Gokhale Memorial Girls' College

Date:13/04/2023

To whom it may concern

Subject: Completion of ENVS Project by PLSA Group B students of Semester II in 2022

The undersigned hereby certifies that the students mentioned in the table given below have completed their AECC 2 - ENVS projects for the University of Calcutta B.A/B.Sc. Semester-II Examination, 2022. These students are mentioned in the modified template of Metric 1.3.2 as ENVS-PLSA Gr. B(as DVV compliance) with pdf link of their projects stated alongside.

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SESSION: 2021-22

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ACKNOWLEDGEMENT

I am really grateful for this project opportunity and would sincerely thank My ENVS Teacher Mr. Shantanu Samanta for trusting me with this project. He has proved to be a guiding light in my entire journey and his valuable insight has helped me improve and make this project a success.

Also, I would thank my friends and family who supported me emotionally as well as academically to complete this project without any obstacles.

Date:
24/05/2022

Thanking You,
Mayuri Sarkar

•Environmental pollution (Air, water, soil, thermal, and noise): causes, effects, and Controls; Primary and secondary air pollutants; Air and water quality standards
• Nuclear hazards and human health risks

Environmental pollution:

Pollution is the introduction of contaminants into the natural environment that causes adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants.

Environmental pollution is one of the most serious problems facing humanity and other life forms on our planet today. "Environmental pollution is defined as "the contamination of the physical and biological components of the earth/atmosphere system to such an extent that normal environmental processes are adversely affected." Pollutants can be naturally occurring substances or energies, but they are considered contaminants when in excess of natural levels. Any use of natural resources at a rate higher than nature's capacity to restore itself can result in pollution of air, water, and land.
Environmental pollution is of different types namely air, water, soil, noise and light-weight. These cause damage to the living system. How pollution interacts with public health, environmental medicine and the environment has undergone dramatic change.

Air pollution:

Air pollution is a mixture of solid particles and gases in the air. Car emissions, chemicals from factories, dust, and pollen and mold spores may be suspended as particles. Ozone, a gas, is a major part of air pollution in cities. When ozone forms air pollution, it's also called smog. Some air pollutants are poisonous.
"Air pollution occurs when harmful or excessive quantities of substances are introduced into Earth's atmosphere. Sources of air pollution include gases, particulates, and biological molecules."
"Air pollution refers to the release of pollutants into the air that are detrimental to human health and the planet as a whole."

Primary and secondary air pollutants:

A primary pollutant is an air pollutant emitted directly from a source. A secondary pollutant is not directly emitted as such, but forms when other pollutants (primary pollutants) react in the atmosphere.

Primary air pollutants:

The primary pollutants are "directly" emitted from the processes such as fossil fuel consumption, volcanic eruption and factories.
The major primary pollutants are Oxides of Sulphur, Oxides of Nitrogen, Oxides of Carbon, Particulate Matter, Methane, Ammonia, Chlorofluorocarbons, Toxic metals etc.

Examples of Primary Pollutants:

1. Car exhaust, smokestacks (CO, SO2, NO)
2. Particulate material (soot, ash)
3. Toxic metals (lead, mercury)
4. Volatile organic compounds (VOCs) (methane, propane, CFCs, etc.)

Secondary air pollutants:

The secondary pollutants are not emitted directly. The secondary pollutants form when the primary pollutants react with themselves or other components of the atmosphere. Most important secondary level Air Pollutants are Ground Level Ozone, Smog and POPs (Persistent Organic Pollutants).

Causes of air pollution:

The burning of fossil fuels Sulfur dioxide emitted from the combustion of fossil fuels like coal, petroleum and other factory combustibles are one the major cause of air pollution. But, their overuse is killing our environment as dangerous gases are polluting the environment

- Burning of Fossil Fuels:
  The combustion of fossil fuels emits a large amount of sulphur dioxide. Carbon monoxide released by incomplete combustion of fossil fuels also results in air pollution.

- Automobiles:
  The gases emitted from vehicles such as jeeps, trucks, cars, buses, etc. pollute the environment. These are the major sources of greenhouse gases and also result in diseases among individuals.

- Agricultural Activities:
  Ammonia is one of the most hazardous gases emitted during agricultural activities. The insecticides, pesticides and fertilizers emit harmful chemicals in the atmosphere and contaminate it.

- Factories and Industries:
  Factories and industries are the main source of carbon monoxide, organic compounds, hydrocarbons, and chemicals. These are released into the air degrading its quality.

- Mining Activities:
  In the mining process, the minerals below the earth are extracted using large pieces of equipment. The dust and chemicals released during the process not only pollute the air but also deteriorate the health of the workers and people living in the nearby areas.

- Domestic Sources:

The household cleaning products and paints contain toxic chemicals that are released in the air. The smell from the newly painted walls is the smell of the chemicals present in the paints. It not only pollutes the air but also affects breathing.

Effects of Air Pollution:

The hazardous effects of air pollution on the environment include:

➢ Diseases:
Air pollution has resulted in several respiratory disorders and heart diseases among humans. The cases of lung cancer have increased in the last few decades. Children living near polluted areas are more prone to pneumonia and asthma.

➢ Global Warming:
Due to the emission of greenhouse gases, there is an imbalance in the gaseous composition of the air. This has led to an increase in the temperature of the earth. This increase in earth's temperature is known as global warming.

➢ Acid Rain:
The burning of fossil fuels releases harmful gases such as nitrogen oxides and sulphur oxides in the air. The water droplets combine with these pollutants, become acidic, and fall as acid rain which damages human, animal and plant life.

➢ Ozone Layer Depletion:
The release of chlorofluorocarbons (CFC), halons, and hydrochlorofluorocarbons in the atmosphere is the major cause of depletion of the ozone layer. The depleting ozone layer does not prevent the harmful ultraviolet rays coming from the sun and causes skin diseases and eye problems among individuals.

➢ Effect on Animals:
The air pollutants suspend on the water bodies and affect the aquatic life. Pollution also compels the animals to leave their habitat and shift to a new place.

Air Pollution Control:

Following are the measures one should adopt to control air pollution:

➢ Avoid Using Vehicles:
People should avoid using vehicles for shorter distances. Rather they should prefer public modes of transport to travel from one place to another. This not only prevents pollution but also conserves energy.

➢ Energy Conservation:
A large number of fossil fuels are burnt to generate electricity. Therefore, do not forget to switch off the electrical appliances when not in use. Thus, you can save the environment at the individual level. Use of energy-efficient devices such CFLs also controls pollution to a greater level.

➢ Use of Energy efficient appliances:
Whether at the domestic level or at the industrial level, we must push for appliances that use energy efficiently, which result in complete combustion of fuel, as incomplete combustion causes air pollution.

➢ Shifting industries:
Another possible solution to reduce the harmful effects of air pollution is to shift the manufacturing plants, factories and industries to remote areas with a low level of population.

➢ Using Modern Techniques:
With technology making great advancements, there are now technologies available that can help reduce the release of pollutants in the air. Air filters, scrubbers, precipitators are just a few examples.

➢ Shifting to Natural Gasses:
Instead of using and exhausting fossil fuels, shifting to greener options is a no-brainer. For example, using CNG (compressed natural gas) instead of petrol or diesel is a great option.

Water pollution:

Water pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include for example lakes, rivers, oceans, aquifers and groundwater. Water pollution results when contaminants are introduced into the natural environment.
"Water is essential to life. It need not be spelt out exactly how important it is. Yet water pollution is one of the most serious ecological threats we face today."

Water pollution happens when toxic substances enter water bodies such as lakes, rivers, oceans and so on, getting dissolved in them, lying suspended in the water or depositing on the bed. This degrades the quality of water. Not only does this spell disaster for aquatic ecosystems, the pollutants also seep through and reach the groundwater, which might end up in our households as contaminated water we use in our daily activities, including drinking.

Sources of Water Pollution:

Point and non-point sources:

1. When pollutants are discharged from a specific location such as a drain pipe carrying industrial effluents discharged directly into a water body it represents point source pollution
2. In contrast, non-point sources include discharge of pollutants from diffused sources or from a larger area such as runoff from agricultural fields, grazing lands, constriction site, abandoned mines and pits, etc.

Causes of Water Pollution:

The causes of water pollution vary and may be both natural and anthropogenic. However, the most common causes of water pollution are the anthropogenic ones, including:

Agrochemicals:

Agrochemicals like fertilizers (containing nitrates and phosphates) and pesticides (insecticides, fungicides, herbicides etc.) washed by rain-water and surface runoff pollute water.

Storm water runoff:

Carrying various oils, petroleum products, and other contaminants from urban and rural areas (ditches). These usually forms sheens on the water surface.

Sewage:

Emptying the drains and sewers in fresh water bodies causes water pollution. The problem is severe in cities.

Mining activities:

Mining activities involve crushing rocks that usually contain many trace metals and sulfides. The leftover material from mining activities may easily generate sulfuric acid in the presence of precipitation water.

