is in great demand for packing tea for Tea industry of Assam while fir tree wood is exploited greatly for packing apples in J & K.

d. **Development projects**: Massive destruction of forests occurs for various development projects like hydroelectric projects, big dams, road construction, mining etc.

e. **Growing food needs**: In developing countries this is the main reason for deforestation. To meet the demands of rapidly growing population, agricultural lands and settlements are created permanently by clearing forests.

f. **Overgrazing:** The poor in the tropics mainly rely on wood as a source of fuel leading to loss of tree cover and the cleared lands are turned into the grazing lands. Overgrazing by the cattle leads to further degradation of these lands.

g. Conversion of forests and woodlands to agricultural land to feed growing numbers of people

Major activities and threats to Forests resources:

1.Timber Extraction: Logging for valuable timber, such as teak and Mahogany not only involves a few large trees per hectare but about a dozen more trees since they are strongly interlocked with each other a by vines etc. Also road construction for making approach to the trees causes further damage to the forests. The steps in timber extraction are:

a) Clear felling
b) Mechanized logging
c) Manual logging
d) Selective logging

2. Mining: Mining operations for extracting minerals and fossil fuels like coal often involves vast forest areas. Mining from shallow deposits is done by surface mining while that from deep deposits is done by sub-surface mining. More than80000 ha of land of the country is presently under the stress of mining activities. Mining and its associated activities require removal of vegetation along with underlying soil mantle and overlying rock masses. This results in defacing the topography and destruction of the landscape in the area. Large scale deforestation has been reported in Mussorie and Dehradun valley due to indiscriminating mining of various minerals over a length of about 40 Km.

DAMS AND OTHER EFFECTS ON FOREST AND TRIBAL PEOPLE

Forest are directly are indirectly effected by the forest. Hydro-electric dams are main cause for deforestation. About 40,000 large dams are currently obstructing Workloads Rivers. Destruction of forest occurs for constructing big dams, which alters ecological balance. In these way landslides, droughts and floods conditions may rise in area. Socio-economic problems related to tribal and native people results from big dam construction

Dam construction produces a number of health hazards. Thousands of workers who build the dams attacked by the diseases like AIDS, measles, tuberculosis, syphilis etc. Dam building has resulted in wide range human rights violations. Rehabilitation policy of the government is

important and typical when most of the displaced persons are tribal people. Tribal life and culture are mostly associated with forest

CASE STUDIES:

Chipko movement related to mining or quarrying opposed by SundarlalBahuguna in North India. The first Chipko action took place spontaneously in April 1973 and over the next five years spread to many districts of the Himalaya in Uttar Pradesh. The name of the movement comes from a word meaning 'embrace': the villagers hug the trees, saving them by interposing their bodies between them and the contractors' axes. The Chipko protests in Uttar Pradesh achieved a major victory in 1980 with a 15-year ban on green felling in the Himalayan forests of that state by order of India's then Prime Minister, Indira Gandhi. Since then the movement has spread to Himachal Pradesh in the North, Kamataka in the South, and Rajasthan in the West, Bihar in the East and to the Vindhyas in Central India. In addition to the 15-year ban in Uttar Pradesh, the movement has stopped clear felling in the Western Ghats and the Vindhyas and generated pressure for a natural resource policy which is more sensitive to people's needs and ecological requirements.
Sardar Sarovar – Narmada project is a multipurpose project in Gujarat

1.4 WATER RESOURCES

Water resources are sources of water that are useful or potentially useful. Uses of water include agricultural, industrial, household, recreational and environmental activities. Virtually all of these human uses require fresh water.

Distribution of water on earth:

- 97% of the water on the Earth is salt water. Only three percent is fresh water; slightly over two thirds of this is frozen in glaciers and polar ice. The remaining unfrozen freshwater is found mainly as groundwater, with only a small fraction present above ground or in the air

Fresh water occurs mainly in two forms
1. Ground water and 2. Surface water

1. Groundwater: About 9.86% of the total fresh water resources is in the form of groundwater and it is about 35-50 times that of surface water supplied

USES OF WATER:

1. DOMESTIC USE: Water used in the houses for the purposes of drinking, bathing, washing Clothes, cooking, sanitary & other needs. The recommended value according to Indian standard specification for domestic use is 135 liters/day
2. INDUSTRIAL USE: Water is required for various industries such as cement, mining, textile, leather industries.
3. PUBLIC USE: This includes water used for public utility purpose such as watering parks, Flushing streets, jails etc.
4. FIRE USE: Water is used in case of accidents and to prevent the fire issues.

