Air Pollution

Introduction

Air pollution occurs when harmful substances including particulates and biological molecules are introduced into Earth's atmosphere. It may cause diseases, allergies or death in humans; it may also cause harm to other living organisms such as animals and food crops, and may damage the natural or built environment. Human activity and natural processes can both generate air pollution.

Indoor air pollution and poor urban air quality are listed as two of the world's worst toxic pollution problems in the 2008 Blacksmith Institute World's Worst Polluted Places report. According to the 2014 WHO report, air pollution in 2012 caused the deaths of around 7 million people worldwide, an estimate roughly matched by the International Energy Agency.

What Is Air Pollution?

Being sick is pretty lousy, isn't it? If you know someone who has a cold, you tend to steer clear of them because you don't want to catch their germs. Every time that person coughs or sneezes, their germs get put into the air and are then free to travel to the next person. Can you imagine trying to contain something like that in the air? It would be pretty difficult because, not only are the germs invisible, but they expand outward as they enter the air.

We don't think of germs as air pollution, but it really is the same idea. **Air pollutants** are gases and particles in the atmosphere that harm organisms and affect climate. **Air pollution**, then, is the release of these particles and gases into the air. For the previous example, the germs would be the pollutants, but the air wouldn't be polluted until those germs are sneezed out.

www.studymafia.org

Sources of Air Pollution

When you think of air pollution, you likely think of human activities, such as coal-burning plants and emissions from cars, planes and boats. But, air pollution also comes from natural sources. Volcanoes are a great example of a natural pollution source; they produce large amounts of particles and gases, and the eruptions send them up into the atmosphere. Forest fires are a natural process that also produce large amounts of potentially harmful gas and particulate matter.

No matter the source, there are two ways pollution can enter the air. **Point source pollution** is when the air pollutants come from a single source of origin, such as smokestacks at a single factory. **Non-point source pollution** is when the air pollutants come from many sources, such as all of the cars in the U.S.

Just like not all sources of pollution are the same, pollutants also vary in their effects. **Primary pollutants** are those that cause direct harm or that can react to form harmful substances in the atmosphere. **Secondary pollutants** are those harmful substances that are created from the reactions between primary pollutants and the components of the atmosphere.

www.studymafia.org

Types of Air Pollutants

In another lesson, we learned about the **Clean Air Act of 1970**, which set limits on emissions and standards for air quality, provided funding for pollution control research and made it possible for citizens to sue those who violate the standards. The standards set forth in this legislation by the Environmental Protection Agency, or EPA, identified six pollutants as those that posed the greatest threat to human health. Let's look at each one.

Carbon monoxide is both odorless and colorless, and it's produced through combustion. Most carbon monoxide emissions come from vehicles, about 62%, but they also come from forest fires, lawn equipment and the burning of industrial waste. This pollutant is dangerous to human health because, even in very small concentrations, it can prevent oxygen from being delivered through your body to major organs. At higher levels, it can cause death.

Sulfur dioxide is also a colorless gas, and it's highly reactive. About 70% of sulfur dioxide emissions come from combustion at industrial power plants, like those that generate electricity from coal. Sulfur in the coal reacts with atmospheric oxygen in the air and forms the compound sulfur dioxide. Once in the air it may react further to create sulfur acid, which can fall back to Earth as acid rain. Sulfur dioxide can also cause respiratory illnesses when it's breathed in.

Nitrogen oxides are a family of gases that are also very reactive, but you can definitely see and smell these! Both nitric oxide and nitrogen dioxide are in this family, and these are the gases that contribute to the smog you see over large cities, like Los Angeles. More than half of these pollutants come from vehicle combustion emissions, with a large amount also coming from industrial combustion. Nitrogen oxides also cause respiratory illnesses.

Ozone is a tricky one because when it's in the stratosphere layer of the atmosphere, it protects us from harmful UV radiation. However, when ozone is lower in the atmosphere, it becomes dangerous to our health because it causes respiratory illnesses and damages ecosystems. Ozone is a secondary pollutant because it reacts from a combination of sunlight, heat, nitrogen oxides and volatile carbon containing compounds.

Particulate matter is just what it sounds like, particles suspended in the air. This can be both liquids and solids, and about 60% of particulate matter pollution is wind-blown dust. The problem is that particulate matter can also be some of those harmful pollutants previously described, as well as toxic chemicals and metals.

www.studymafia.org

Effects of Air Pollution

1. Respiratory and heart problems: The effects of Air pollution are alarming. They are known to create several respiratory and heart conditions along with Cancer, among other threats to the body. Several millions are known to have died due to direct or indirect effects of Air pollution. Children in areas exposed to air pollutants are said to commonly suffer from pneumonia and asthma.

2. Global warming: Another direct effect is the immediate alterations that the world is witnessing due to Global warming. With increased temperatures world wide, increase in sea levels and melting of ice from colder regions and icebergs, displacement and loss of habitat have already signaled an impending disaster if actions for preservation and normalization aren't undertaken soon.

