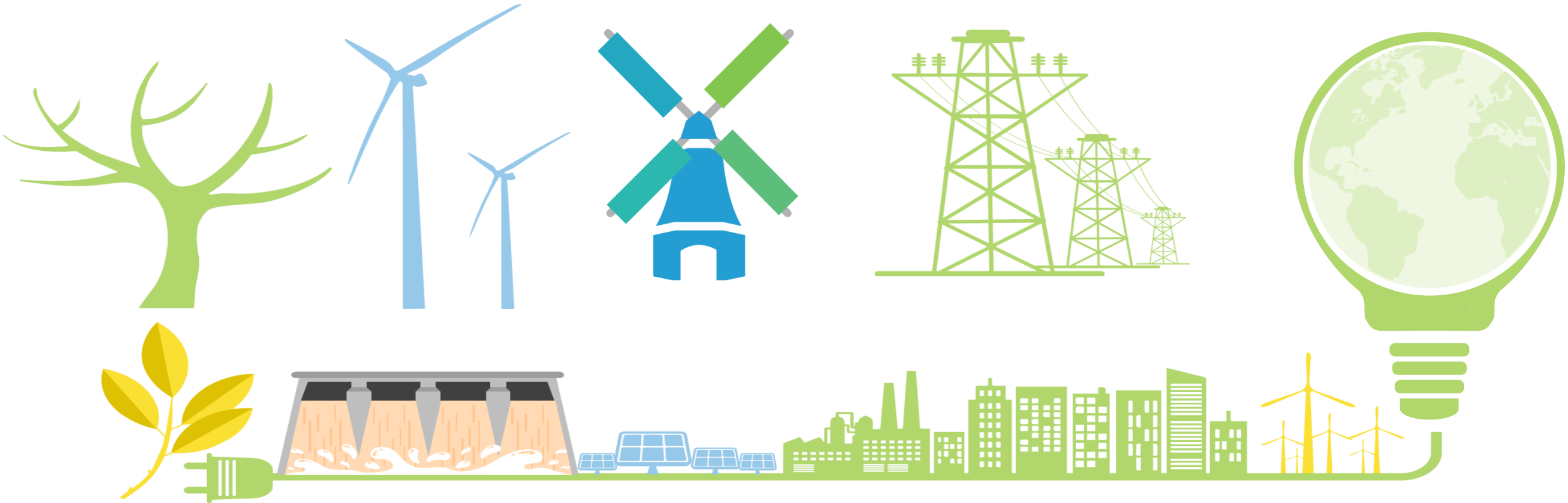
Natural Resources Classification

- **Renewability/Exhaustibility**

Renewable resources: These resources can be replenished naturally.

