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BIO 202

NURSING

Humans pollute the land, water and air with unwanted refuse. Almost 2.4 billion people don’t have access to clean water. In some countries, the smog caused by air pollution is deadly and can block out the sun in a dense haze. It is rare to find a beach in the world that doesn’t have litter.

 Humans produce about 300 million tons of plastic each year. More than 8 million tons of that plastic are dumped into the oceans, and in 2017, an estimated 5 trillion pieces of plastic littered the seas. The plastic in the oceans has devastating effects on wildlife. In 2017, for example, a beached whale discovered off the coast of Scotland died because of the amount of plastic it had consumed – about nine pounds of plastic bags were found coiled in its digestive tract.

 Humans alone have the potential to gather resources from beyond their immediate surroundings and process them into different and more versatile forms. This has made humans to thrive and flourish beyond natural constraints. As a result of which the anthropogenic (man-induced) pollutants have overloaded the system, and the natural equilibrium is disturbed.Rapid development activities have been associated with more and more exploitation of various natural resources. Technological development has resulted in fast depletion of non-renewable energy resources, mainly coal and petroleum, and also various minerals. Mining activities, dam, building, urbanization and industrialization have all interfered with the ecological balance of nature due to large scale impact.

Primitive humans used natural resources to satisfy their basic needs of air, water, food and shelter. These natural and unprocessed resources were readily available in the biosphere, and the residues produced by the use of these resources were generally compatible with or easily assimilated by the environment.

**IMPACTS OF HUMAN ACTIVITIES ON OUR ECO SYSTEM**

**Overexploitation**

Overexploitation is a major threat to ecosystems and therefore sustainability. It is the consumption of a natural resource at a rate greater than that natural resource can maintain itself. Overhunting of species (see “What Happened to All the Fish” as follows) is one of the clearest examples of overexploitation, but there are other forms. Land degradations are human-induced changes that impair the capacity of the land to sustain life. Deforestation and overgrazing exploit the land and result in the exceeding of sustainable yield.

**Schematic representation of agricultural effects**

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The effects of agriculture on the environment can be broadly classified into three groups, viz. local, regional and global:

i. Local Changes:

These occur at or near the site of farming. These changes/effects include soil erosion and increase in sedimentation downstream in local rivers. Fertilizers carried by sediments can cause eutrophication of local water bodies. Polluted sediments can also transport toxins and destroy local fisheries.

ii. Regional Changes:

They generally result from the combined effects of farming practices in the same large region. Regional effects include deforestation, desertification, large scale pollution, increases in sedimentation in major rivers.

iii. Global Changes:

These include climatic changes as well as initially extensive changes in chemical cycles.

**Environmental Effects**

When fossil fuels are burned, multiple chemicals and organic compounds are released into and generated by chemical reactions in the atmosphere. Some of these include mercury, sulfur oxides, methane, nitrogen oxides and most importantly, carbon dioxide. Mercury often falls back to the ground when released from burning coal, poisoning fish and threatening food chains, including human food supplies. Sulfur, nitrogen and volatile organic compounds react with oxygen and other naturally occurring gases in the atmosphere, contributing to the phenomenon of acid rain. Acid rain can seriously damage forests and contaminate soils, making them less suited to productive agriculture.

**The Greenhouse Effect**

According to the U.S. Environmental Protection Agency, nitrogen oxides, methane, carbon dioxide and fluorinated gases are considered the primary greenhouse gases. High levels of these trap energy from the sun in the earth's lower atmosphere. This causes increasing average temperatures across the globe, greatly affecting climate patterns. Ice-cap and glacial melt, combined with thermal expansion of warming oceans, is predicted to cause significant sea-level rise by the end of the 21st century, flooding many low-lying coastal areas. Warming temperatures may also severely disrupt sensitive arctic ecosystems, contribute to increasing desertification and affect weather patterns that humans currently depend on for agriculture.

**Fossil Fuels**

Over the course of our planet's 4.5 billion year history, many types of organisms have lived and died. During the Carboniferous period, about 300 to 360 million years ago, land plants, multiple forms of aquatic life and giant insects flourished in an oxygen-rich environment. As these life forms died, they decomposed in vast quantities over eons, creating the numerous coal and petroleum deposits that are now extracted for fuel and burned to generate electricity and power vehicles.

**Controversy and Consensus**

Although scientists do not fully understand all of the variables that are driving climate change and although there is still some controversy, there is increasing evidence that these changes are human induced. In its 2013 report, the Intergovernmental Panel on Climate Change declared 95 percent certainty that global warming since 1950 is man-made. The report also highlights the possible amount of global temperature increases over the next century and the probable effects on global climate patterns.

**Pollution**

Pollution is the contamination, harm, or disruption of the natural environment through the emissions of harmful substances. Pollution is most typically associated with anthropogenic sources but can also occur from natural activity, such as volcanic eruptions. Pollution can impact air, water, and land. Pollutants include domestic, industrial, and agricultural waste. It comes in many different forms and can be chemical substances or noise, heat, or light.

Pollution can be either point source or nonpoint source. Point source is a specific and easily identifiable source of pollution, such as a factory or power plant. Nonpoint sources consist of many small, distributed sources of a pollutant that are difficult to individually identify and on their own may not be that harmful but in aggregate are significant sources of pollution. A classic example of nonpoint source would be soap detergents, fertilizers, and other commonly used chemicals and products from many residences and businesses that then contaminate watersheds with high levels of nitrogen. Nonpoint sources tend to be more complex to regulate for pollution emissions.

**Habitat Destruction**

Habitat destruction brought on by the activity of humans threatens resident species and ecosystems. Two examples of habitat destruction are deforestation and desertification. Deforestation occurs when a forest or stand of trees is removed, converting the land to a nonforest use. This changes the ecosystem drastically and results in a dramatic loss of biodiversity. Deforestation can be the result of timber harvesting or of clearing land for agricultural, commercial, or residential use. The loss of biodiversity and trees alters the ecosystem and can result in aridity and erosion. It also results in climate change and extinction, and it can lead to desertification if on a significant enough scale.

**Invasive Species**

Invasive species are brought on by transporting species either intentionally or accidentally from other areas of the world. This can be devastating to existing species as invasive species are introduced on a timescale much more quickly than typically would happen with evolution over longer time periods. This can include outcompeting native species in the ecosystem, leading to the decline or extinction of local species, and overpopulation as these invasive species may not have any predators in this new ecosystem. They also can be a major economic cost.nclude displacement of indigenous peoples.

**GENETIC MODIFICATION**

The use of genetic modified organisms, or GMOs, has played an important role in increasing crop yields so we can feed our populations. In addition to providing better crop yields, modified plants are better able to resist disease and parasites, tolerate more extreme temperatures, or thrive with less water. However, modifying plants has not always been intentional. For example, continued use of herbicides, like glyphosate, has caused many weeds to become immune to their effects. In fact, 249 species of weeds are now immune to all normally used herbicides. The only way to get rid of them is to till the soil, which exposes the soil to sunlight and kills the organisms that help make the land fertile.