5. IRRIGATION: To grow crops which is the main sources for food?
6. OTHER USES: Hydro electric power generation requires water.

OVER UTILIZATION OF GROUND WATER AND SURFACE WATER

Over use of groundwater has following effects.

1. **Lowering of water table:** Excessive use of ground water for drinking, irrigation and Domestic purposes has resulted in rapid depletion of ground water in various regions leading to lowering of water table & drying of wells.

The reasons for shortage of water are:

a. Increase in population,
b. Increasing demand of water for various purposes.
c. Unequal distribution of fresh water.
d. Increasing pollution of water sources cause over exploitation.

2. **Ground subsidence:** When ground water withdrawal is greater than its recharge rate, the sediments in the aquifer become compacted. This is called ground subsidence which may cause damage of buildings, destroy water supply systems etc.

3. **Drought. A drought** is an extended period of months or years when a region notes a deficiency in its water supply whether surface or underground water. Generally, this occurs when a region receives consistently below average precipitation.

We can define drought in four main ways:

a) Meteorological drought: related to rainfall amounts
b) Hydrological drought: determined by water levels in reservoirs
c) Agricultural drought: related to the availability of water for crops
d) Socioeconomic Drought: related to demand and supply of economic goods

a) Meteorological Drought: Meteorological drought is generally defined by comparing the rainfall in a particular place and at a particular time with the average rainfall for that Place. The definition is, therefore, specific to a particular location. Meteorological drought leads to a depletion of soil moisture and this almost always has an impact on crop production.

b) Hydrological Drought: Hydrological drought is associated with the effect of low rainfall on water levels in rivers, reservoirs, lakes and aquifers. Hydrological droughts usually are noticed some time after meteorological droughts. First precipitation decreases and, Sometime after that, water levels in rivers and lakes drop.

C) Agricultural Drought: Agricultural drought mainly effects food production and farming. Agricultural drought and precipitation shortages bring soil water deficits, reduced ground water or reservoir levels, and so on. Deficient topsoil moisture at planting may stop germination, leading to low plant populations.

d) Socioeconomic Drought: Socioeconomic drought occurs when the demand for an economic good exceeds supply as a result of a weather-related shortfall in water supply. The supply of many economic goods, such as water, forage, food grains, fish, and hydroelectric power, depends on weather. Due to variability of climate, water supply is sufficient in some years but not satisfactory to meet human and environmental needs in other year

FLOODS

A **flood** is an overflow of water that submerges land which is normally dry. The European Union (EU) Floods Directive defines a flood as a covering by water of land not normally covered by water. Flooding may occur as an overflow of water from water bodies, such as a river or lake, in which the water overtops or breaks, resulting in some of that water escaping its usual boundaries, or it may occur due to an accumulation of rainwater on saturated ground in an area flood. Floods can also occur in rivers when the flow rate exceeds the capacity of the river channel, particularly at bends in the waterway. Floods often cause damage to homes and businesses if they are in the natural flood plains of rivers.

CONFLICTS OVER WATER

Water conflict is a term describing a conflict between countries, states, or groups over an access to water resources. The United Nations recognizes that water disputes result from opposing interests of water users, public or private.

A wide range of water conflicts appear throughout history, though rarely are traditional wars waged over water alone. Instead, water has historically been a source of tension and a factor in conflicts that start for other reasons. However, water conflicts arise for several reasons, including territorial disputes, a fight for resources, and strategic advantage.

These conflicts occur over both freshwater and saltwater, and between international boundaries. However, conflicts occur mostly over freshwater; because freshwater resources are necessary, yet limited, they are the center of water disputes arising out of need for potable water. As freshwater is a vital, yet unevenly distributed natural resource, its availability often impacts the living and economic conditions of a country or region. The lack of cost-effective water desalination techniques in areas like the Middle East, among other elements of water crises can put severe pressures on all water users

According to the 1992 International Conference on Water and the Environment, Water is a vital element for human life, and any human activity relates somehow to water. Unfortunately, it is not a renewable resource and in the future it "might get worse with climate change

Water conflicts occur because the demand for water resources and potable water extend far beyond the amount of water actually available. Elements of a water crisis may put pressures on affected parties to obtain more of a shared water resource, causing diplomatic tension or outright conflict.