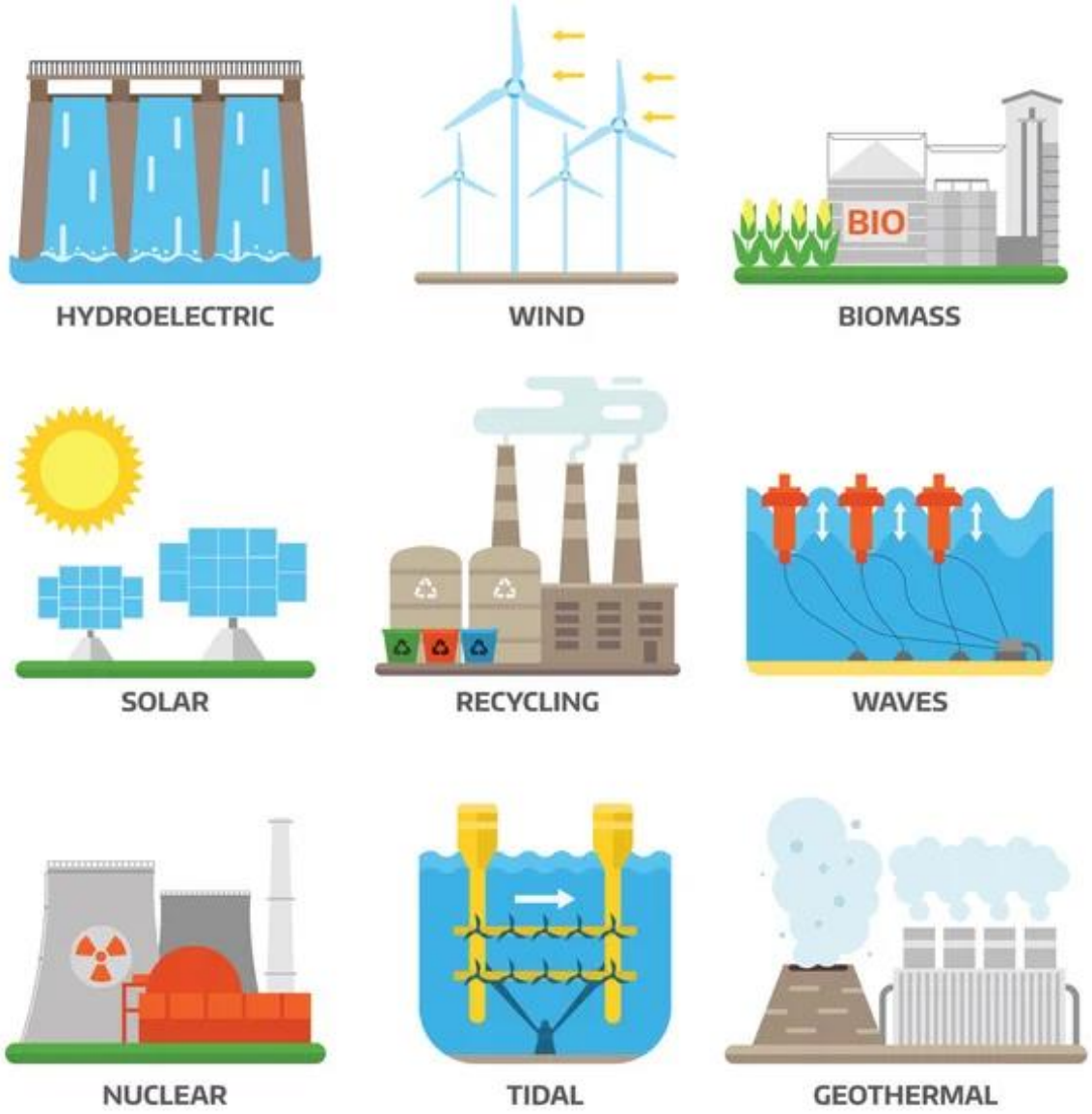
Non-renewable resources: These resources are formed over a long geological time period in the environment and cannot be renewed easily.

Renewable and nonrenewable resources are energy sources that human society uses to function on a daily basis. The difference between these two types of resources is that renewable resources can naturally replenish themselves while nonrenewable resources cannot. This means that nonrenewable resources are limited in supply and cannot be used sustainably.



Renewable Resource

- A renewable resource is a resource that can be replenished naturally over time. As a result, it is sustainable despite its consumption by humankind.
- They are available in plenty and by far most the cleanest sources of energy available on this planet
- Solar Energy, Wind Energy, Geothermal Energy, Biomass Energy From Plants, Tidal Energy are the examples of Renewable resources.
- Renewable energy is energy which is generated from natural sources (sun, wind, rain, tides)and can be generated again and again as and when required.



Non Renewable Resource

- Nonrenewable energy resources include coal, natural gas, oil, and nuclear energy. Once these resources are used up, they cannot be replaced, which is a major problem for humanity as we are currently dependent on them to supply most of our energy needs.

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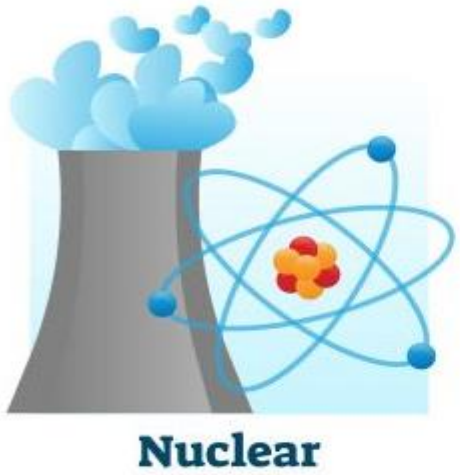


Natural Resources Classification

- **Ownership**

Individual Resources: Resources owned privately by individuals. These include plots, houses, plantations, pastures, ponds, etc.

