

## Unit 2

### Energy Resources

Natural resources: The environmental factors which fulfill the needs of human and help to improve lifestyle are called as resources. The resources which are naturally present in the environment called as Natural Resources. Development of any nation is depends on quality and quantity of resources. These resources include land, forest, water, fossil fuels, animals, minerals, air, sunlight etc. Natural resources can be classified in two broad categories that are Renewable and Non renewable resources.

1. **Renewable Resources:** The resources which are ample in nature or if they are used once then these resources regenerated by natural processes or by human activities, such resources are called as renewable resources or non-Exhaustible resources.  
e.g. - Solar energy, wind energy
2. **Non- Renewable Resources:** these resources are available in limited quantities on earth. These resources which are exhausted after using once they cannot be regenerated easily are called as nonrenewable or exhaustible resources.  
e.g. - Coal, oil, petroleum
3. **Cyclic Resources:** the resources which can be used again and again passing through some processes are known as cyclic resources.  
e.g. - Water

### Forest Resources

In India, forests form 23 percent of the total land area. The word 'forest' is derived from the Latin word 'foris' means 'outside' (may be the reference was to a village boundary or fence separating the village and the forest land).

Forest is one of the important natural resources used by man. Man has depended on forest for his survival. Forest resources in India have always been one of the richest resources.

Forest resources in India: Forests provide renewable natural resources and contribute considerably to the economic development of the nation. Forest plantations comprise a vital part of the forest resources. Most of the wood produced in India is obtained from the forest reserves.

Forest Resources in India:

1. Non Forest: 77.72%
2. Very Dense Forest: 2.54%
3. Moderately Dense Forest: 9.71%
4. Open forest: 8.77%
5. Scrubs: 1.26%

Around 20% of total area under forest is in the state of MP, AP, UP, Arunachal Pradesh, Orissa, and Maharashtra.

### **Uses of Forest Resources:**

#### **The direct benefits from forests are:**

**(a) Fuel Wood:** Wood is used as a source of energy for cooking purpose and for keeping warm.

**(b) Timber:** Wood is used for making furniture, tool-handles, railway sleepers, matches, ploughs, bridges, boats etc.

**(c) Bamboos:** These are used for matting, flooring, baskets, ropes, rafts, cots etc.

**(d) Food:** Fruits, leaves, roots and tubers of plants and meat of forest animals form the food of forest tribes.

**(e) Shelter:** Mosses, ferns, insects, birds, reptiles, mammals and micro-organisms are provided shelter by forests.

**(f) Paper:** Wood and Bamboo pulp are used for manufacturing paper (Newsprint, stationery, packing paper, sanitary paper)

**(g) Rayon:** Bamboo and wood are used in the manufacture of rayon (yarns, artificial silk-fibres)

**(h) Forest Products:** Tannins, gums, drugs, spices, insecticides, waxes, honey, horns, musk, ivory, hides etc. are all provided by the flora and fauna of forests.

#### **The indirect benefits from forests are:**

**(a) Conservation of Soil:** Forests prevent soil erosion by binding the soil with the network of roots of the different plants and reduce the velocity of wind and rain — which are the chief agents causing erosion.

**(b) Soil-improvement:** The fertility of the soil increases due to the humus which is formed by the decay of forest litter.

**(c) Reduction of Atmospheric Pollution:** By using up carbon dioxide and giving off oxygen during the process of photosynthesis, forests reduce pollution and purify the environment.

**(d) Control of Climate:** Transpiration of plants increases the atmospheric humidity which affects rainfall and cools the atmosphere.

**(e) Control of Water flow:** In the forests, the thick layer of humus acts like a big sponge and soaks rain water preventing run-off, thereby preventing flash-floods. Humus prevents quick evaporation of water, thereby ensuring a perennial supply of water to streams, springs and wells.

### **Effect on Environment due to 'Deforestation'**

Deforestation is the removal of a forest.