Industrial Effluents:

Industrial wastes containing toxic chemicals, acids, alkalis, metallic salts, phenols, cyanides, ammonia, radioactive substances, etc., are sources of water pollution. They also cause thermal (heat) pollution of water.

Burning of fossil fuels:

the emitted ash particles usually contain toxic metals (such as As or Pb). Burning will also add a series of oxides including carbon dioxide to air and, respectively, water bodies.

Leaking landfills:

May pollute the groundwater below the landfill with a large variety of contaminants (whatever is stored by the landfill).

Animal waste:

Contribute to the biological pollution of water streams. Think of it this way: anything that can cause air pollution or soil pollution may also affect water bodies and cause innumerable ecological and human health issues

Effects of water pollution:

The effects of water pollution are varied. They include poisonous drinking water, poisonous food animals (due to these organisms having bioaccumulated toxins from the environment over their life spans), unbalanced river and lake ecosystems that can no longer support full biological diversity, deforestation from acid rain, and many other effects. These effects are, of course, specific to the various contaminants.

1. Water bodies in the vicinity of urban areas are extremely polluted. This is the result of dumping garbage and toxic chemicals by industrial and commercial establishments.

2. Water pollution drastically affects aquatic life. It affects their metabolism, behavior, causes illness and eventual death. Dioxin is a chemical that causes a lot of problems from reproduction to uncontrolled cell growth or cancer. This chemical is bioaccumulated in fish, chicken and meat. Chemicals such as this travel up the food chain before entering the human body.

3. The effect of water pollution can have a huge impact on the food chain. It disrupts the food-chain. Cadmium and lead are some toxic substances, these pollutants upon entering the food chain through animals (fish when consumed by animals, humans) can continue to disrupt at higher levels.

4. Humans are affected by pollution and can contract diseases such as hepatitis through faucal matter in water sources. Poor drinking water treatment and unfit water can always cause an outbreak of infectious diseases such as cholera etc.

5. The ecosystem can be critically affected, modified and destructured because of water pollution.

Control of Water Pollution:

Water pollution, to a larger extent, can be controlled by a variety of methods. Rather than releasing sewage waste into water bodies, it is better to treat them before discharge. Practicing this can reduce the initial toxicity and the remaining substances can be degraded and rendered harmless by the water body itself. If the secondary treatment of water has been carried out, then this can be reused in sanitary systems and agricultural fields.
A very special plant, the Water Hyacinth can absorb dissolved toxic chemicals such as cadmium and other such elements. Establishing these in regions prone to such kinds of pollutants will reduce the adverse effects to a large extent. Some chemical methods that help in the control of water pollution are precipitation, the ion exchange process, reverse, and coagulation. As an individual, reusing, reducing, and recycling wherever possible will advance a long way in overcoming the effects of water pollution.

Soil Pollution:

Soil contamination or soil pollution as part of land degradation is caused by the presence of xenon biotic chemicals or other alteration in the natural soil environment. It is typically caused by industrial activity, agricultural chemicals or improper disposal of waste.

Definition of Soil pollution:

"Soil pollution refers to the contamination of soil with anomalous concentrations of toxic substances. It is a serious environmental concern since it harbors many health hazards."

"Soil pollution refers to anything that causes contamination of soil and degrades the soil quality. It occurs when the pollutants causing the pollution reduce the quality of the soil and convert the soil inhabitable for microorganisms and macro organisms living in the soil."

Causes of Soil Pollution:

Soil pollution can be natural or due to human activity. However, it mostly boils down to the activities of the human that causes the majority of soil pollution such as heavy industries, or pesticides in agriculture.

Industrial activities including mining, smelting and manufacturing; domestic, livestock and municipal wastes; pesticides, herbicides, fertilizers used in agriculture; petroleum-derived products that are released into or break-down in the environment; fumes generated by transportation all contribute to the problem. These include pharmaceuticals, endocrine disruptors, hormones and biological pollutants; "e-waste" from old electronics; and the plastics that are nowadays used in almost every human endeavor.

Natural Pollution of Soil:

In some extremely rare processes, some pollutants are naturally accumulated in soils. This can occur due to the differential deposition of soil by the atmosphere. Another manner in which this type of soil pollution can occur is via the transportation of soil pollutants with precipitation water.

Anthropogenic Soil Pollution:

Almost all cases of soil pollution are anthropogenic in nature. A variety of human activities can lead to the contamination of soil.

Pesticides:

Before World War II, the chemical nicotine chemical present in the tobacco plants was used as the pest controlling substance in agricultural practices. However, DDT was found to be extremely useful for malaria control and as pest control of many insects during World War II.

Inorganic Fertilizers:

Excessive use of inorganic nitrogen fertilizers leads to acidification of soil and contaminate the agricultural soil.

Industrial Pollution:

The incorrect way of chemical waste disposal from different types of industries can cause contamination of soil. Human activities like this have led to acidification of soil and contamination due to the disposal of industrial waste, heavy metals, toxic chemicals, dumping oil and fuel, etc.

Heavy Metals:

The presence of heavy metals (such as lead and mercury, in abnormally high concentrations) in soils can cause it to become highly toxic to human beings.

Effects of Soil Pollution:

Soil pollution affects plants, animals and humans a like. While anyone is susceptible to soil pollution, soil pollution effects may vary based on age, general health status and other factors, such as the type of pollutant or contaminant inhaled or ingested. However, children are usually more susceptible to exposure to contaminants, because they come in close contact with the soil by playing in the ground; combined with lower thresholds for disease,(headaches, nausea, and vomiting, coughing, pain in the chest, and wheezing) this triggers higher risks than for adults. Therefore, it is always important to test the soil before allowing your kids to play there, especially if you live in a highly industrialized area.

Control of Soil Pollution:

Several technologies have been developed to tackle soil remediation. Some important strategies followed for the decontamination of polluted soil are listed below.

1. Excavation and subsequent transportation of polluted soils to remote, uninhabited locations.
2. Extraction of pollutants via thermal remediation – the temperature is raised in order to force the contaminants into the vapor phase, after which they can be collected through vapors extraction.
3. Bioremediation or phytoremediation involves the use of microorganisms and plants for the decontamination of soil.
4. Mycoremediation involves the use of fungi for the accumulation of heavy metal contaminants.

Thermal pollution:

Thermal pollution, sometimes called "thermal enrichment," is the degradation of water quality by any process that changes ambient water temperature. A common cause of thermal pollution is the use of water as a coolant by power plants and industrial manufacturers. Other causes of thermal pollution include soil erosion.

Cause of Thermal Pollution:

Many human and natural factors contribute to the problem of thermal pollution. The single biggest cause of thermal pollution is probably cooling for industrial machinery and power plants. Water is an excellent, and free, cooling agent. This is why many industrial operations pull in relatively cool water to cool their machinery and let the relatively warm water flow back into the river or lake or sea.

Thermal pollution also has some natural causes. Geothermal vents and hot springs introduce excess heat into bodies of water. Soil erosion, deforestation, and runoff from paved areas are other artificial sources of hot water. Deforestation eliminates shade, which exposes the water to sunlight. Water on hot paved surfaces gets hot, then runs off into nearby bodies of water, raising the water temperature. Retention ponds can also be a source of thermal shock because the relatively small and shallow bodies of water can absorb quite a bit of heat energy from the sun. Pumping that water directly into a river, lake, or bay causes a significant temperature increase, just like pouring a hot pitcher of water into a bathtub full of water causes the water to jump a few degrees Fahrenheit.

Effects of Thermal Pollution:

The effects of thermal pollution are diverse, but in short, thermal pollution damages water ecosystems and reduces animal populations. Plant species, algae, bacteria, and multi-celled animals all respond differently to significant temperature changes. Organisms that cannot adapt can die of various causes or can be forced out of the area. Reproductive problems can further reduce the diversity of life in the polluted area.
The Effects of Thermal Pollution: The effects of thermal pollution are diverse, but in short, thermal pollution damages water ecosystems and reduces animal populations.

1. Decreased Dissolved Oxygen:

Warm water holds less oxygen than cool water. If the oxygen level drops animals that cannot move to another area may begin to die. In deeper bodies of water, the injection of warm water can keep oxygen from dispersing into deep water, which is potentially good for bacteria but dangerous for aquatic animals. The decreased oxygen can cause algae blooms that pose a threat to aquatic plants and animals. This algae bloom problem is probably the most common and best-known side effect of thermal pollution.

2. Loss of Biodiversity:

The sudden heating can kill off vulnerable organisms or drive them away. This is one of many serious issues for threatened and endangered animal species. This loss can come from organisms dying from the hot water, being unable to reproduce as effectively as before, or simply leaving the area. We usually think of animals as casualties of water pollution, but multi-celled aquatic plants are also at risk when thermal pollution changes the local aquatic ecosystem.