Community Resources: Resources which are accessible to all the members of a community.

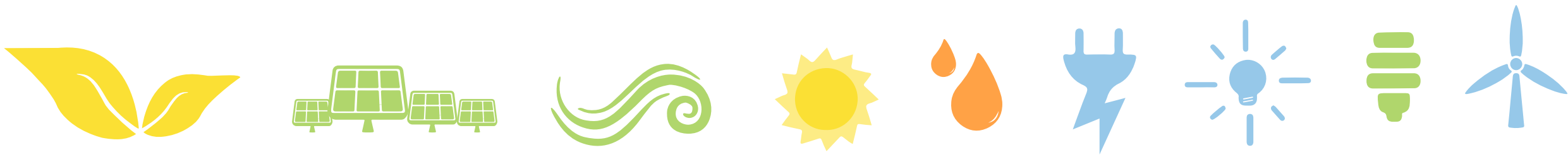
National Resources: Essentially, All the individual and community resources belong to the nation. The nation has legal powers to acquire them for public welfare. These also include minerals, forests and wildlife within the political boundaries and Exclusive economic zone.

International Resources: These resources are regulated by international organizations. E.g.: International waters.

Problems associated with natural resources

1. The unequal consumption of natural resources

A major part of natural resources today are consumed in the technologically advanced or ‘developed’ world, usually termed ‘the west’. The ‘developing nations’ of ‘the east’, including India and China, also over use many resources because of their greater human population. However, the consumption of resources per capita (per individual) of the developed countries is up to 50 times greater than in most developing countries. Advanced countries produce over 75% of global industrial waste and greenhouse gases.



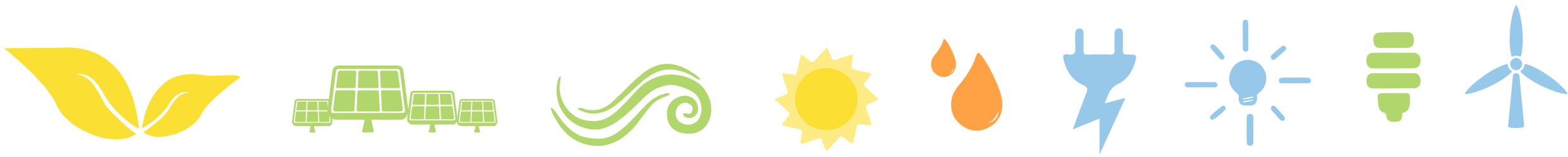
Problems associated with natural resources

2. Planning land use

Land is a major resource, needed for not only for food production and animal husbandry, but also for industry and growing human settlements. These forms of intensive land use are frequently extended at the cost of ‘wild lands’, our remaining forests, grasslands, wetlands and deserts. This demands for a pragmatic policy that analyses the land allocation for different uses.

3. The need for sustainable lifestyles

Human standard of living and the health of the ecosystem are indicators of sustainable use of resources in any country or region. Ironically, both are not in concurrence with each other. Increasing the level of one, usually leads to degradation of other. Development policies should be formulated to strike a balance between the two



Natural Resources Classification

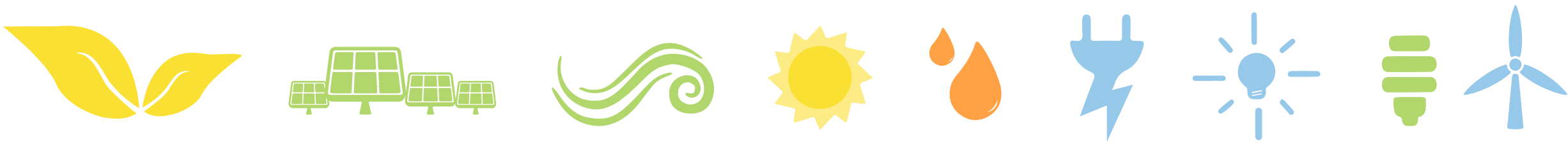
- **Stage of Development**

Potential resources: Resources that are known to exist, but have not been utilized yet. These may be used in the future. For example, petroleum in sedimentary rocks that, until pulled out and put to use remains a potential resource.