The Cauvery water dispute: Out of Indias 18 major rivers, 17 are shared between different states. In all these cases, there are intense conflicts over these resources which badly seem to resolve. The Cauvery river water is a born of contention between tamilnadu and Karnataka and the problem is almost hundred years old. Tamilnadu occupying the downstream region of the river wants water-use regulated in the upstream state Karnataka refuses to do so and claims its privacy over the river as upstream user. The river water is almost fully utilized and both the

states having increasing demands for agriculture and industry. The consumption is more in Tamilnadu than Karnataka where the catchment area is rockier. On June 2, 1990, the Cavery Water dispute tribunal was set up which through an interim award directed Karnataka to ensure that 205 TMCF of water was made available in Tamilnadus mettur dam every year, till a settlement was reached. In 1991-92 due to good monsoon, there was no disputr as there was good stock of water in Mettur , but in 1995, the situation turned into a crisis due to delayed rains and an expert committee was set up to look into the matter which found there was a complex cropping pattern in Cauvery basin. Sambra paddy in winter, Kurvai paddy in summer and some cash crops demanded intensive water, thus aggravating the water crisis. Proper selection of crop varieties, optimum use of water, better rationing and rational sharing patterns, and pricing of water are suggested as some measures to solve the problem.

DAMS-BENEFITS AND PROBLEMS

Today there are more than 45,000 large dams around the world, which play an important role in communities and economies that harness these water resources for their economic development. Current estimates suggest some 30-40% of irrigated land worldwide relies on dams. Hydropower, another contender for the use of stored water, currently supplies 19% of the world's total electric power supply and is used in over 150 countries. The world's two most populous countries – China and India – have built around 57% of the world's large dams.

BENEFITS:

River valley projects with big dams have usually been considered to play a key role in the development process due to their multiple uses. India has the distinction of having the largest number of river valley projects. The tribal's living in the area pin big hopes on these projects as they aim at providing employment and raising the standard and quality of life. The dams have tremendous potential for economic upliftment and growth. They can help in checking floods and famines, generate electricity and reduce water and power shortage, provide irrigation water to lower areas, provide drinking water in remote areas and promote navigation, fishery etc

PROBLEMS:

- Fragmentation and physical transformation of rivers.
- Serious impacts on riverine ecosystems.
- Social consequences of large dams due to displacement of people.
- Water logging and Stalinization of surrounding lands.
- Dislodging animal populations, damaging their habitat and cutting off their migration routes.
- Fishing and travel by boat disrupted.

Large dams have had serious impacts on the lives, livelihoods, cultures and spiritual existence of indigenous and tribal peoples. They have suffered disproportionately from the negative Impacts of dams and often been excluded from sharing the benefits. In India, of the 16 to 18 million people displaced by dams, 40 to 50% were tribal people, who account for only 8% of our nation's one billion people.

1.5 MINERAL RESOURCES

A mineral is a naturally occurring substance of definite chemical composition and identifiable physical properties. An ore is a mineral or combination of minerals from which a useful substance, such as a metal, can be extracted and used to manufacture a useful product.
The geological processes are caused for the formation of the minerals over millions of years ago in the earth's crust. Minerals are generally localized in occurrence and the deposits are very sporadic in distribution. Mineral resources are non renewable and the mineral /ore is extracted by the process of mining.
Iron, aluminum, zinc, manganese and copper are important raw materials for industrial use. Important non-metal resources include coal, salt, clay, cement and silica. Stone used for building material, such as granite, marble, limestone, constitute another category of minerals. Minerals with special properties that humans value for their aesthetic and ornamental value are gems such as diamonds, emeralds and rubies. The luster of gold, silver and platinum is used for ornaments. Minerals in the form of oil, gas and coal were formed when ancient plants and animals were converted into underground fossil fuels.

Uses of minerals:
Minerals are used in a large number of ways for domestic, industrial, commercial
Sectors etc…
1. Generation of energy by using coal (lignite / anthracite); uranium, gold, silver, platinum, diamond are used in jewellery. Copper, aluminum etc are used as cables for transmission of power.
2. Some of the minerals are used in ayurvedam as medicine.
Gold is reputed to strengthen the heart muscle and increase energy and stamina.