#### **Causes of Deforestation:**

1. **Forest fires:** Each year, fires burn millions of hectares of forest worldwide. Fires are a part of nature but degraded forests are particularly vulnerable. This happens due to extreme warm summers and milder winters. Fires, whether caused by man or nature results in huge loss of forest cover. The resulting loss has wide-reaching consequences on biodiversity, climate, and the economy.
2. **Fuel wood harvesting:** Over-harvesting for domestic use or for commercial trade in charcoal significantly damages forests.
3. **Mining:** Oil and coal mining require considerable amount of forest land. Apart from this, roads and highways have to be built to make way for trucks and other equipment. The waste that comes out from mining pollutes the environment and affects the nearby species.
4. **Climate change:** Forest loss is both a cause and an effect of our changing climate.
5. **Agricultural Activities:** agricultural activities are one of the major factors affecting deforestation. Due to overgrowing demand for food products, huge amount of trees are felled down to grow crops and for cattle grazing.
6. **Logging:** Apart from this, wood based industries like paper, match-sticks, furniture etc also need a substantial amount of wood supply. Wood is used as fuel both directly and indirectly, therefore trees are chopped for supplies. Firewood and charcoal are examples of wood being used as fuel. Some of these industries thrive on illegal wood cutting and felling of trees.
7. **Urbanization:** Further on order to gain access to these forests, the construction of roads are undertaken; here again trees are chopped to create roads. Overpopulation too directly affects forest covers, as with the expansion of cities more land is needed to establish housing and settlements. Therefore forest land is reclaimed.

#### **Effects of Deforestation**

1. **Climate Imbalance:** Deforestation also affects the climate in more than one ways. Trees release water vapor in the air, which is compromised on with the lack of trees. Trees also provide the required shade that keeps the soil moist. This leads to the imbalance in the atmospheric temperature further making conditions for the ecology difficult. Flora and fauna across the world are accustomed to their habitat. These haphazard clearances of forests have forced several of these animals to shift from their native environment. Due to this several species are finding it difficult to survive or adapt to new habitats.

2. **Increase in Global Warming:** Trees play a major role in controlling global warming. The trees utilize the green house gases, restoring the balance in the atmosphere. With constant deforestation the ratio of green house gases in the atmosphere has increased, adding to our global warming woes.
3. **Soil Erosion:** Also due to the shade of trees the soil remains moist. With the clearance of tree cover, the soil is directly exposed to the sun, making it dry.
4. **Floods:** When it rains, trees absorb and store large amount of water with the help of their roots. When they are cut down, the flow of water is disrupted and leads to floods in some areas and droughts in other.
5. **Wildlife Extinction:** Due to massive felling down of trees, various species of animals are lost. They lose their habitat and forced to move to new location.

## Water Resources

Water is one of the most essential requirements of life. About 70% of earth's surface is covered with water. So earth is called as 'water planet' or 'blue planet'.

Global distribution of water:

Ocean, Sea	97.1%
Frozen Ice	2.15%
Ground Water	0.65%
Surface Water	0.03%

Water resources are not uniformly distributed on earth. In India, Cherapunji receives highest precipitation that is 1200 mm while the arid Rajasthan receives the lowest precipitation that is 200mm annually.

Now a day, the increased use of water and changing lifestyle are deteriorating the valuable resource. Water consumption has increased many folds particularly for domestic, agriculture and industrial sector. Presently, there is overuse or misuse of this precious resource.

The surface water on earth is present in the form of ocean, seas, rivers, stream, lakes, ponds etc. this water is used for many purpose like cooking, cleaning, bathing, drinking, gardening etc. all industries require water. Water is used as a solvent, cooling agent, cleaning agent in industries. Depleting water resources is a global problem.

**Causes of water depletion:**

- **Excessive demand of water:** due to over population, the demand of water has increased considerably. More quantities of water are used and wasted over the time.
- **Evaporation:** due to global warming and change in the climate, more amounts of surface water and ground water is being evaporated due to excessive heat. There is a decline in the level of water in the reservoir and dams due to evaporation.
- **Pollution:** most of the industrial waste water is dumped to these water sources. This in turn pollutes and contaminates water. This can be considered another reason for depletion of water resources.
- **Deforestation:** This can be considered a major cause for water depletion. Large scale deforestation considerably lowers the capacity of the soil to retain water and this affects the water table.
- **Poor storage:** due to poor storage facilities, lots of rain water is wasted. The technological development in procuring rain water and storing it for future use is low. A lot of water is again lost due to ignorance. This again causes depletion.
- **Saltwater:** deep within the ground, the water gets mixed with salt water and it is termed as saltwater contamination. This in turn reduces the availability of usable water. This is another reason for depletion of water resources.
- **Low rainfall:** rainfall has reduced considerably over the years. This is mainly because of large scale deforestation and drastic climatic changes. These add to the reduction in water resources.
- **Agriculture:** agricultural activities steadily increasing by the day which means more water is pumped for use. For agricultural use more ground water is pumped because it's free of cost. This can be done by fixing a bore well. This reduces the levels of water leading to its depletion. [Also refer about Agricultural pollution ]
- **Urbanization:** the government and the people have behind urbanization. This has really affected the water resources because of mass deforestation.
- **Seepage:** when the collected water is transported through the canals and pumps, a lot of water is seeped into the ground and lost. This again causes depletion.