3. Ecological Impacts:

The local aquatic ecosystem can be damaged by thermal pollution, especially if it is dramatic, as in copious amounts of warm water being dumped into a chilly pond or bay or river. "Thermal shock" can kill off insects, fish, and amphibians.

4. Migration:

Fish and amphibians may move away from the warm water to a more-suitable location, disrupting the ecosystem for animals that remain. Birds may also be forced to leave in search of areas with more food.

5. Increased Toxins:

Toxins in the water are more a side effect of dumping waste water than a direct effect of thermal pollution. Chemical pollution is an almost inevitable side effect of using water for cooling. Solvents, fuel oil, and dissolved heavy metals end up in the lake or river where the cooling water gets dumped.

Nuclear hazards and human health risks:

These can be both beneficial and harmful, depending on the way in which they are used. We routinely use X-rays to examine bones for fractures, treat cancer with radiation and diagnose diseases with the help of radioactive isotopes. About 17% of the electrical energy generated in the world comes from nuclear power plants.
Radioactive substances when released into the environment are either dispersed or become concentrated in living organisms through the food chain. Other than naturally occurring radioisotopes, significant amounts are generated by human activity, including the operation of nuclear power plants, the manufacture of nuclear weapons, and atomic bomb testing. For example, strontium 90 behaves like calcium and is easily deposited and replaces calcium in the bone tissues. It could be passed to human beings through ingestion of strontium-contaminated milk. Again another example is tritium, which is radioactive hydrogen. The amount of tritium released from nuclear power plants to the atmosphere have reached as high as tens of thousands of curies in one year, and releases to bodies of water have measured as high as tens of millions of picocuries per litre.

Nuclear accidents impact health:

Apart from the damage caused by fires and explosions, accidents also release radioactive materials which can cause radiation sickness. Radiation exposure above a certain threshold, usually only received by workers and emergency teams in a stricken plant, causes acute radiation syndrome within hours of exposure. Depending on the dose of radiation this ranges from skin rashes, vomiting and diarrhoea, to coma and death.
Radiation damages DNA, especially as it assembles in dividing cells. That means tissues which contain many dividing cells, such as the gut lining, skin and bone marrow, are most at risk of damage. High enough doses also damage brain cells and such doses are invariably fatal.

Samanta 25/05/2022 copy from book

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Environmental Studies

AECC 2/Tutorial

Natural Calamities

Acknowledgement

I would like to express my special thanks of gratitude to my teacher, (Mr. Santanu Samanta) and our Principal (Dr. Atashi Rarpha), who gave me the golden opportunity to do this project on the topic "Natural Calamities". It helped me in doing a lot of Research and i came to know about a lot of things related to this topic.

Finally, I would also like to thank my parents and friends who helped me a lot in finalizing this project within the limited time frame.

Samanta
25/05/2022

Content

Introduction

To start with, first we should know the meaning of "Natural Calamity".So, what is "Natural Calamity"?

Natural disasters or Natural Calamities are catastrophic events with atmospheric, geological, and hydrological origins (e.g., droughts, earthquakes, floods, hurricanes, landslides) that can cause fatalities, property damage and social environmental disruption.

Natural disasters are the result of a hazard overwhelming highly vulnerable community, often resulting in mortality and morbidity. Over the past decade, over 300 natural disasters occur yearly around the world affecting millions and cost billions. The disaster cycle is a framework used to base a coordinated plan to respond, recover, prevent, and prepare for a disaster. Access to clean water, proper sanitation, food/nutrition, shelter, and the threat of communicable diseases are concerns that have the potential to be detrimental to the management of a natural disaster, slowing the recovery process.

Types of Natural Calamities

"Mother Nature" is totally unpredictable so as it's calamities and disasters related to it. So, there are many types of natural calamities and disasters. But, here, we will discuss specifically about 5 major natural calamities.

These are : Earthquake, Flood, Cyclone, Tsunami and Landslide.

are constantly shifting. Disturbances in the earth's crust are created when they pass each other or collide. Earthquakes or tremors are the terms for these types of disturbances.

Effects of an Earthquake

Land shaking, surface faulting, ground collapse, and, less frequently, tsunamis are all consequences of earthquakes.

Earthquakes can lead to:

Death of humans and animals

Buildings, lakes, and bridges have all been destroyed.

Landslides and Floods, Tsunamis.

2.Flood

Flood is an overflow of water that submerges land that is usually dry.In the sense of "flowing water", the word may also be applied to the inflow of the tide. Floods are an area of study of the discipline hydrology and are of significant concern in agriculture, civil engineering and public health.

Causes of flood

Many different situations can cause a flood. Here are just a few:

- Heavy rainfall
- Ocean waves coming on shore, such as a storm surge
- Melting snow and ice, as well as ice jams
- Dams or levees breaking

Geography can also make an area more likely to flood. For example, areas near rivers are often at risk for floods.

3.Cyclone

In meteorology, a cyclone is tropical system in which the atmospheric winds rotate inwards to a low-pressure area at the centre. It can be clockwise and anticlockwise depending upon the Southern and Northern Hemisphere.

Causes of Cyclone

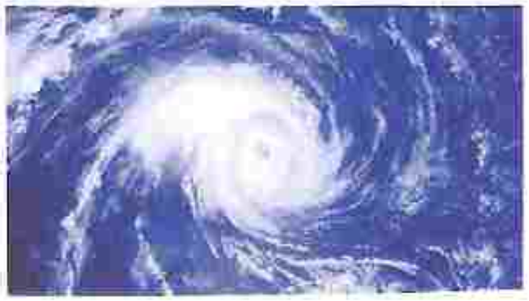
- Cyclone is caused at low pressure areas.
- Cyclone occurs at the equator.
- Cyclone is caused by the rising of warm air above the surface of sea.
- When the warm air rises, the cold air rushes to the empty space.
- Then the cold air gets heated up and again rises in the

atmosphere.

- This process (Cyclone Cycle) takes place continuously.
- This process of rapid rising of hot air creates an eye at the centre of the cyclone.
- Similarly, the low pressure area gets filled by the high pressure winds.

Effects of Cyclone

- Tropical cyclones trigger serious rainfall and landslides. They cause serious damage to towns and villages. Also, they destroy coastal companies, such as shipyards and oil well.
- When these hurricanes blow far inland, human settlements are causing a lot of devastation.
- They trigger a lot of crop damage and destroy plenty of forests.
- They are disturbing the entire civic lives, particularly when they kill electricity and telephone lines.
- Torrential rains often accompany these cyclones, which trigger flooding.
- Not only do they cause a lot of damage to assets, but also to people's lives. Civic installations are being dismantled.



previous waves. When waves enter harbors, very strong and dangerous water currents are generated that can easily break ship moorings, and bores that travel far inland can be formed when tsunamis entire rivers or other waterway channels

Effects of Tsunami

Large tsunamis strike with tremendous force and are a significant threat to human health, coastal property and infrastructure, coastal resources, and coastal, regional, and even national economies.Most tsunami damage and destruction is caused by flooding, wave impacts, erosion,strong currents, and floating debris (e.g., trees, structures, vehicles, and other things that can act like battering rams). The water can be just as dangerous, if not more so, as it returns to the sea, taking debris and people with it.The debris in the water is particularly dangerous as evidenced by bruises on the bodies of many victims of the 2004 Indian Ocean tsunami.

In addition to loss of life and mass injuries, other potential impacts include damage to and destruction of homes and businesses, ports and harbors, cultural resources, utilities, and critical infrastructure and facilities. There may be loss of access to basic services such as power, sewer, and water. Communications, transportation (ground, air, and marine), and health and public safety services may be disrupted.

Impacts from a large local tsunami will likely be in addition to impacts from a preceding earthquake, and impacts from both may trigger secondary hazards, which could be more devastating than the direct destruction.

Effects of landslide

Landslides can disturb the social and economic environment with the number of other damages which are mentioned below:

Short Term Impacts

- The natural beauty of the area is damaged.
- Loss of life and property
- Roadblocks
- Destruction of railway lines.
- Channel blocking because of the falling of rocks.
- It leads to the diversion of river water, which can cause floods as well.

Long Term Impacts

- Landscape changes can be permanent
- The loss of fertile land or cultivation land
- Erosion and soil loss can lead to environmental problems.
- Population shifting and migration
- Effects on the sources of water
- Some roads can be damaged or closed permanently.

Natural Calamities : Preventive Measures

Earthquake : Preventive Measures

Earthquakes induced by human activity have been documented at many locations in the United States and in many other countries around the world. Earthquakes can be induced by a wide range of causes including impoundment of reservoirs, surface and underground mining, withdrawal of fluids and gas from the subsurface, and injection of fluids into underground formations. While most induced earthquakes are small and present little hazard, larger and potentially damaging manmade earthquakes have occurred in the past.