3. Acid Rain: Harmful gases like nitrogen oxides and sulfur oxides are released into the atmosphere during the burning of fossil fuels. When it rains, the water droplets combines with these air pollutants, becomes acidic and then falls on the ground in the form of acid rain. Acid rain can cause great damage to human, animals and crops.

4. Eutrophication: Eutrophication is a condition where high amount of nitrogen present in some pollutants gets developed on sea's surface and turns itself into algae and and adversely affect fish, plants and animal species. The green colored algae that is present on lakes and ponds is due to presence of this chemical only.

5. Effect on Wildlife: Just like humans, animals also face some devastating affects of air pollution. Toxic chemicals present in the air can force wildlife species to move to new place and change their habitat. The toxic pollutants deposit over the surface of the water and can also affect sea animals.

6. Depletion of Ozone layer: Ozone exists in earth's stratosphere and is responsible for protecting humans from harmful ultraviolet (UV) rays. Earth's ozone layer is depleting due to the presence of chlorofluorocarbons, hydro chlorofluorocarbons in the atmosphere. As ozone layer will go thin, it will emit harmful rays back on earth and can cause skin and eye related problems. UV rays also have the capability to affect crops.

www.studymafia.org

When you try to study the sources of Air pollution, you enlist a series of activities and interactions that create these pollutants. There are two types of sources that we will take a look at: **Natural sources and Man-made sources.**

Natural sources of pollution include dust carried by the wind from locations with very little or no green cover, gases released from the body processes of living beings (Carbon dioxide from humans during respiration, Methane from cattle during digestion, Oxygen from plants during Photosynthesis). Smoke from the combustion of various inflammable objects, volcanic eruptions etc along with the emission of polluted gases also make it to the list of Natural sources of Pollution.

While looking at the man-made contributions towards air pollution, smoke again features as a prominent component. The smoke emitted from various forms of combustion like in bio mass, factories, vehicles, furnaces etc. Waste used to create landfills generate methane, that is harmful in several ways. The reactions of certain gases and chemicals also form harmful fumes that can be dangerous to the well being of living creatures.

www.studymafia.org

Solutions for Air Pollution

1. Use public mode of transportation: Encourage people to use more and more public modes of transportation to reduce pollution. Also, try to make use of car pooling. If you and your colleagues come from the same locality and have same timings you can explore this option to save energy and money.

2. Conserve energy: Switch off fans and lights when you are going out. Large amount of fossil fuels are burnt to produce electricity. You can save the environment from degradation by reducing the amount of fossil fuels to be burned.

3. Understand the concept of Reduce, Reuse and Recycle: Do not throw away items that are of no use to you. In-fact reuse them for some other purpose. For e.g. you can use old jars to store cereals or pulses.

4. Emphasis on clean energy resources: Clean energy technologies like solar, wind and geothermal are on high these days. Governments of various countries have been providing grants to consumers who are interested in installing solar panels for their home. This will go a long way to curb air pollution.

5. Use energy efficient devices: CFL lights consume less electricity as against their counterparts. They live longer, consume less electricity, lower electricity bills and also help you to reduce pollution by consuming less energy.

Several attempts are being made world wide on a personal, industrial and governmental levels to curb the intensity at which Air Pollution is rising and regain a balance as far as the proportions of the foundation gases are concerned. This is a direct attempt at slacking Global warming. We are seeing a series of innovations and experiments aimed at alternate and unconventional options to reduce pollutants. Air Pollution is one of the larger mirrors of man's follies, and a challenge we need to overcome to see a tomorrow.

www.studymafia.org

Conclusions

Urban air pollution has long been a serious problem in the FSU, reflecting both the importance of highly polluting, resource-intensive industries for the national economy and political factors such as the low priority of environmental issues and lack of public participation. At the beginning of the transition from a centrally planned to a free market economy and a more open society, it was assumed that environmental performance in the FSU would improve. In particular, a shift away from heavy industries to less resource-intensive sectors and improvements in energy efficiency were expected to reduce air pollution levels. All countries of the FSU experienced a decline in industrial output following the change in economic regime and emissions of main pollutants have fallen as a result of a slump in production.

Many commentators saw this as a much needed break for the environment. However, while absolute levels of emissions have decreased, the ongoing economic crisis and persisting financial problems have ensured that decreases in emissions have been smaller than declines in output as a result of the associated deterioration of regulatory mechanisms, a lack of investment into pollution abatement equipment, weak enforcement of environmental legislation and public disengagement. In the areas benefiting from economic changes, and especially in large cities, environmental pressures have increased because of growing car ownership. As the environmental benefits of the economic downturn are uncertain, and new sets of pollution problems face the FSU, has economic restructuring been good for the environment? When and where will emissions return to their pre-transition level? Is decoupling of economic and emission trends feasible? How to implement the 'win-win' strategies in the future? Pursuing the transformation of their country into the world's most industrialized society, the Soviets believed that these problems could be solved. Or could they?

www.studymafia.org