#### **Effects of water depletion:**

- **Deep wells:** as a result of water depletion, deep wells need to be dug because of the water shortage. Pumps will have to be put deeper and deeper to extract water.
- **Expensive resource:** water being a renewable resource, it will become very expensive due to limited availability. If this resource is used, wasted, polluted and depleted, it will become a non-renewable resource.
- **Contamination:** one of the major effects of depletion is contamination. For getting water, deep wells are dug as a result the ground water gets mixed with salty water deep within making it contaminated. This is known as salt contamination. This eventually reduces the amount of consumable water.

- **Marine life:** due to the depletion, contamination and evaporation of surface water, the marine life gets affected. This is a threat to the fishes, flora, fauna and all the creature of the sea.
- **Agriculture:** agricultural productivity depends on the availability of water. Agriculture cannot exist without adequate supply of water. Due to the depletion of water resource, the output or the productivity of agriculture reduces which affects the food supply of the country.
- **Aquifers:** an aquifer is a permeable rock that holds ground water. This can be used for water supply for agriculture and other human activities. An aquifer can be at different depths depending on a lot of natural factors. So as a result of depletion, the aquifers also get depleted.
- During summers and drought loss of live stocks affects local economy.
- According to survey by United Nations Food and Agriculture Organization (FAO), 1.2 billion people, almost 20% of earth's population, are experiencing water scarcity. Another 500 million come danger close to that threshold.
- Scarcity of water and disturbance in hydrological cycle.

#### **Solution to prevent water depletion:**

- Water issues may be resolved or controlled by conservation, replenishment and by finding new sources.
- **Alternative source:** any other alternative source of water should be discovered so as to avoid further depletion.
- **Technology:** newer technology should be developed so that proper storage of ground water can be attained without leakage. This can reduce depletion to an extent. Comprehensive research should be done to find new methods. E.g. rain water harvesting
- **Awareness:** the government should organize effective campaign and make people aware of the how precious and priceless the water resources are. Awareness should be reach all levels of the society including children. Special classes should be conducted in each and every school of the country. People should be taught to reduce, reuse and recycle water to avoid wastage. All these measures can be taken to reduce and avoid water depletion.
- **Plant more trees:** afforestation can reduce depletion to a great extend. The roots of the plants and trees helps to hold more water thus increasing the ground water. This prevents soil erosion too.
- **Don't pollute water:** throwing of industrial waste and other harmful chemical into the water should be banned completely. Proper measures and strict laws should be passed to check pollution of the water resources. This in turn preserves the naturality of the water available which can be for future use. Less contamination and pollution reduces depletion to a large extent.

## **Mineral Resources**

A mineral is pure inorganic substance that occurs naturally in the earth's crust. Minerals are naturally occurring, inorganic, crystalline solids having definite chemical composition and characteristic physical properties. Minerals gift of nature which is non renewable resource. These minerals are obtained by mining and by metallurgical processes. There are four types of mineral resources.

1. Metal e.g. aluminium, iron, copper etc.
2. Industrial mineral e.g. limestone, potash etc.
3. Construction material e.g. sand, stone, gravel etc.
4. Fuel/energy mineral e.g. uranium, petroleum etc.

Mining pollutes the environment, on large scale. Value of these minerals increases because of the large demand, but the supply is decreasing. This has resulted in more efforts to drill and search other territories. The environment is being abused and this depletion of resources in one way of showing the effects.

### **Causes of mineral depletion:**

- The large scale exploitation of minerals began in the industrial revolution around 1760 in England and has grown rapidly over ages.
- Today's economy is largely based on fossil fuels (coal, petrol and diesel), minerals and oil.
- Lots of building materials are obtained from mines. Demand of stones, marbles, granite, limestone etc is ever increasing.
- To support 8-9% of GDP growth, mining sector has to do well. It puts extra efforts on minerals.