The hazard posed by manmade earthquakes can be mitigated by minimizing or in some cases stopping the activity that is causing the earthquakes to occur. For example, earthquakes linked to wastewater disposal in deep wells in Colorado, Ohio and Arkansas stopped occurring after injection was halted.

We cannot prevent natural earthquakes from occurring but we can significantly mitigate their effects by identifying hazards, building safer structures, and providing education on earthquake safety. By preparing for natural earthquakes we can also reduce the risk from human induced earthquakes.

Flood : Preventive Measures

Some methods of flood control have been practiced since ancient times.[1] These methods include planting vegetation to retain extra water, terracing hillsides to slow flow downhill, and the construction of floodways (man-made channels to divert floodwater).[1] Other techniques include the construction of levees, dikes, dams, reservoirs[1] or retention ponds to hold extra water during times of flooding.

Cyclone : Preventive Measures

- **Planting trees to prevent cyclone damage.** This reduces the frontal gust damage by deflecting and redirecting wind.
- **Reduce the height of taller trees** – a group of trees and tall shrubs together (of equal height) can divert wind through funneling. This reduces the pressure on your trees and moves the wind away from your home.
- **Cutting back the inner canopy** – Most tree branches break or entire trees fall over due to wind catching the limbs of a tree like the sail on a boat. Cutting back the inner canopy allows the wind to move through the tree freely, without damage to the tree or your home.
- **When a tree branch twists, it becomes fragile.** Cutting back longer branches prevents twisting and maintains the trees health for a substantially longer life.
- **Removal of nuts** (coconuts, berries, etc.) and excess fronds from palm trees before the wet season.
- **Removal of dying and diseased species.** Locating tree rot both internal and external. (The internal rot is your biggest danger in a cyclone. Leaving this unchecked can cause sudden breakages even in the dry season.)

Tsunami : Preventive Measures

Like other natural calamities, tsunami is natural and we, humans can't stop it from happening. But here are some ways by which, we can atleast protect ourselves from tsunami.

Communities that understand their tsunami risk are better prepared to protect the public in the event of a tsunami. Protective measures include:

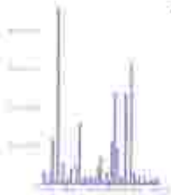
- Planning and practicing for response to tsunamis;
- Warning the public;
- Establishing, marking, and publicizing evacuation routes; and
- Educating the public (residents and visitors) about tsunamis and tsunami safety before a tsunami strikes.

Landslide : Preventive Measures

Landslides pose a recurrent hazard to human life and livelihood in most parts of the world, especially in some regions that have experienced rapid population and economic growth.Hazards are mitigated mainly through precautionary means—for instance, by restricting or even removing populations from areas with a history of landslides, by restricting certain types of land use where slope stability is in question, and by installing early warning systems based on the monitoring of ground conditions such as strain in rocks and soils, slope displacement, and groundwater levels. There are also various direct methods of preventing landslides; these include modifying slope geometry, using chemical agents to reinforce slope material, installing structures such as piles and retaining walls, grouting rock joints and fissures, diverting debris pathways, and rerouting surface and underwater drainage. Such direct methods are constrained by cost, landslide magnitude and frequency, and the size of human settlements at risk.

Human cost to Natural Calamities

UNDRR report published to mark the International Day for Disaster Risk Reduction on October 13, 2020, confirms how extreme weather events have come to dominate the disaster landscape in the 21st



century. The statistics in this report are from the Emergency Events Database (EM-DAT) maintained by the Centre for Research on the Epidemiology of Disasters (CRED) which records disasters which have killed ten or more people; affected 100 or more people; resulted in a declared state of emergency; or a call for international assistance. In the period 2000 to 2019, there were 7,348 major recorded disaster events claiming 1.23 million lives, affecting 4.2 billion people (many on more than one occasion) resulting in approximately US$2.97 trillion in global economic losses. This is a sharp increase over the previous

Tsunami caused damage over 9,000 miles away on the California coast.

2. The intensity of a tornado is rated on the (enhanced) Fujita scale. It examines the damage done to man-made structures after the fact. The scale ranges from F0 (Gale) with winds of 40–73 mph to an F5 (Incredible) with winds from 261–319 mph.

3. According to National Geographic, in 90 percent of avalanche fatalities, the avalanche is started by the victim or someone in the victim's party. Digging the victim out quickly means the difference between life and death. Ninety-three percent of victims rescued within 15 minutes survived. That rate drops to 20 to 30 percent after 45 minutes and gets a lot worse from there.

4. There are approximately 1,900 active volcanoes. About 90 percent of them exist in the Ring of Fire in the Pacific Ocean.

5. For a tropical storm or cyclone to be upgraded to hurricane status, it must have maximum sustained winds of at least 74 miles per hour.

Facts

1. The largest earthquake ever recorded anywhere in the world occurred in 1960 in Chile. It was a whopping 9.5 on the Moment Magnitude scale. The resulting Tsunami caused damage over 9,000 miles away on the California coast.

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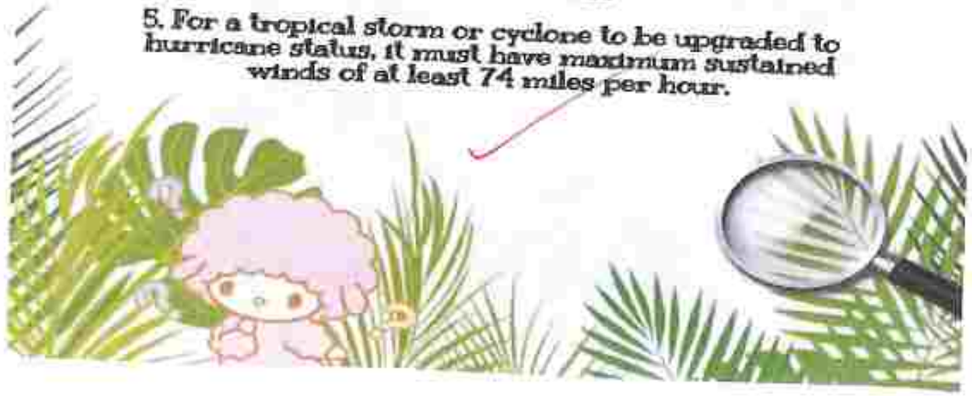

Conclusion

Ecological disasters can create profound disruption for communities that extends far beyond the geographic boundaries of the event. Psychological and behavioral responses create the most significant public health burden following a disaster. An understanding of community responses and the cultural and contextual factors that influence their development and evolution are critical for effective response and recovery efforts. Community response to extreme events show phases; an understanding of these optimizes timing and resourcing of recovery efforts. Interventions should be evidence-based, tailored to community needs, and serve to enhance the essential elements of safety, calming, self- and community-efficacy, social connectedness, and hope or optimism. Risk and crisis communication can shape community behaviors and influence perception of risk with trust and health-promoting behaviors being heavily influenced by thoughtful public health messaging. Effective leadership involves communication with community members, being present, honest, and trustworthy, modeling self-care, addressing community challengess such as grief and loss, and is essential for community recovery.

Samantha

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PROJECT – ENVS

Topic: STUDY OF COMMON INSECTS, BIRDS AND PLANTS

CONTENTS

INTRODUCTION

Plant and animal kingdom together make biosphere or the living world. Both plant and animal kingdom include a wide variety of organisms which contribute towards the biodiversity on the planet earth. Here, we would be studying few of those organisms: their features, habitat, properties, location, uses and so forth.

COMMON INSECTS

In a popular sense, "insect" usually refers to familiar pests or disease carriers, such as bedbugs, houseflies, clothes moths, Japanese beetles, aphids, mosquitoes, fleas, horseflies, and hornets, or to conspicuous groups, such as butterflies, moths, and beetles. Many insects, however, are beneficial from a human viewpoint; they pollinate plants, produce useful substances, control pest

insects, act as scavengers, and serve as food for other animals. Insects have segmented bodies, jointed legs, and

(Image source:- https://www.nih.gov/)

Mosquitoes belong to the order Diptera, and suborder Nematocera. The term "Culicidae" is derived from Latin, which translates to "gnat". Today, close to 110 genera have been identified in the family Culicidae and over 3,600 species have been documented.

Most mosquitoes are two-winged insects no larger than 20 mm in size. From an evolutionary perspective, the earliest mosquito fossils were discovered from the Cretaceous period, some 90 to 100 million years ago. These insects are also considered pests as they cause a host of diseases in humans and animals.

FEATURES

- Mosquito Anatomy - Like all true insects, mosquitoes have three major body parts: head, thorax and abdomen.

The head is the sensory center for the mosquito, where the compound eyes and antennae are located, as well as the proboscis used for feeding.

The thorax is composed of three body segments and each segment has one pair of legs. As a member of the insect order Diptera, mosquitoes have one pair of wings, located on the middle segment.

The abdomen is composed of ten body segments and hosts the insect's digestive, respiratory and reproductive systems.