Actual resources: Resources that have been surveyed, quantified and qualified, and are currently used in development. These are typically dependent on technology and level of their feasibility. E.g.: Wood processing

Reserves: The part of an actual resource that can be developed profitably in the future.

Stocks: Resources that have been surveyed, but cannot be used due to lack of technology. E.g.: Hydrogen vehicles



Forest Resources

Forest Resources

Forest is important renewable resources. Forest vary in composition and diversity and can contribute substantially to the economic development of any country .Plants along with trees cover large areas, produce variety of products and provide food for living organisms, and also important to save the environment.

It is estimated that about 30% of world area is covered by forest whereas 26% by pastures. Among all continents, Africa has largest forested area (33%) followed by Latin America (25%), whereas in North America forest cover is only 11%. Asia and former USSR has 14% area under forest. European countries have only 3% area under forest cover.

Forest Resources

'A nation that destroys its soils destroys itself. Forests are the lungs of our land, purifying the air and giving fresh strength to our people'

Franklin D. Roosevelt

Forest Importance

Forest can provide prosperity of human being and to the nations. Important uses of forest can be classified as

- **Commercial values**
- **Ecological significance**
- **Aesthetic values**
- **Life and economy of tribal**

Forest Importance

1- Commercial values

•Forests are main source of many commercial products such as wood, timber, pulpwood etc. About 1.5 billion people depend upon fuel wood as an energy source. Timber obtained from the forest can used to make plywood, board, doors and windows, furniture, and agriculture implements and sports goods. Timber is also a raw material for preparation of paper, rayon and film.

•Forest can provide food , fiber, edible oils and drugs.

•Forest lands are also used for agriculture and grazing.

•Forest is important source of development of dams, recreation and mining.

Forest Importance

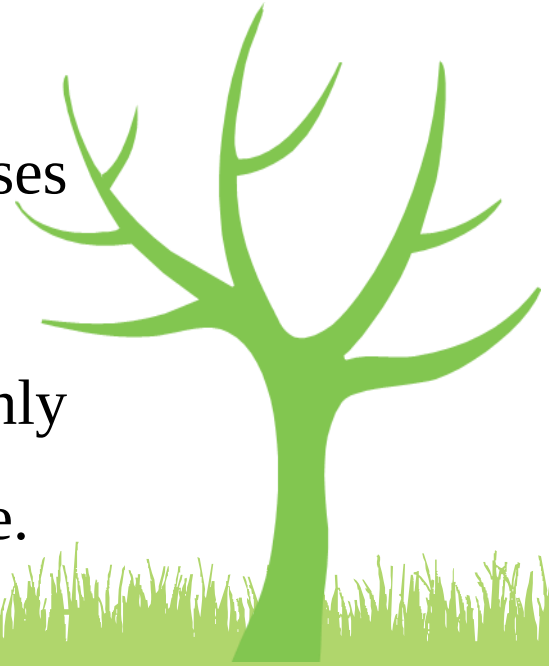
2- Life and economy of tribal

Forest provide food, medicine and other products needed for tribal people and play a vital role in the life and economy of tribes living in the forest.

3- Ecological uses

Forests are habitat to all wild animals, plants and support millions of species. They help in reducing global warming caused by green house gases and produces oxygen upon photosynthesis.

Forest can act as pollution purifier by absorbing toxic gases. Forest not only helps in soil conservation but also helps to regulate the hydrological cycle.



Forest Importance

4- Aesthetic values

All over the world people appreciate the beauty and tranquility of the forest because forests have a greatest aesthetic value. Forest provides opportunity for recreation and ecosystem research.