### **Effects of mineral depletion:**

- Mining has resulted in more efforts to drill and search for other territories enriched with minerals. Mining pollutes the environment, only on a larger scale. Accidents related with landslides are common in coal mining areas.

- The environment is being abused and this depletion of resources show multiplying effects. Situation becomes grim when local people are denied of their share in development process.
- Onshore mining processes badly affects marine life.

### **Solutions to prevent mineral depletion:**

- Strong global and local legislations are required to reverse the trend. Government need to show more strong political will to preserve our resources.
- Use of synthetic building materials can reduce the load on natural stones.
- Use of new technologies at thermal power plants, ignite engines, metallurgy, industries etc so that big outputs can be obtained from low inputs.

## **Land Resources**

Resources are usable for humans. About 30% of earth's surface is covered with land and remaining 70% are covered with water. A part of earth surface that is not covered with water is called as Land. Land represents those natural resources which are useful. Land resource includes natural resources which are iron ore, oil, water, soil, plants and water etc.

The fertile surface layer of earth capable of supporting plant life is called as soil. Soil is most important resource and it take decades or even centuries for the development of soil horizon having different physio-chemical properties.

Nine fold classification of Land:

1. Forests: This includes all lands classed as forest under any legal enactment dealing with forests or administered as forests, whether state-owned or private, and whether wooded or maintained as potential forest land. The area of crops raised in the forest and grazing lands or areas open for grazing within the forests should remain included under the forest area.
2. Area under Non-agricultural Uses: This includes all lands occupied by buildings, roads and railways or under water, e.g. rivers and canals and other lands put to uses other than agriculture.
3. Barren and Un-culturable Land: includes all barren and unculturable land like mountains, deserts, etc. Land which cannot be brought under cultivation except at an exorbitant cost,



should be classed as unculturable whether such land is in isolated blocks or within cultivated holdings.

4. Permanent Pastures and other Grazing Lands: includes all grazing lands whether they are permanent pastures and meadows or not. Village common grazing land is included under this head.
5. Land under Miscellaneous Tree Crops, etc. : This includes all cultivable land which is not included in 'Net area sown' but is put to some agricultural uses. Lands under Casurina trees, thatching grasses, bamboo bushes and other groves for fuel, etc. which are not included under 'Orchards' should be classed under this category.
6. Culturable Waste Land: This includes lands available for cultivation, whether not taken up for cultivation or taken up for cultivation once but not cultivated during the current year and the last five years or more in succession for one reason or other. Such lands may be either fallow or covered with shrubs and jungles, which are not put to any use. They may be assessed or unassessed and may lie in isolated blocks or within cultivated holdings. Land once cultivated but not cultivated for five years in succession should also be included in this category at the end of the five years.
7. Fallow Lands other than Current Fallows: This includes all lands, which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years.
8. Current Fallows: This represents cropped area, which are kept fallow during the current year. For example, if any seeding area is not cropped against the same year it may be treated as current fallow.
9. Net Area Sown: This represents the total area sown with crops and orchards.

India has 2.4% land of the world; supporting 16% of the total population that is per capita land availability is 0.48ha only.

#### Land Utilization in India:

No	Use	Area(m.ha)
1	Area under non agricultural uses	23.57
2	Barren and uncultivated land	19.26
3	Net area sown	141.10
4	Forest land	69.41
5	Miscellaneous tree crops	3.37
6	Cultivated waste lands	13.66
7	Current Fallow	14.80
8	Permanent pasture and grazing	10.90

## **Land Degradation:**

Land degradation is decline soil fertility, reduce quality and productivity. It occurs due to natural imbalance, misuse and overuse of land or soil. In India about 300 m. ha area are degraded.