- There are about 200 different species of mosquitoes in the United States, which live in specific habitats, exhibit unique behaviors and bite different types of animals. Despite these differences, all mosquitoes share some common traits, such as a four-stage life cycle (egg, larva, pupa, adult).

  Different species of mosquitoes prefer different types of standing water in which to lay their eggs. The presence of beneficial predators such as fish and dragonfly nymphs in permanent ponds, lakes and streams help keep these bodies of water relatively free of mosquito larvae. However, portions of marshes, swamps, clogged ditches and temporary pools and puddles are all prolific mosquito breeding sites.

- Mosquitoes bite and suck blood for reproduction. Though male mosquitoes only eat flower nectar, female mosquitoes eat both flower nectar and blood. The females need the protein in blood to develop eggs.

Mosquitos have a long mouthpart (proboscis) that extends far beyond their heads. It looks like a tiny needle. When a

mosquito bites us, it uses this mouthpart to pierce our skin, suck our blood and secrete saliva into our bloodstream.

HABITAT

Some mosquitoes like living near people, while others prefer forests, marshes, or tall grasses. All mosquitoes like water because mosquito larvae and pupae live in the water with little or no flow.

Different types of water attract different types of mosquitoes.

Permanent water mosquitoes: These mosquitoes tend to lay their eggs in permanent-to-semi-permanent bodies of water.

Some mosquitoes prefer clean water, while others like nutrient-rich waters.

Some mosquitoes lay eggs near the edges of lakes and ponds, or among plants in swamps and marshes, or in containers that hold water.

Floodwater mosquitoes: These mosquitoes lay their eggs in moist soil or in containers above the water line. The eggs dry out, then hatch when rain floods the soil or container. Floodwater habitats include:

species, about 30 are found in human habitations and some are considered as pests.

Cockroach species found in India are:

1. German cockroach (Blattella germanica)
2. American cockroach (Periplaneta americana)
3. Brown-banded cockroach (Supella longipalpa)
4. Oriental cockroach (Blatta orientalis)

Cockroaches are one of the oldest insect species on earth. In fact, fossil evidence for this group of insects can be traced back to the Carboniferous Period, over 350 million years ago.

FEATURES

- The cockroach is characterized by a flattened oval body, long threadlike antennae, and a shining black or brown leathery integument. The head is bent downward, and the mouthparts point backward instead of forward or downward as is the case in most other insects. Male cockroaches usually have two pairs of wings, whereas females, in some species, are wingless or have vestigial wings.
- Interestingly, cockroaches are quite resilient insects, able to withstand between 6 to 15 times more radiation than humans.

- Moreover, cockroaches are capable of living without a head for weeks on end.
- Cockroaches are also resilient to chemicals – if one group of cockroaches succumb to a particular strain of insecticide, the roaches that survive can pass on their resistance to the new generation. This makes cockroaches very hard to eradicate from human households.

HABITAT

American cockroaches prefer to live in warm, dark, wet areas, like sewers and basements. They often enter structures through drains and pipes. Although American cockroaches can be found in homes, they are also common in larger commercial buildings, such as restaurants, grocery stores and hospitals.

Cockroaches crawl through dirty areas and then walk around our homes tracking in lots of bacteria and germs. They can contaminate food by shedding their skins. Their cast off skin and waste byproducts are allergens that can trigger allergic reactions, asthma and other illnesses, especially in children.

BIRDS

They are warm-blooded vertebrates more related to reptiles than to mammals and they have a four-chambered heart (as do mammals), forelimbs modified into wings (a trait shared with bats), a hard-shelled egg, and keen vision, the major sense they rely on for information about the environment. Their sense of smell is not highly developed, and auditory range is limited. Most birds are diurnal in habit. More than 1,000 extinct species have been identified from fossil remains.

ORIENTAL MAGPIE-ROBIN

Scientific name - Copsychus saularis

A medium-sized robin with a broad white wingbar running from the shoulder to the tip of the wing. White outertail feathers, particularly when in flight. Males sport black-and-white plumage while the females are grayish brown and white. Juveniles resemble females, but have a scaly head and upperparts. They have a good repertoire of melodious calls and are known to imitate other bird calls. The most commonly heard call is a whistle given at dawn. Most often seen singing from a high exposed perch. These birds are often seen in cultivated areas, open woodlands, and gardens.

HABITAT

An Oriental magpie robin is commonly found in woodlands. These areas comprise trees overlapping each other, forming a dense canopy. The preferred habitat of this bird is open areas found in gardens or mangroves. They often nest around human settlements and cultivated areas and they also usually avoid dense forests. This bird is found up to an elevation of 2000 ft (609.6 m) from sea level.

ROCK PIGEON

Scientific name – Columba livia

Geographic Range

Wild Columba livia are native to Europe, North Africa, and southwestern Asia. Feral pigeons are found worldwide, including throughout all of North America. It should be noted that occurrence within this range is not evenly distributed (see habitat).

Habitat

Wild rock doves nest in crevices along rocky seaside cliffs, close to agriculture or open shrub vegetation. Feral pigeons live in old farm buildings in rural areas. In cities, the skyscrapers tend to take the place of their natural cliff surroundings.

Physical Description

The rock dove has a dark bluish-gray head, neck, and chest with glossy yellowish, greenish, and reddish-purple iridescence along its neck and wing feathers. Females tend to show less iridescence than the males. The bill is dark grayish-pink. Two dark bands across the wings are seen in most pigeons, and one bluish-gray band across the tail. Rock doves and feral pigeons can be divided into a large

number of different phenotypes, or groups based on outward characteristics. Some of these classifications are the blue-bar, blue checker, dark checker, spread, and red phenotypes.

Other Physical Features: endothermic and bilateral symmetry.

PLANTS

Plants are an incredibly important kingdom of organisms. They are multicellular organisms with the amazing ability to make their own food from carbon dioxide in the atmosphere. They provide the foundation of many food webs and animal life would not exist if plants were not around. The study of plants is known as botany.

buttiana, a probable hybrid of B. glabra and B. peruviana, has given rise to varieties having lemon yellow ("Golden Glow"), orange ("Louis Wathen"), and crimson ("Mrs. Butt") bracts. Bougainvilleas are hardy in warm climates.

Bougainvillea in bloom, framing the window on a house in

CHARACTERISTICS

Bougainvillea is a tropical and subtropical woody, ever-
Green, shrubby vine. Typically multi-trunked or with
Clumping stems, it has a spreading, round plant habit
With a height and spread of up to 20 feet. It climbs by
Sending out slender arching canes armed with stiff curved
Thorns. As they age, the stems turn from mid-green to
Dull green-brown. Bougainvillea is deciduous when
Grown in areas with a long dry season.
Numerous cultivars are available, with a striking ar-
Ray of colors. Their colorful "flowers" are really bracts,
Or modified leaves, 1
/2-2-inch long structures to which
The true flowers are attached at the mid-rib. New growth
Is required for inflorescence production, which occurs
On short stem axes borne laterally in the axils of leaves.
From their initial emergence to full maturity, the bracts
Of many cultivars change color. Bracts may retain their
Color for several months after the flowers have finished.

Gradually fading to resemble the color and texture of Paper.

Leaves are simple and alternate, with an undulate leaf Margin. The leaf blade is 2–4 inches long, with much Variation in shape: globular, elliptical, obivate, ovate, Or cordate. Leaves are mid- to deep green, although some Cultivars have variegated foliage.

The true, perfect flowers are small, tubular, and sur- Rounded by showy, colorful petaloid bracts. The vibrant Colors of bougainvillea are not from the inconspicuous, Commonly white or yellow, flowers but from the bracts That surround each flower.

The fruit is an elongated achene less than 1 /2 inch long.

It is rather inconspicuous, not showy, and has a dry, hard Fruit cover.

LOCATION AND LANDSCAPE USES

Location

Bouganvilleas grow best in full sun. High light inten-
Sity is required for good flowering. Low light and shady
Areas are not suitable, as the plants will drop their bracts.
Bougainvillea does best at elevations from 10 to 2500
Feet.
Bougainvillea can tolerate hot dry locations, with tem-
Peratures over 100°F. It does well in locations with a
Minimum of 65°F at night and 75–95°F during the day.
B. Glabra can tolerate slightly cooler conditions (58–
64°F) than B. Spectabilis (64–68°F). Bougainvillea does
Best with at least 25 inches of rainfall per year.
Bougainvillea grows well in rich, well drained, acidic
(ph 5.5–6.0) soil. It does not thrive in soil that is con-
Stantly wet. Proper soil ph is essential because it affects
The availability of mineral elements. A soil ph above
6.0 increases the possibility of micronutrient deficien-
Cies, particularly iron. Bougainvillea is drought toler-
Ant, salt tolerant, and wind resistant.
Bougainvillea is very susceptible to girdling during a
Storm. The bark will rub off at ground level when stems

Whip in high-speed winds. The plant is slow to recover From this, compared to other shrubs. If girdling is se- Vere, the entire plant will wilt a few days after a storm. It should not be planted in extremely windy, unprotected Areas.