Deforestation

Forests contribute substantially to the national economy. With the increasing population and increased demand for fuel wood, the expansion of areas under urban development and industries has led to the over-exploitation of forests. At the international level, we are losing forest at the rate of 1.7 crore hectares annually. Overexploitation also occurs due to overgrazing and forest conversion to pastures for domestic use.

- Forest are burned or cut for clearing of land for agriculture ,harvesting for wood and timber , development and expansion of cities .These economic gains are short term where as long term effects of deforestation are irreversible
- Deforestation rate is relatively low in temperate countries than in tropics If present rate of deforestation continues we may losses 90% tropical forest in coming six decades
- For ecological balance 33% area should be under forest cover

Causes of deforestation

1- Shifting cultivation

This practice is prevalent in tribal areas where forest lands are cleared to grow subsistence crops. It is estimated that principle cause of deforestation in tropics in Africa, Asia and tropical America is estimated to be 70, 50, and 35% respectively. Shifting cultivation which is a practice of slash and burn agriculture are posses to clear more than 5 lakh hectares of land annually.

2- Commercial logging

It is a important deforestation agent. It may not be the primary cause but definitely it acts as secondary cause, because new logging lots permits shifting cultivation and fuel wood gatherers access to new logged areas.

Causes of deforestation

3- Need for fuel wood

Increased population has lead to increasing demand for fuel wood which is also acting as an important deforestation agent, particularly in dry forest.

4 - Expansion for agribusiness

With the addition of cash crops such as oil palm, rubber, fruits and ornamental plants, there is stress to expand the area for agribusiness products which results in deforestation.

Causes of deforestation

5- Development projects and growing need for food

The growing demand for electricity, irrigation, construction, mining, etc. has lead to destruction of forest. Increased population needs more food which has compelled for increasing area under agriculture crops compelling for deforestation.

6 - Raw materials for industrial use

Forest provides the raw materials for industry and it has exerted tremendous pressure on forests. Increasing demand for plywood for backing has exerted pressure on the cutting of other species

Major effects of deforestation

Deforestation adversely and directly affects and damages the environment and living beings

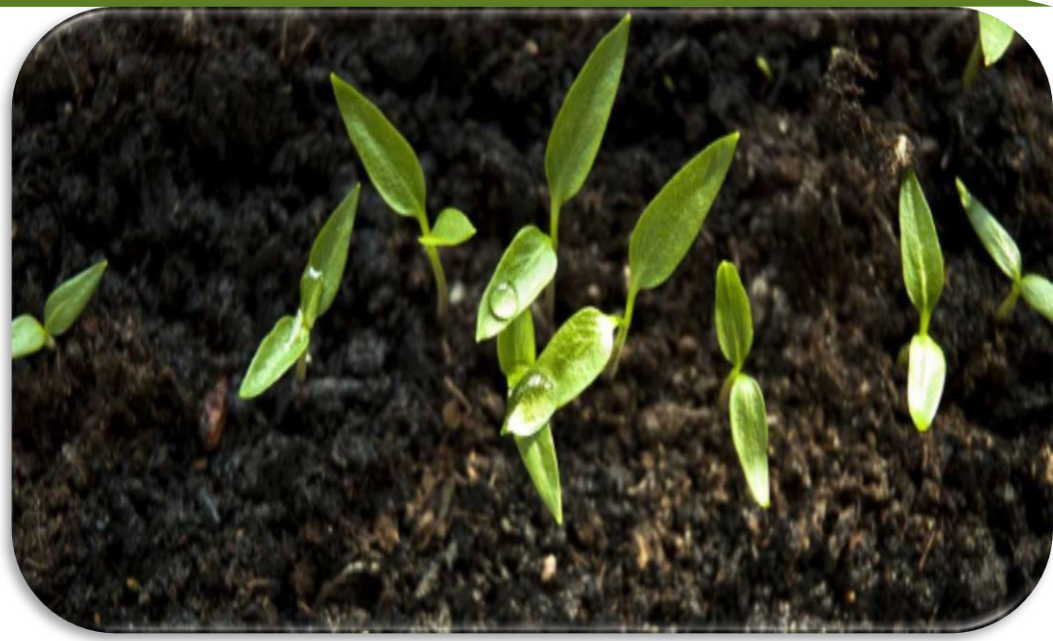
Major effects of deforestation

- Soil erosion and loss of soil fertility
- Decrease of rain fall due to affect of hydrological cycle
- Expansion of deserts
- Contributed to rise in temperature.
- Climate change and depletion of water table
- Loss of biodiversity ,flora and fauna
- Environmental changes and disturbance in forest ecosystems
- Extinction of several species of plants and animals.