### **Causes of Land Degradation:**

- **Physical Factors:** There are several physical factors contributing to soil degradation distinguished by the manners in which they change the natural composition and structure of the soil. Rainfall, surface runoff, floods, wind erosion, tillage, and mass movements result in the loss of fertile top soil thereby declining soil quality. All these physical factors produces different types of soil erosion (mainly water and wind erosion) and soil detachment actions, and their resultant physical forces eventually changes the composition and structure of the soil by wearing away the soil's top layer as well as organic matter.
- **Biological Factors:** Biological factors refer to the human and plant activities that tend to reduce the quality of soil. Some bacteria and fungi overgrowth in an area can highly impact the microbial activity of the soil through biochemical reactions, which reduces crop yield and the suitability of soil productivity capacity. Human activities such as poor farming practices may also deplete soil nutrients thus diminishing soil fertility. The biological factors affect mainly lessens the microbial activity of the soil.
- **Chemical Factors:** The reduction of soil nutrients because of alkalinity or acidity or water logging are all categorized under the chemical components of soil degradation. In the broadest sense, it comprises alterations in the soil's chemical property that determine nutrient availability. It is mainly caused by salt buildup and leaching of nutrients which corrupt the quality of soil by creating undesirable changes in the essential soil chemical ingredients. These chemical factors normally bring forth irreversible loss of soil nutrients and productivity capacity such as the hardening of iron and aluminum rich clay soils into hardpans.
- **Deforestation:** Deforestation causes soil degradation on the account of exposing soil minerals by removing trees and crop cover, which support the availability of humus and litter layers on the surface of the soil. Vegetation cover primarily promotes the binding of the soil together and soil formation, hence when it is removed it considerably affects the capabilities of the soil such as aeration, water holding capacity, and biological activity.
- **Misuse or excess use of fertilizers:** The excessive use and the misuse of pesticides and chemical fertilizers kill organisms that assist in binding the soil together. Most agricultural practices involving the use of fertilizers and pesticides often entail misuse or excessive application, thereby contributing to the killing of soil's beneficial bacteria and other microorganisms that help in soil formation.

- **Industrial and Mining activities:** Soil is chiefly polluted by industrial and mining activities. As an example, mining destroys crop cover and releases a myriad of toxic chemicals such as mercury into the soil thereby poisoning it and rendering it unproductive for any other purpose. Industrial activities, on the other hand, release toxic effluents and material wastes into the atmosphere, land, rivers, and ground water that eventually pollute the soil and as such, it impacts on soil quality. Altogether, industrial and mining activities degrade the soil's physical, chemical and biological properties.
- **Urbanization:** Urbanization has major implications on the soil degradation process. Foremost of all, it denudates the soil's vegetation cover, compacts soil during construction, and alters the drainage pattern. Secondly, it covers the soil in an impermeable layer of concrete that amplifies the amount of surface runoff which results in more erosion of the top soil.
- **Overgrazing:** The rates of soil erosion and the loss of soil nutrients as well as the top soil are highly contributed by overgrazing. Overgrazing destroys surface crop cover and breaks down soil particles, increasing the rates of soil erosion. As a result, soil quality and agricultural productivity is greatly affected.

#### **Effects of Land Degradation:**

- **Land degradation:** Soil quality decline is one of the main causes of land degradation and is considered to be responsible for 84% of the ever diminishing acreage. About 40% of the world's agricultural land is severely diminished in quality because of erosion and the use of chemical fertilizers, which prevent land from regenerating. The decline in soil quality as a result of agricultural chemical fertilizers also further leads to water and land pollution thereby lowering the land's worth on earth.
- **Drought and aridity:** Drought and aridity are problems highly influenced and amplified by soil degradation. As much as it's a concern associated with natural environments in arid and semi-arid areas, the UN recognizes the fact that drought and aridity are anthropogenic induced factors especially as an outcome of soil degradation. Hence, the contributing factors to soil quality decline such as overgrazing, poor tillage methods, and deforestation are also the leading causes of desertification characterized by droughts and arid conditions.
- **Loss of arable land:** Because soil degradation contributes to land degradation, it also means that it creates a significant loss of arable land. As stated earlier, about 40% of the world's agricultural land is lost on the account of soil quality depreciation caused by agro-chemicals and soil erosion. Most of the crop production practices result in the topsoil loss and the damage of soil's natural composition that make agriculture possible.
- **Increased flooding:** Land is commonly altered from its natural landscape when it rids its physical composition from soil degradation. For this reason, the transformed land is unable to soak up water, making flooding more frequent. In other words, soil degradation

takes away the soil's natural capability of holding water thus contributing to more and more cases of flooding.

