

KERALA PUBLIC SCHOOL, KADMA

**ENVIRONMENTAL APPLICATION
(STUDY MATERIAL)**

SESSION :2020-'21

CLASS : IX

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**UNIT 1 : Our Main Environmental problems
Ch.2: Resource Depletion**

UNIT 1: OUR MAIN ENVIRONMENTAL PROBLEMS

CH.2 : RESOURCE DEPLETION



RESOURCE

A resource is a source or supply from which a benefit is produced and that has some utility.

Resources are broadly classified upon their availability into – **Renewable & Non renewable resources**.

1. RENEWABLE RESOURCES

- **Eg.** Sun, air, water, trees & animals (biomass), Geothermal energy

These are the resources which can be replenished or reproduced quickly.

- **Biomass :** By burning plant matter, heat or electricity can be generated through the running of turbines. Biomass is considered a renewable resource due to the ability to plant new trees, replacing those that are cut down or die naturally.
- **Tidal energy :** It is considered a renewable resource because the earth's tides are inexhaustible & do not release any greenhouse gas.
- **Hydropower :** The movement of water naturally creates kinetic energy, which can be turned into electricity.
- **Solar energy:** It is available in abundance, is inexhaustible and does not emit any greenhouse gas.
- **Wind energy:** It is also clean and in abundance. With the use of turbines, wind can generate electricity in a sustainable way.

2. NON RENEWABLE RESOURCES

- **Eg.** Minerals, oil, natural gas, fossil fuels (coal & petroleum)

These are the resources which cannot be replenished, once they are depleted. They are formed over very long geological periods & their rate of formation is extremely slow.

- **Oil :** Extraction of oil from land & sea, cause large amount of pollution. Oil spills cause damage to local ecosystems that are almost irremediable.
Oil is nonrenewable as its formation takes millions of years.
- **Petroleum & natural gas:** The process of finding natural gas involves examining rocks, analyzing sound waves, measuring the gravitational pull of rock masses & finally drilling into the rock in search of natural gas deposits.
The amount of time required to make natural gas from fossil fuels, compared with the rate in which it is consumed makes it a nonrenewable resource.
- **Coal:** Formation of coal from dead plant matter, covered by layers of water, rock, dirt & buried at the bottom of swamps take millions of years.

DEPLETION OF RESOURCES

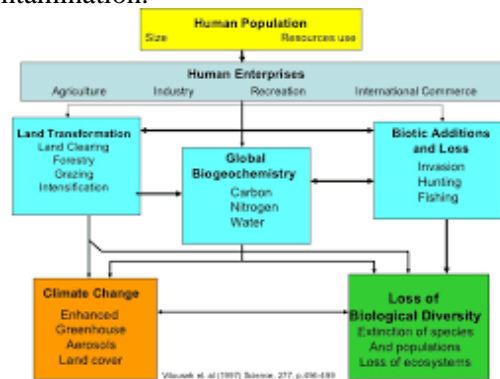
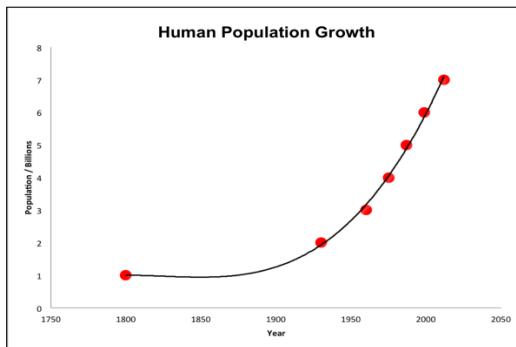
Resource depletion is the consumption of a resource faster than it can be replenished.

- **The value of a resource is a direct result of its availability in nature and the cost of extracting the resource, the more a resource is depleted the more the value of the resource increases.**
- There are several types of resource depletion, the most known being: Aquifer depletion, deforestation, mining for fossil fuels and minerals, pollution or contamination of resources, slash-and-burn agricultural practices, Soil erosion, and overconsumption, excessive or unnecessary use of resources.

FACTORS CAUSING DEPLETION OF RESOURCES

1. Overpopulation

The total global population is more than seven billion people. Still, there is a consistent increase in the overall earth population and this has been a critical factor in accelerating the depletion of natural resources. An increase in the population expands the need for resources and conditions necessary to sustain it. In addition, it contributes to increased ecological contamination.



2. Poor Farming Practices

Humans are causing a lot of stress to land resources due to the over-reliance on food production for daily nutritional requirements. Poor irrigation practices, for example, is a key contributing factor to salinization (increase of salt concentration in soil) and alkalization (decrease in acidity of the soil), that sustains plant growth. Poor soil management practices and the use of heavy machinery and farming equipment also destroy the soil structure making it unsuitable for plant growth. Some farming practices such as excessive use of pesticides, fungicides, and herbicides equally kill important soil micro-organisms that are essential in replenishing nutrients in the soil.