Conservation of forest

- Regulated and planned cutting of trees.
- Control over forest fires.
- Reforestation.
- Afforestation
- Check on forest clearance for agriculture and human habitation and settlement.
- Development green belt around cities.
- Check on mining activities in forest areas.
- Protection of existing forest.
- Conservation of threatened species of trees.

Conservation of forest



- Agro-forestry.
- Development of national parks and sanctuaries.
- Development of botanical gardens.
- Development of seed banks.
- Forest management.
- Proper role of government in forest conservation

Water Resources

Water Resources

Water is essential for human survival and well-being and important to many sectors of the economy. However, resources are irregularly distributed in space and time, and they are under pressure due to human activity.

Around the world, human activity and natural forces are reducing available water resources. Although public awareness of the need to better manage and protect water has grown over the last decade, economic criteria and political considerations still tend to drive water policy at all levels. Science and best practice are rarely given adequate consideration.

Water Resources

Water resources are natural resources of water that are potentially useful for humans such as a source of drinking water supply or irrigation water.

- 67-70% of Earth's surface is covered by water.
- 97% of the water on the Earth is salt water and only 1-3 percent is fresh water
- slightly over two thirds of this is frozen in glaciers and polar ice caps.
- The remaining unfrozen freshwater is found mainly as groundwater, with only a small fraction present above ground or in the air
- Only less than 0.7% is available for human use.

Water Resources

- Natural sources of fresh water include surface water, under river flow, groundwater and frozen water .
- Artificial sources of fresh water can include treated wastewater (wastewater reuse) and desalinated seawater.
- Human uses of water resources include agricultural, industrial, household, re creational and environmental activities.

Water Resources

• With the growth of human population there is an increasing need for larger amounts of water to fulfil a variety of basic needs. Today in many areas this requirement cannot be met.

• Overutilization of water occurs at various levels. Most people use more water than really needed. Most of us waste water during a bath by using shower or during washing of clothes. Many agriculturists use more water than necessary to grow crops. There are many ways in which farmers can use less water without reducing the yields such as the use of drip irrigation systems.

• Agriculture also pollutes surface water and underground water stores by the excessive use of chemical fertilizers and pesticides. Methods such as the use of biomass as fertilizers and non toxic pesticides such as neem products reduces the agricultural pollution of surface and ground water.

• Industry tends to maximize short-term economic gains by not bothering about its liquid waste and releasing it into the streams, rivers, sea

Water Resources

Floods

• Floods have been a serious environmental hazards from centuries.
• Deforestation causes flood that kills people, damage crops and destroys homes.
• Rivers changes its course during floods and tons of valuable soil is lost to the sea.
• As the forest are degraded, rain water no longer percolates slowly into the the sub-soil but runs off down the mountainside bearing large amount of top soil.

Water Resources

Droughts

• In most arid regions of the world the rains are unpredictable. This leads to a periods when there is a serious scarcity of water to drink, use in farm, or provide for urban or industrial use.
• One of the factor that worsens the effect of droughts is deforestation.
• Drought is one of the major problem in our country, due to unpredictable climatic condition or due to the failure of one and more monsoon.

Water Resources

Water Management

- Building several small reservoirs instead of few mega projects.
- Develop few catchment dams.
- Afforestation permits recharging of underground water.
- Treatment and recycling municipal waste water for agricultural use.
- Preventing leakages from dams and canals.
- Preventing loss in municipal pipes.
- Effective rain water harvesting in urban environments.
- Water conservation measures in agriculture such as using drip irrigation.
- Pricing the water at its real value makes people use it more responsibly and efficiently and reduce the water wasting.