- **Pollution and clogging of waterways:** Most of the soil eroded from the land together with the chemical fertilizers and pesticides utilized in agricultural fields are discharged into waterways and streams. With time, the sedimentation process can clog waterways, resulting in **water scarcity**. The agricultural fertilizers and pesticides also damage marine and **freshwater ecosystems** and the limits the domestic uses of the water for the populations that depend on them for survival.

#### **Solutions to control soil depletion:**

- Good vegetation cover.
- Use new irrigation practices like drip irrigation, sprinkle irrigation etc. save surface water.
- Use sustainable agricultural techniques like use of biofertilizers, biopesticides etc.
- Educating farmers and other stake holders to take care of this valuable gift by using above technique in appropriate way.

## **Energy Resources**

Energy is one of the important components of economic development. There is direct relation between the economic development and per capita energy consumption. Simply speaking more developed country, higher consumption of energy. India's per capita consumption of energy is only one eighth of global average energy.

Two main sources of energy:

- Conventional energy sources: these are also called as non renewable sources. These sources are in limited quantity. These are divided into two types:
  1. Commercial
  2. Non commercial
  1. Commercial: these are coal, petroleum and electricity. These are called commercial resources because they have price or consumer has to pay to purchase them.
    - a. Coal and lignite: Coal is the major source of energy. Coal deposits in India are 148790 million tones. In 1950-51 annual production of coal was 32 million tones. In 2005-06 annual production of coal was 343 million tones. India is now fourth

largest coal producing country in world. Coal deposits are mainly found in Orissa, Bihar, Bengal and MP. It provides employment to 7 lack workers.

- b. Oil: in these days oil is considered as the most important source of energy. It is widely used in automobiles, trains, planes and ships etc. In India it is found upper Assam, Gujarat. The resources of oil are small in India. In 1950-51 total production of oil in India was 0.3 million tones. It increased to 32.4 million tons in 2000-01 but india still imports 70% of has oil from abroad. As per current rate of consumption, oil reserves in india may last about 20 to 25 years.
- c. Electricity: it is common and popular source of energy. It is used in commercial and domestic purpose. There are 3 main sources of power generation.
  1. Thermal Power: Generated electricity with the help of coal and oil. It is a major source of electricity.
  2. Hydro-electric power: it is produced by constructing dams over overflowing river.
  3. Nuclear power: nuclear power plants use uranium as fuel. This fuel cheaper than coal. India has nuclear power plants at Tarapur, Kota, UP.
- 2. Non-commercial energy source: it includes fuel wood, straw and dried dung. Commonly used in rural India. The total availability of fuel wood in india was only 50 million tons a year. It is less than 50% of total requirements. In coming years there would be shortage of fire wood. Agricultural wastes like straw used as fuel for cooking purpose it is about 65m.tons and animal dung is about 73 million tones.
- Non-Conventional sources of energy: it is also called as renewable source of energy. E.g. solar energy, wind, tidal
  1. Solar energy: Energy produced through sunlight is called as solar energy. Solar photovoltaic cells are exposed to sunlight and in the form of electricity produced. The cell converts sunlight into electricity. Solar energy is used for cooking, hot water.
  2. Wind energy: this type of energy can be produced by harnessing wind power. In india 2756 wind pumps where set up for this purpose. In 7 states wind power houses installed and their capacity was 1000MW.india has second position in wind generation.

3. Tidal energy: energy produced by exploited the tidal waves of the sea called tidal energy. It is costly.
4. Bio- Energy: energy obtained from organic matter. Example of bio-energy is biogas by putting cow dung into plants. Besides producing gas this plant convert gobar into manure. It can be used for cooking, lighting and generation of power.
5. Energy from Urban waste: urban waste poses a big problem from its disposal. Now is can be used for generation of power.

### **Causes and effects of depletion of resources**

Natural resource depletion refers to the decreasing amount of resource. It occurs when we use the resources at a rate faster than their renewable. Now a day due to industrial revolution the natural resources are used as a raw material for industries. Because of the population explosion we use more resources. Due to large scale industrial and domestic waste natural resources such as water and air face pollution due to these resources being over-exploited and being depleted day by day. This is serious problem as without these humans cannot survive.