Mining and its Process:
Minerals and their ores need to be extracted from the earth's interior so that they can be used. This process is known as mining. **Mining** is the extraction of valuable minerals or other geological materials from the earth, from an ore body, lode, vein, (coal) seam or reef, which forms the mineralized horizon and package of economic interest to the miner.
Mining operations generally progress through four stages:
(1) Prospecting: Searching for minerals.
(2) Exploration: Assessing the size, shape, location,
(3) Development: Work of preparing access to the deposit so that the minerals can be extracted from it.
(4) Exploitation : Extracting the minerals from the mines.

Types of mining:
The method of mining has to be determined depending on whether the ore or mineral deposit is nearer the surface or deep within the earth. The topography of the region and the Physical nature of the ore deposit is studied. Mines are of two types
a) Surface (open cut or strip mines)
b) Deep or shaft mines.

a) Surface Mining: Surface mining is used to obtain mineral ores that are close to Earth's Surface. The soil and rocks over the ore are removed by blasting. Typically, the remaining ore is drilled or blasted so that large machines can fill trucks with the broken rocks. The trucks take the rocks to factories where the ore will be separated from the rest of the rock. Surface mining includes open-pit mining, quarrying, and strip mining.

1) Open-pit mining creates a big pit from which the ore is mined. The size of the pit grows until it is no longer profitable to mine the remaining ore.

2) Strip mines are similar to pit mines, but the ore is removed in large strips.

3) A quarry is a type of open-pit mine that produces rocks and minerals that are used to make buildings.

b) Underground Mining: Underground mining is used for ores that are deep in Earth's surface. For deep ore deposits, it can be too expensive to remove all of the rocks above the ore. Underground mines can be very deep. The deepest gold mine in South Africa is more than 3,700 meters deep (that is more than 2 miles)! There are various methods of underground mining. These methods are more expensive than surface mining because tunnels are made in the rock so that miners and equipment can get to the ore. Underground mining is dangerous work. Fresh air and lights must also be brought in to the tunnels for the miners. Miners breathe in lots of particles and dust while they are underground. The ore is drilled, blasted, or cut away from the surrounding rock and taken out of the tunnel

Environmental effects:

Mineral extraction and processing in mines involves a negative impact on environment. Much risk is involved in mining process because of high temperature, pressure Variations, fire hazards and lack of ventilation in mines.

- Mining process involves removal of over burden of soil, ore extraction & transportation, crushing & grinding of ore, water treatment of ore, storage of waste material. As a result of these activities cause air pollution, noise pollution, water pollution, loss of habitat of wildlife, concentration of toxic substances in tailing ponds and spreading of dust.
- People working in mines often suffer from serious respiratory system and skin diseases.
- Mining often causes ground subsidence which results in tilting of buildings, cracks in houses, buckling of roads, bending of rail tracks etc.
- Exploration process before a mining involves, geochemical, geophysical surveys Drilling activities which causes for air pollution, noise pollution etc...
- In addition, disturbance of all vegetation (flora) and fauna (animals) from that a region.
- **Acid mine drainage** (AMD), or **acid rock drainage** (ARD): The outflow of acidic water from (usually abandoned) metal mines or coal mines. However, other areas where the earth has been disturbed (e.g. construction sites, subdivisions, transportation corridors, etc.) may also contribute acid rock drainage to the environment

1.6 FOOD RESOURCES

The main sources of human food are plants and animals. Human beings consume almost all parts of plants in the form of **cereals** (wheat, barley, millet, rye, oats, maize, corn, rice etc.); **pulses** (peas, red grams, green grams); **vegetables** (carrot, cauliflower, beans); **fruits** (banana, orange, grapes, pineapple) and **spices** (pepper, cloves). Also a number of products such as milk, butter, egg and meat supplement the requirements.

WORLD FOOD PROBLEMS

Since world's population is growing every year and the demand of food is also increasing continuously. Although world's food production has increased almost three times during the last 50 years, but at the same time rapid population growth outstripped the food production. So, the world food problem is a complex one depending on food production, population increase, the prevalence of poverty and environmental impacts.