USE OF PESTICIDES



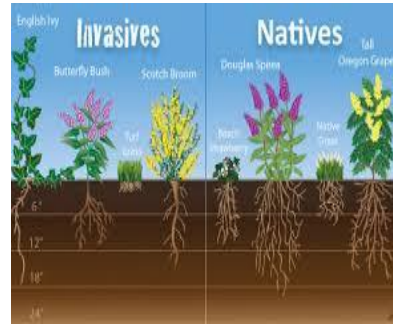
TOP SOIL EROSION



JHUM CULTIVATION



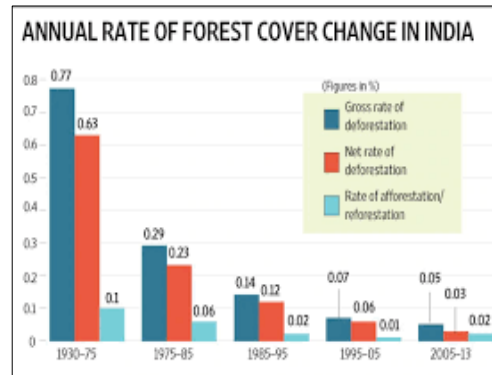
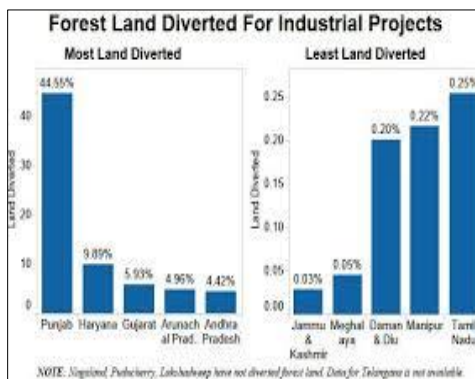
FLOOD IRRIGATION



INVASIVE SPECIES

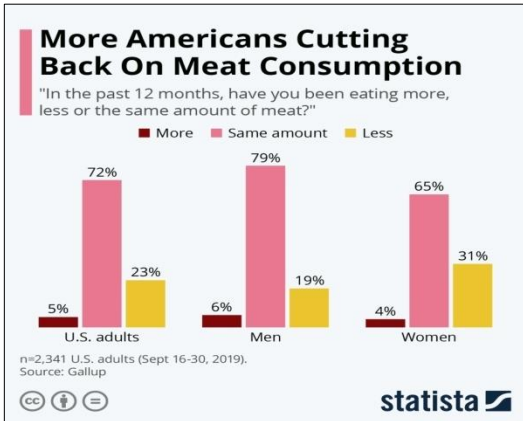
3. Logging

People clear forests primarily for agricultural reasons due to the increase in the population pressure. Humans are cutting down trees to make space for residential complexes and multiplexes. Through deforestation, the planet not only loses trees but also thousands of animals and plant biodiversity due to the destruction of their natural habitats. Moreover, increased logging activities lead to soil erosion that degrades natural soil minerals.



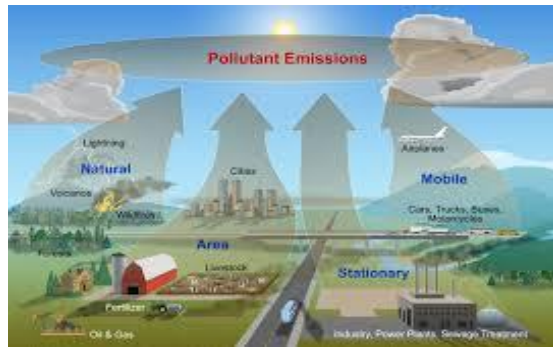
4. Overconsumption of Natural Resources

The 1760 industrial revolution saw large-scale mineral and oil exploration and the practice has been gradually growing, leading to more and more natural oil and mineral depletion. And together with the advancements in technology, development, and research in the contemporary era; exploitation of minerals has become easier and humans are digging deeper to access different ore.