Landscape uses

Bougainvillea's growth habit and beautiful showy bracts Make it a popular plant for landscapes. It is used in mass Plantings, as shrubs or bushes, and as ground cover on Banks. Bougainvillea provides hedges, barriers, and Slope coverings. For large, difficult-to-maintain areas, Bougainvillea is an excellent ground cover. It can cover A whole hillside and will choke out weed growth. Dwarf Cultivars make colorful ground covers.

Bougainvillea can be trained as a "standard," a small Flowering tree with a single trunk (photo above), over Arbors, into espaliers, onto walls, or to cascade down a Slope. Bougainvillea is used as an accent plant, a speci- Men plant, in hanging baskets, in containers, and for Bonsai.

Give plants enough room to grow to maturity with-
Out being crowded. Most cultivars do well 6–9 feet apart.
Smaller cultivars can be planted closer together, at 3–5-
Foot spacing. Bouganvillea should not be planted within
4 feet of walkways, as the thorns could catch unsus-
Pecting passersby.
In Hawai'i, flowering is heaviest from September to
April. Flowering is promoted by short daylengths. In
Addition, cultural practices are important to ensure sat-
Isfactory floweringæavoid overwatering, overfertilizing
With nitrogen, putting plants in heavy shade, and prun-
Ing too frequently. The flowering peak in Guam occurs
During the dry months, March through May.

LOTUS

UNIQUE PROPERTIES OF LOTUS

Biologically, lotus has not only the common aquatic plant features, but also certain unique features that distinguish it from other plant species. These features include seed longevity, leaf ultrahydrophobicity and floral thermoregulation. Understanding of the mechanisms that lead to the formation of these unique properties is important, for not only the basic plant biology, but also their great usage potential through bionics.

Lotus fruit is famous for its longevity. It was reported that lotus fruits buried underground over 1300 years in the Northeast of China could still be germinated [24]. Understanding the underlying mechanism of lotus seed longevity may contribute to enhancing seed storage in agriculture, and even in the healthcare of human beings.

Previous studies have shown that the first factor contributing to this feature might be the chemical compositions of lotus fruit wall, which contains high contents of polysaccharides (galactose, mannose) and tannins [25]. These compounds might help to prevent any negative effects from the environment. Recently, another study showed that the polyphenols content in lotus seed epicarp increased along with the ripening, and showed

strong anti-oxidation activity [26], which might also be helpful. Besides of the physical factors, several thermo-proteins, which showed high stability under high temperature, were also indicated to be helpful. These proteins include CuZn-SOD, 1-CysPRX, dehydrin, Cpn20, Cpn60, HSP80, EF-1α, Enolase1, vicilin, Met-Synthase and PIMT [27]. The functions of some genes involved in seed thermos-tolerance and germination vigor, including NnANN1 and NnPER1 (Peroxiredoxin 1), were verified in transgenic Arabidopsis [28,29]. To achieve this, the lotus genome contains multi-copies for most of the antioxidative genes [6,7]. Recent study showed that small RNA might also be involved in the regulation of lotus seed longevity [30]. How these different factors cooperatively function to contribute to the lotus seed longevity is still elusive, but worthy of studying. More importantly, it is very interesting to know if these factors also work in other systems.

Lotus leaves exhibit ultra-hydrophobicity, which is also known as the "lotus effect" [31]. This characteristic of ultra-hydrophobicity could ensure that the leaf upper epidermis is not covered by water, thus maintaining the normal function of its stomata [32]. Because of this, ultrahydrophobicity is believed to be an advantage in the evolution of the lotus.

CONCLUSION

Further studies showed that the easily rolling water droplets could help to remove the dirt particles adhering on the leaf surface and result in a self-cleaning phenomenon, which is heavily dependent upon the contact angle [35]. Two wax biosynthesis-related genes were cloned from the lotus, and transformed in Arabidopsis, which resulted in an alteration of the cuticle wax structure in inflorescence stems, and proved their function in the biosynthesis of the extra-long fatty acids [36]. More studies on the lotus leaf chemical compositions and structure might be very helpful in producing materials with super-hydrophobicity and self-cleaning features.

ACKNOWLEDGEMENT

I would like to convey my heartfelt gratitude to Mr. Shantanu Samanta for his tremendous direction and assistance in the completion of my project.

I would also like to thank our Principal Madam for providing me with this wonderful opportunity to work on a project

with such a fascinating topic. This project would not have been accomplished without their help and insights.

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Samanta 26/05/2022

GOKHALE MEMORIAL GIRLS' COLLEGE.

ENVS PROJECT

CO-ORDINATED BY PROFESSOR Shantanu Samanta

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Page NO: ??

growth is concentrated in the Sustainable Development Goals which seek to improve the standard of living globally while reducing the impact of society on the environment.

Growth rate candela

The "population growth rate" is the rate at which the number of individuals in a population increases in a given time period, expressed as a fraction of the initial population. Specifically, population growth rate refers to the change in population over a unit time period, often expressed as a percentage of the number of individuals in the population at the beginning of that period. This can be written as the formula, valid for a sufficiently small time interval:

{\displaystyle Population\ growth\ rate={\frac {P(t_{2})-P(t_{1})}{P(t_{1})(t_{2}-t_{1})}}}

A positive growth rate indicates that the population is increasing, while a negative growth rate indicates that the population is decreasing. A growth ratio of zero indicates that there were the same number of individuals at the beginning and end of the period—a growth rate may be zero even when there are significant changes in the birth rates, death rates, immigration rates, and age distribution between the two times.

Most populations do not grow exponentially; rather they follow a *logistic* model. Once the population has reached its carrying capacity, it will stabilize and the exponential curve will level off towards the carrying capacity, which is usually when a population has depleted most its natural resources. In the world human population, growth has been following a linear trend throughout the last few decades.

Population growth rate

A world map showing global variations in fertility rate per woman according to the CIA World Factbook's 2016 data.

7–8 children	5–6 children	3–4 children	1–2 children
6–7 children	4–5 children	2–3 children	0–1 children

IMPACT OF HUMAN POPULATION ON ENVIORONMENT

Human population growth impacts the Earth system in a variety of ways, including:

- Increasing the extraction of resources from the environment. These resources include fossil fuels (oil, gas, and coal), minerals, trees, water, and wildlife, especially in the oceans. The process of removing resources, in turn, often releases pollutants and waste that reduce air and water quality, and harm the health of humans and other species.
- Increasing the burning of fossil fuels for energy to generate electricity, and to power transportation (for example, cars and planes) and industrial processes.
- Increase in freshwater use for drinking, agriculture, recreation, and industrial processes. Freshwater is extracted from lakes, rivers, the ground, and man-made reservoirs.
- Increasing ecological impacts on environments. Forests and other habitats are disturbed or destroyed to construct urban areas including the construction of homes, businesses, and roads to accommodate growing populations. Additionally, as populations increase, more land is used for agricultural activities to grow crops and support livestock. This, in turn, can decrease species populations, geographic ranges, biodiversity, and alter interactions among organisms.
- Increasing fishing and hunting, which reduces species populations of the exploited species. Fishing and hunting can also indirectly increase numbers of species that are not fished or hunted if more resources become available for the species that remain in the ecosystem.
- Increasing the transport of invasive species, either intentionally or by accident, as people travel and import and export supplies. Urbanization also creates disturbed environments where invasive species often thrive and outcompete native species. For example, many invasive plant species thrive along strips of land next to roads and highways.
- The transmission of diseases- Humans living in densely populated areas can rapidly spread diseases within and among populations. Additionally, because transportation has become easier and more frequent, diseases can spread quickly to new regions.

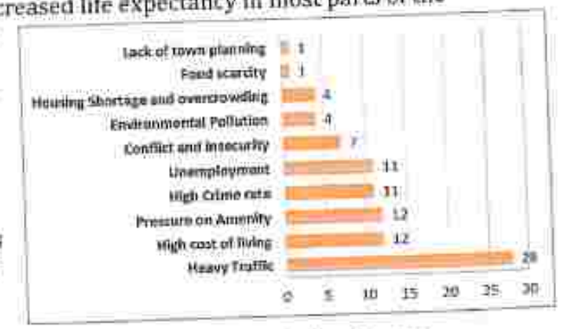
the world is global warming. Like glass in a greenhouse, gases like carbon monoxide admit the sun's light but tend to reflect back downward the heat that is radiated from the ground below, trapping heat in the earth's atmosphere. This is called the greenhouse effect. Air pollution is not the only environmental damage being done by the increasing population. Nowadays water pollution is also one of the increasing problems due to the population explosion. Water is considered the essence of life. As in the case of air pollution, the increasing population calls for increasing numbers of factories. These factories lead to various kinds of pollution, including water pollution. Also, India being an agrarian country, the water pollution also comes from pesticides used for agriculture. As we can observe, the increased population size is leading to increased pollution, which in turn is leading to a more hostile environment for human beings themselves.