Famines are due to lack of access to food but not lack of food. Modern agriculture is largely based upon technological factors like the use of improved seeds, chemical fertilizers, synthetic pesticides etc…

The **green revolution** however changed traditional agricultural practices with a rapid increase in food production in developing countries. An American agricultural scientist, **Norman Borlaug** developed a high yielding variety of wheat through new concepts in plant breeding. By the mid 1960's, the green revolution was fully adopted in India.

CHANGES CAUSED BY AGRICULTURE AND OVER GRAZING

CHANGES CAUSED BY AGRICULTURE

There are two types of agricultural systems:
(1) Traditional system and (2) Modern and Industrialized system

(**1) Traditional system:**
The traditional system is again subdivided into two types namely:
(a) **Traditional Subsistence Agriculture** (TSA): In this system, only enough crops or livestock Are produced for the use of family and a little surplus to sell to meet the needs.
(b) **Traditional Intensive Agriculture**(TIA):Farmers increase their inputs of human labor,
Water fertilizers to get higher yields for the use of their families and to sell small quantities for getting income.

(2) Modern and industrialized system: In the system of **modern and industrialized agriculture**, a large extent of land will be brought under agriculture and huge quantities of fuel, energy,
water, chemical fertilizers, pesticides used to produce large quantities of single crops purely for sale. This system is spreading in India in the name of Green revolution. But this modern agricultural system has its own adverse effects on environment.

a. Excessive use of chemical fertilizers to boost up the crop yield, contaminate groundwater with nitrate. The presence of excess of nitrate in drinking water is dangerous for human Health. Excess Nitrate reacts with hemoglobin and causes for "Blue **Baby Syndrome**" which kill the infants.

b. The excessive N P K fertilizers in agriculture fields are often washed off with water and leads to **algal blooming** and **Eutrophication. Phosphates** have been accumulating in soils, lake sediments for decades change the ecology. Increased levels of phosphates in water bodies cause Eutrophication (growth of unwanted plants).

c. The excessive use of pesticides enters the food chain and become hazardous to human life.

d. A large area of fertile land has become saline in recent years due to excessive irrigation.

e. Consumption of fuel energy is more when shifting of human and animal labour to agriculture machinery. Use of fuel leads to air pollution.

f. Continuing to increase input of fertilizers, water and pesticides eventually produces no Additional increase in crop yield but slows down the productivity of the crop.

g. Due to increased irrigation, the underground **aquifers are slowly and constantly become dry**. The rate at which they are being depleted is much faster than its recharge.

h. Excessive application of chemical fertilizers can increase soil **salt content**. The percolation of domestic and industrial sewage also increase the salinity of soil.

i. The stagnation of water in the soil in the upper layers causes for **water logging** which Causes for less oxygen availability for respiration of plants.

Modern, intensive agriculture causes many problems, including the following:

- Artificial fertilizers and herbicides are easily washed from the soil and pollute rivers, lakes and Water courses.
- The prolonged use of artificial fertilizers results in soils with a low organic matter content Which is easily eroded by wind and rain?
- Dependency on fertilizers. Greater amounts are needed every year to produce the same Yields of crops.
- Artificial pesticides can stay in the soil for a long time and enter the food chain where they build up in the bodies of animals and humans, causing health problems.
- Artificial chemicals destroy soil micro-organisms resulting in poor soil structure and aeration and decreasing nutrient availability.
- Pests and diseases become more difficult to control as they become resistant to artificial Pesticides. The numbers of natural enemies decrease because of pesticide use and habitat loss.

WATER LOGGING

Water logging refers to the saturation of soil with water. Soil may be regarded as waterlogged when the water table of the groundwater is too high to conveniently permit an anticipated activity, like agriculture. In agriculture, various crops need air (specifically, oxygen) to a greater or lesser depth in the soil. Water logging of the soil stops air getting in. How near the water table must be to the surface for the ground to be classed as waterlogged varies with the purpose in view. A crop's demand for freedom from water logging may vary between seasons of the year, as with the growing of rice (Oryza sativa).

In irrigated agricultural land, water logging is often accompanied by soil salinity as waterlogged soils prevent leaching of the salts imported by the irrigation water

SALINITY

Soil salinity is the salt content in the soil; the process of increasing the salt content is known as salinization. Salt is a natural element of soils and water. Salinization can be caused by natural processes such as mineral weathering or the gradual withdrawal of an ocean. It can also be caused by artificial processes such as irrigation

Salinization is a process that results from:

- High levels of salt in the water.