5. Pollution

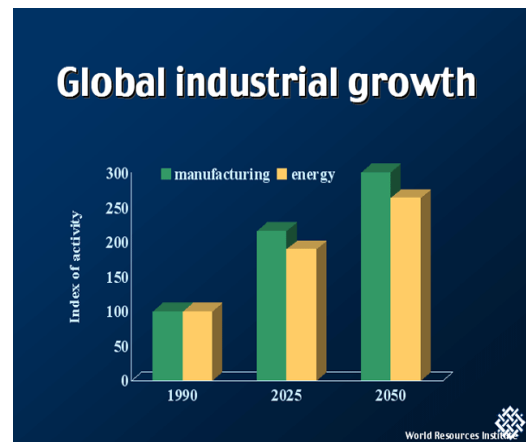
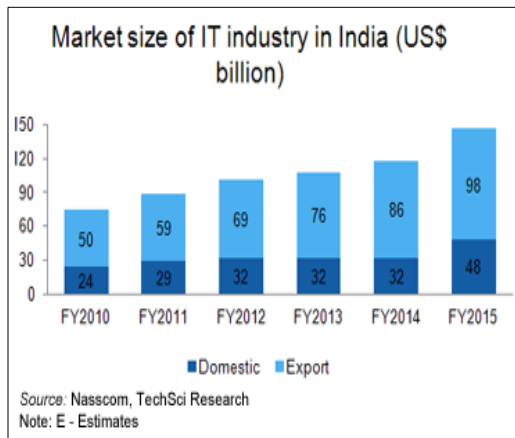
An increase in population and modern activities is a major contributor to the disposal of pollutants into the natural environment and as such, the value of natural environments is gradually exposed to degradation. The soil, air, lakes, and seas are being contaminated with sewage, radioactive, materials, and toxic chemicals among other pollutants.



Uncontrolled release of carbon monoxide, nitrous oxide, sulphur oxide, and carbon dioxide, for example, have resulted in the degradation of the ozone layer and global warming – environmental changes with their resultant depletive impacts on different natural habitats. Millions of different animal and plant species have thus lost their natural habitats and are on the verge of extinction.

6. Industrial and Technological Development

The present-day world is incessantly becoming industrialized as more and more countries make major technological breakthroughs. But as technological advancements continue, there is similarly a considerable growth in industries that release toxins and chemical by-products which are eventually deposited in lakes, soils, and lands. As a result, the by-products and toxic materials alter natural habits such as aquatic systems and wildlife.



Effects of Depletion of Natural Resources

1. Water shortages

Poor farming practices, deforestation, and pollution are major causes of water resource depletion due to contamination, wastage, and the destruction of natural water catchment areas.

Water shortage contributes to –

- Lack of access to drinking water
- Famine and food insecurity
- Lack of education
- Sanitation issues
- Diseases
- Migration
- Destruction of habitats
- Loss of biodiversity

NOTE : As of today, approximately **one billion people lack access to clean water**

2. Oil depletion

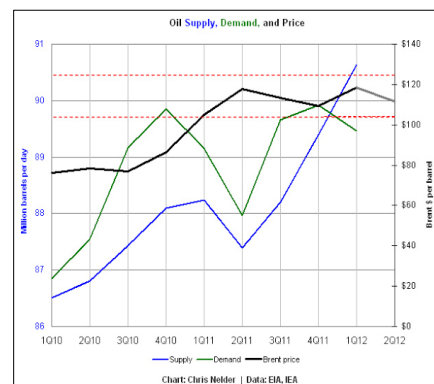
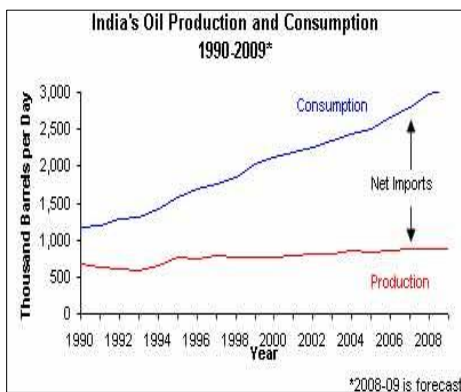
Oil is a non-renewable resource that accounts for approximately 40 percent of the total energy used globally. Research by **EIA**'s International Energy Outlook had shown that due to the high rate of oil exploitation, the amount of oil remaining would last for only 25 years.

Oil is an essential commodity in manufacturing, planting, mining, and transportation among many activities, and its depletion would be devastating.

The adverse effects of oil depletion include –

- Fall of the business
- High cost of living in developing countries
- Uncertainty in the transport sector
- Increase in prices

(EIA : Environmental Impact Assessment)



Peak oil is the period when the maximum rate of global petroleum extraction is reached, after which the rate of production will undergo a long-term decline.

The **2005 Hirsch report**, funded by United State Department of Energy, concluded that the decreased supply combined with increasing demand will significantly increase the worldwide prices of petroleum derived products, and that most significant will be the availability and price of liquid fuel for transportation.

3. Loss of forest cover

Approximately **18 million acres of forest cover are destroyed annually**. This means that half of the world's natural forest cover has already been cleared. Furthermore, studies indicate an increase in deforestation in the past three decades has resulted in a **12% to 17% rise in greenhouse gases globally**.