Deforestation

Forests are an important natural resource of India. They have moderate influence against floods and thus they protect the soil erosion. Forests also play an important role in Impacts of Population Growth on the Physical Environment Physical environment means – non living environment or the land, air, water, soil and minerals. The utilization, overuse and misuse of physical resources increased manifold due to the growth of human population. As it has been told earlier, more population means more mouths to eat food which requires more agricultural production. More cultivable land has been made available by clearing forests and by reclaiming wet lands, ponds and green belts. Advanced agriculture requires utilization of more water, more fertilizers and more pesticides. Application of fertilizers and pesticides makes the soil infertile. Clearing of forests has its own serious impacts and the environment on the whole gets imbalanced. More population means more space to construct houses and availability of more consumer goods. It also requires more means of transport, more consumption of fossil fuels and more pollution of air, land and water. Thus growth of population leads to pollution of air, land and water. Different types of pollutions are causing a number of problems in the physical environment that are further affecting the biological environment seriously.

Ageing population

The decline in fertility rates combined with increased life expectancy in most parts of the world means not only a slowing of population growth but also to an older population. The UN report predicts that the number of people aged 60 and over will more than triple by 2100, accounting for 3.1 billion people. The WHO Global Health and Aging report attributes the increase in elderly population to a change in causes of death, from infectious to non-communicable diseases. Treatment of these diseases, which include hypertension, high cholesterol, arthritis, diabetes, heart disease, cancer, dementia, and congestive heart failure, add pressure to the health care system.



Migration

Generally, population patterns are diverse. Population growth can account for a struggle to get jobs and can cause social and economic strain causing people to migrate to countries with better opportunities.

Professor Mark Collision of the South African Population Research Infrastructure Network (SAPRIN), the Medical Research Council / Wits Rural Public Health and Health Transitions Research Unit (Agincourt), says that in the last 20 years fertility rates in Africa have dropped, the working age population has risen and dependency ratios (the number of dependents supported by the working age population) have declined. This, he believes, is an opportunity to spur economic development.

"The resources – monetary and otherwise – that would otherwise have been absorbed by raising children and supporting large families can be invested in productive and household savings," says Collision, who describes this phenomenon as a potential 'demographic dividend'.

Collision says that this demographic dividend is a potential developmental gain created by a window of time where fertility has fallen for several years but the ageing population has not yet risen significantly.

"This can usher in a golden moment when there are relatively few young and few old, and hence a large working age to non-working age ratio."

Citing a study by *Ahmed et al* in 2016, Collision says that this demographic dividend could account for 11-15% gross domestic product (GDP) growth by 2030 in many African countries, but that policies are needed to enhance the education and employability of young adults, as well as to create greater access to contraception and financial systems.

In an essay by Aderanti Adepoju of the World Economic Forum Global Agenda Council on Migration Human Resources Development Centre, Adepoju says that the distinctive

In the Sixth, Seventh and Eighth Plans, efforts were done to control population by determining long-term demographic aims.

Ninth Five-Year Plan: In 1993, the government had established an expert group under the chairmanship of M.S. Swaminathan for formulating national population policy. Though this group had prepared the draft of the new population policy in 1994, it was reviewed in 1999 by the Family Welfare Department and was passed by the Parliament in 2000. The Central Government formulated the 'new national population policy' in February 2000. This policy has three main objectives:

Objectives of Ninth Five Year Plan:-

1. Temporary objective: The easy supply of birth control devices was included in it. Besides, the development of health protection framework and recruitment of health workers were also made a part of it.

2. Middle-term objective: Under it, the total fertility rate (TFR) had to bring down to the replacement level of 2.1 by 2010.

3. Long-term objective: Under it, the Objective of population stabilization by 2045 is to be achieved.

The population has to be stabilized at that level which must be harmonious from the points of view of economic and social development and environmental protection.

It has been announced in the new population policy to keep the composition of the Lok Sabah unchanged by 2026 so that the states could co-operate without any fear. Under current provisions, the number of MPs in different states by 2001 has been determined on the basis of the census 1971. It was to be changed in 2001 on the basis of the new census report (2001). But it might be harmful to those states which had taken part in the population control programme with great fervor. Those states which had not laid proper attention on population control could get more shares in the Lok Sabha resulting in wrong effect on the population control programme. So, the Lok Sabha would not have more than 553 elected seats till 2026 and the number of Lok Sabha seats of each state would remain the same as it is at present. While announcing this new policy, the Central Health Minister said that the people living below poverty line would be rewarded properly if they would marry after 21 years, adopt the standard of two children and undergo sterilisation after two children.

The following major Objectives had been set in the National Population Policy till the year 2010:

1. The 'total fertility rate' to be reduced to 2.1.
2. The high class birth control services had to be made available publically so that the standard of two children could be adopted.
3. The infant mortality rate had to be reduced to 30 per thousand.
4. The mother mortality rate had also to be reduced to below 100 per one lakh.
5. The late marriage of girls had to be encouraged.

GOKHALE MEMORIAL GIRLS' COLLEGE.

ENVS PROJECT

CO-ORDINATED BY PROFESSOR Shantanu Samanta

SEM I I

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DATE OF SUBMISSION:–

Contents:-

Contents:-

Growth rate models

The "population growth rate" is the rate at which the number of individuals in a population increases in a given time period, expressed as a fraction of the initial population. Specifically, population growth rate refers to the change in population over a unit time period, often expressed as a percentage of the number of individuals in the population at the beginning of that period. This can be written as the formula, valid for a sufficiently small time interval:

{\displaystyle Population\ growth\ rate={\frac {P(t_{2})-P(t_{1})}{P(t_{1})(t_{2}-t_{1})}}}

A positive growth rate indicates that the population is increasing, while a negative growth rate indicates that the population is decreasing. A growth ratio of zero indicates that there were the same number of individuals at the beginning and end of the period—a growth rate may be zero even when there are significant changes in the birth rates, death rates, immigration rates, and age distribution between the two times.

Most populations do not grow exponentially; rather they follow a logistic model. Once the population has reached its carrying capacity, it will stabilize and the exponential curve will level off towards the carrying capacity, which is usually when a population has depleted

most its natural resources. In the world human population, growth has been following a linear trend throughout the last few decades.https://en.wikipedia.org/wiki/Population_growth#cite_note-:5-8

Population growth rate

A world map showing global variations in fertility rate per woman according to the CIA World Factbook's 2016 data-

7–8 children	5–6 children	3–4 children	1–2 children
6–7 children	4–5 children	2–3 children	0–1 children

Estimates of population evolution in different continents between 1950 and 2050 according to the United Nations. The vertical axis is logarithmic and is in millions of people. (2011)

World population growth rates between 1950 and 2050

The world population growth rate peaked in 1963 at 2.2% per year and subsequently declined. In 2017, the estimated annual growth rate was 1.1%. The CIA World Fact book gives the world annual birthrate, mortality rate, and growth rate as 1.86%, 0.78%, and 1.08% respectively. The last 100 years have seen a massive fourfold increase in the population, due to medical advances, lower mortality rates, and an increase in agricultural productivity made possible by the Green Revolution.

The annual increase in the number of living humans peaked at 88.0 million in 1989, then slowly declined to 73.9 million in 2003, after which it rose again to 75.2 million in 2006. In 2017, the human population increased by 83 million. Generally, developed nations have seen a decline in their growth rates in recent decades, though annual growth rates remain above 2% in some countries of the Middle East and Sub-Saharan Africa, and also in South Asia, Southeast Asia, and Latin America.

In some countries the population is declining, especially in Eastern Europe, mainly due to low fertility rates, high death rates and emigration. In Southern Africa, growth is slowing due to the high number of AIDS-related deaths. Some Western Europe countries might also experience population decline. Japan's population began decreasing in 2005.

The United Nations Population Division projects world population to reach 11.2 billion by the end of the 21st century. The Institute for Health Metrics and Evaluation projects that the global population will peak in 2064 at 9.73 billion and decline to 8.89 billion in 2100. A 2014 study in Science concludes that the global population will reach 11 billion by 2100, with a 70% chance of continued growth into the 22nd century. The German Foundation for World Population reported in December 2019 that the global human population grows by 2.6 people every second, and could reach 8 billion by 2023.