#### **Causes:**

- Overpopulation: with increasing population, demands of the country increase which further results in depletion of resources.
- Over consumption and waste: as the standard of living of people improves, they tend to consume more and waste even more.
- Deforestation and destruction of ecosystem: forests are cut annually, to make space for multiplexes, residential complex etc. this is not only destroys trees but also destroys home of thousands of species of animals.
- Mining: minerals and oil, metals are high demand today. This is a very big problem as ores are being depleted day by day.
- Industrial development: Now a day due to industrial revolution the natural resources are used as a raw material for industries.

- Pollution and contamination of resources: pollution has a direct effect on contamination of resources available in nature.

### **Effects:**

- Resource scarcity: resource like fossil fuels, timber water become scare because of over consumption and degradation mostly because of population growth.
- Rising prices: when natural resources becomes scare, food, fuel, energy price rise.
- Water shortages
- Global warming
- Atmospheric changes
- Loss of biodiversity

## **Energy Conservation**

Energy conservation is not about making limited resources last as long as they can, that would mean that you are doing nothing more than prolong a crisis until you finally run out of energy resources all together. Conservation is the process of reducing demand on a limited supply and enabling that supply to begin to rebuild itself. Many times the best way of doing this is to replace the energy used with an alternate.

Without energy conservation, the world will deplete its natural resources. While some people don't see that as an issue because it will take many decades to happen and they foresee that by the time the natural resource is gone there will be an alternative; the depletion also comes at the cost of creating an enormous destructive waste product that then impacts the rest of life. The goal with energy conservation techniques is reduce demand, protect and replenish supplies, develop and use alternative energy sources, and to clean up the damage from the prior energy processes. Energy conservation supports the eco friendly lifestyle by providing energy, which saves the earth.

### **Methods of energy conservation:**

**Solar Energy:** Solar power uses the sun's energy and light to provide heat, light, and electricity for homes. It is the primary source of all energy forms on the earth. It is one such energy which helps in maintaining the ecological balance through the process of photosynthesis and green house effect. We have been using sun to dry clothes and boil food for generations. But now number of techno powers which have been developed to make full use of solar energy such as: - Photovoltaic systems: By these systems the electricity could be produced directly from the sunlight.

**Solar Process Space heating and cooling:** It is the commercial and industrial use of sun's heat.

**Solar Hot Water:** The process to heat water with the solar energy.

**Solar Power plants:** Producing electricity but using the sun's heat.

**Passive Solar heating and day lighting:** Use solar energy to heat buildings.

- Advantages of solar energy:
  1. Non-polluting
  2. No hazardous waste generation
  3. Inexhaustible and infinitely renewable.

**Wind energy:** Wind energy is often used to generate the mechanical power or the electricity. In the country like India, wind energy holds the great importance because of large hilly, coastal and desert areas. In the rural areas it is used to pump water and grind grain. The benefit of wind energy is that it is fully pollution free and is eco friendly too. It costs low and the generation of power is continuous. It is the most effective way to conserve the energy and prevent the environment.

- Advantages of wind energy:
  1. Wind is ever available free.
  2. Help to satisfy the need of electrical energy for large scale.
- Disadvantages:
  1. Installation requires open land.
  2. Cost is high.

**Geothermal Energy:** Geothermal energy is used in the form of thermal energy, electrical energy, nuclear energy, mechanical energy, chemical energy and light energy. It uses heat energy from beneath the surface of the earth. It was first used to produce electricity in the Italy in 1903. Geothermal energy has the major environment benefit as it prevents air pollution. It is particularly important in the inland nations such as Indian Oceans and the pacific regions. Energy generation from geothermal sources is only possible in few places under unique geographic conditions.

- Advantages:
  1. It is an inexhaustible energy resource.
  2. It is very cheap. It is clean and sustainable.

**Wave energy:** Ocean waves contain large amount of energy, which can be extracted through Ocean winds, Ocean currents, Ocean Geothermal etc. if the barrage is built across the river, electricity can be obtained by the flow of water through turbines as the tide rise and falls.

**Hydroelectric energy:** Another renewable source of energy is the hydroelectric energy, which is produced from fast flowing water. The process is pollution free. The movement of water spins the turbines which in turn generate electricity.

**Biomass energy:** Biomass is the plant and animal waste which is used as the energy. Biomass energy like manure from livestock, plant waste etc can be used to generate electricity, fuel, light, and heat. We get biomass energy directly from plants and indirectly from the animal waste.