Causes

One of the main causes of deforestation is clearing forests for agricultural reasons. As the population of developing areas, especially near rainforests, increases, the need for land for farming becomes more and more important. For most people, a forest has no value when its resources are not being used, so the incentives to deforest these areas outweigh the incentives to preserve the forests. For this reason, the economic value of the forests is very important for the developing countries.

Environmental impact

Because deforestation is so extensive, it has made several significant impacts on the environment, including:

- Carbon dioxide in the atmosphere
- Changing the water cycle
- An increase in soil erosion
- A decrease in biodiversity
- Increasing risks of landslides

Deforestation is often cited as a contributor to global warming, because trees and plants remove carbon dioxide and emit oxygen into the atmosphere. One of the most pressing issues that deforestation creates is soil erosion. The removal of trees causes higher rates of erosion, increasing risks of landslides, which is a direct threat to many people living close to deforested areas. As forests get destroyed, so does the habitat for millions of animals.

It is estimated that **80% of the world's known biodiversity lives in the rainforests**, and the destruction of these rainforests is accelerating extinction at an alarming rate.

4. Depletion of minerals

There has been an increase in the exploitation of minerals such as phosphorus, gasoline, copper, and zinc among others to sustain the seven billion people on earth.

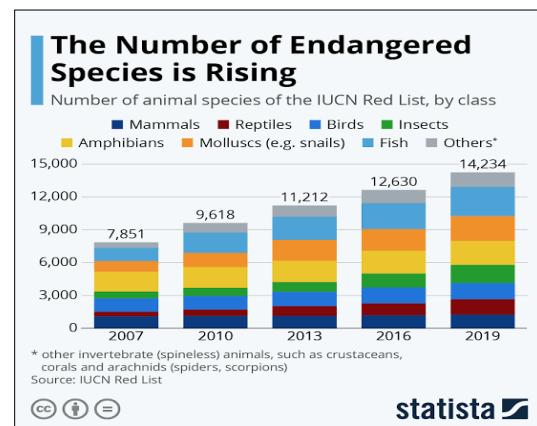
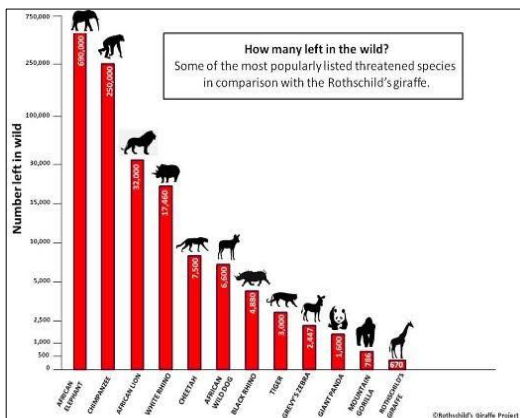
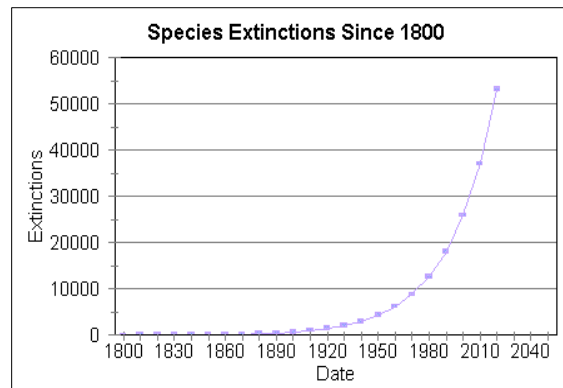
Studies by **Global Phosphorus Research Institute**, for example, shows that the earth could run out of phosphorus – an essential element for plant growth, in the next 50 to 100 years.

Studies by the **United States Geological Survey** also indicate that there is an increase in non-renewable resources consumption of natural minerals and construction materials such as copper, sand, gravel, and stone.

- Some minerals which may enter production decline during the next 20 years are - **Gasoline, Copper, Zinc**
- Some minerals which may enter production decline during the present century: **Aluminium, Coal, Iron**

5. Extinction of Species

Due to the changes in the living conditions of animals as a result of resource overexploitation and habitat degradation, some species may go extinct. Forested regions are known to be a habitat for thousands of animals but deforestation is progressively destroying forest habitats. Practices such as overfishing and pollution have similarly led to a drastic reduction in the number of marine species such as the tuna fish.



ASSIGNMENT

I Short answer type questions :

1. Define Resource Depletion. Name the two kinds of natural resources.
2. Differentiate between Renewable & Non Renewable resource.
3. Name any four factors causing depletion of resources.
4. Give any two factors resulting in extinction of species.
5. What do you mean by PEAK OIL?

II Long answer type questions:

1. Deforestation causes Global warming. Explain.
2. Explain the consequences of water scarcity on earth .
3. In what way Industrial & technological development cause resource depletion ? Explain.