- Increasing the extraction of resources from the environment. These resources include fossil fuels (oil, gas, and coal), minerals, trees, water, and wildlife, especially in the oceans. The process of removing resources, in turn, often releases pollutants and waste that reduce air and water quality, and harm the health of humans and other species.
- Increasing the burning of fossil fuels for energy to generate electricity, and to power transportation (for example, cars and planes) and industrial processes.
- Increase in freshwater use for drinking, agriculture, recreation, and industrial processes. Freshwater is extracted from lakes, rivers, the ground, and man-made reservoirs.
- Increasing ecological impacts on environments. Forests and other habitats are disturbed or destroyed to construct urban areas including the construction of homes, businesses, and roads to accommodate growing populations. Additionally, as populations increase, more land is used for agricultural activities to grow crops and support livestock. This, in turn, can decrease species populations, geographic ranges, biodiversity, and alter interactions among organisms.
- Increasing fishing and hunting, which reduces species populations of the exploited species. Fishing and hunting can also indirectly increase numbers of species that are not fished or hunted if more resources become available for the species that remain in the ecosystem.
- Increasing the transport of invasive species, either intentionally or by accident, as people travel and import and export supplies. Urbanization also creates disturbed environments where invasive species often thrive and outcompete native species. For example, many invasive plant species thrive along strips of land next to roads and highways.
- The transmission of diseases- Humans living in densely populated areas can rapidly spread diseases within and among populations. Additionally, because transportation has become easier and more frequent, diseases can spread quickly to new regions.

It's Effect on Global Warming

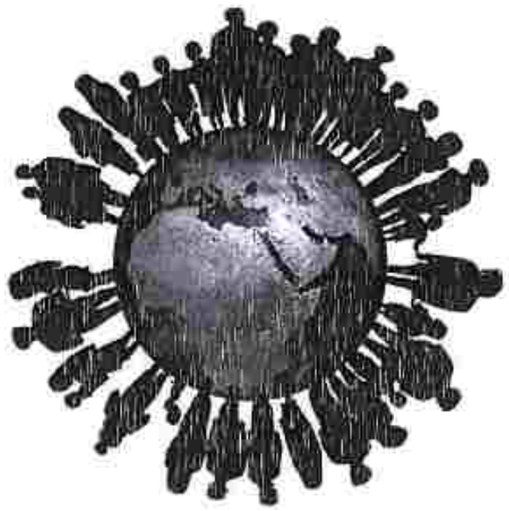
The rapid increase of human population is putting an incredible strain on our environment. While developed countries continue to pollute the environment and deplete its resources,

Population growth: The impact on health and societies

We have a "golden moment" and "unique opportunity" to spur economic development, says Professor Mark Collision.

A United Nations report released in 2017 puts the current world population at 7.6 billion people. By 2030 this number is expected to increase to 8.6 billion and eventually 11.2 billion by 2100. With a handful of countries being primarily responsible for this growth, about 83 million people are being added to the population each year even though it is expected that fertility levels will continue to decline.

Nigeria, the fastest growing country, is expected to become the third largest country in the world by 2050, exceeding the population of the USA. The UN report also states that nine countries – India, Nigeria, the Democratic Republic of the Congo, Pakistan, Ethiopia, the United Republic of Tanzania, the United States of America, Uganda and Indonesia – will house half the world's population between 2017 and 2050.



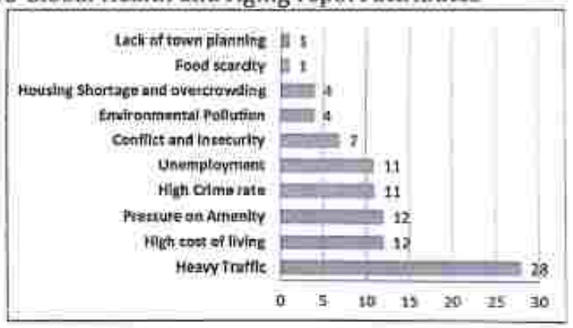
Malnutrition

A growing population with disparities in distribution can add strain to the environment to feed people. A World Health Organization (WHO) report published in 2005 explains that overpopulation "is a breakdown of the ecological balance in which the population may exceed the carrying capacity of the environment." This means weakened food production, leading to inadequate food consumption and malnutrition.

A report from Cornell University suggests that malnutrition makes people more susceptible to life-threatening diseases like malaria and respiratory infections. From 1950 to 2007 malnutrition increased by 37% and is linked to six million child deaths a year. In 2011 the WHO cautioned that an increase in travel and harmful strains of human-to-human viruses could cause over 100 million deaths in the future as many will be weakened by malnutrition.

Ageing population

The decline in fertility rates combined with increased life expectancy in most parts of the world means not only a slowing of population growth but also to an older population. The UN report predicts that the number of people aged 60 and over will more than triple by 2100, accounting for 3.1 billion people. The WHO Global Health and Aging report attributes the increase in elderly population to a change in causes of death, from infectious to non-communicable diseases. Treatment of these diseases, which include hypertension, high cholesterol, arthritis, diabetes, heart disease, cancer, dementia, and congestive heart failure, add pressure to the health care system.



Migration

Generally, population patterns are diverse. Population growth can account for a struggle to get jobs and can cause social and economic strain causing people to migrate to countries with better opportunities.

Professor Mark Collision of the South African Population Research Infrastructure Network (SAPRIN), the Medical Research Council / Wits Rural Public Health and Health Transitions Research Unit (Agincourt), says that in the last 20 years fertility rates in Africa have dropped, the working age population has risen and dependency ratios (the number of dependents supported by the working age population) have declined. This, he believes, is an opportunity to spur economic development.

"The resources – monetary and otherwise – that would otherwise have been absorbed by raising children and supporting large families can be invested in productive and household savings," says Collision, who describes this phenomenon as a potential 'demographic dividend'.

Collision says that this demographic dividend is a potential developmental gain created by a window of time where fertility has fallen for several years but the ageing population has not yet risen significantly.

"This can usher in a golden moment when there are relatively few young and few old, and hence a large working age to non-working age ratio."

Citing a study by *Ahmed et al* in 2016, Collision says that this demographic dividend could account for 11-15% gross domestic product (GDP) growth by 2030 in many African countries, but that policies are needed to enhance the education and employability of young adults, as well as to create greater access to contraception and financial systems.

In an essay by Aderanti Adepoju of the World Economic Forum Global Agenda Council on Migration Human Resources Development Centre, Adepoju says that the distinctive features of migration include increasing female migration, diversification of migration destinations, transformation of labour flows into commercial migration, and emigration of skilled health and other professionals.

But, while migration causes a 'brain drain' which can have negative consequences in areas such as health where access to health is impacted negatively by the emigration of skilled healthcare workers, and is compromising millennium development goals, it is not all bad.

Population Policies of India

Population Policies formulated to address the unmet needs for contraception, health care infrastructure, and health personnel, and to provide integrated service delivery for basic reproductive and child health care. The main objective is to achieve a stable population at a level consistent with the requirements of sustainable economic growth, social development, and environmental protection. Several policies have been formulated in different Five-Year Plans by the Government of India for population control.

Population Policies formulated to address the unmet needs for contraception, health care infrastructure, and health personnel, and to provide integrated service delivery for basic reproductive and child health care. The main objective is to achieve a stable population at a level consistent with the requirements of sustainable economic growth, social development, and environmental protection.

Five-Year Plans by the Government of India for population control:-

First Five Year Plan: India is the first country in the world to begin a population control programme in 1952. It emphasized the use of natural devices for family planning.

Second Five Year Plan: Work was done in the direction of education and research and the clinical approach was encouraged.

Third Five Year Plan: In 1965, the sterilization technique for both men and women was adopted under this plan. The technique of copper- T was also adopted. An independent department called the Family Planning Department was set up.

Fourth Five-Year Plan: All kinds of birth control methods (conventional and modern) were encouraged.

Fifth Five Year Plan: Under this plan the National Population Policy was announced on 16 April, 1976. In this policy, the minimum age for marriage determined by the Sharda Act, 1929 was increased. It increased the age for boys from 18 to 21 years and for girls from 14 to 18 years. The number of MPs and MLAs was fixed till the year 2001 on the basis of the census 1971. Under this Plan, forced sterilization was permitted which was later on given up. In 1977, the Janata Party government changed the name of Family Planning Department to Family Welfare Department.

In the Sixth, Seventh and Eighth Plans, efforts were done to control population by determining long-term demographic aims.

A high level 100-membered National Population Commission has been set up under the chairmanship of the Prime Minister on 11 May 2000 to supervise and analyze the implementation of this new population policy.

CONCLUSION

Human Population growth is one of the biggest threats to the current world environment. Each person requires space, energy and resource to survive, which results in environmental losses. If the human population was maintained at sustainable levels, it would be possible to balance these environmental losses with renewable resources and regeneration. But our population is rapidly rising beyond the earth's ability to regenerate and sustain with a reasonable quality of life. We are exceeding the carrying capacity of our planet.

We need to limit our growth voluntarily, and promote contraceptive use, before nature controls our pollution for us with famines, drought and plagues.

ACKNOWLEDGEMENT

I would like to take the opportunity to convey my gratitude towards prof. Shantanu Sharma for always being supportive and also my friends who have made it easier for me to finish the project with their help. Working on this project has enriched my knowledge about the global consequences due to constant population growth and has also widened my awareness on the measures and the policies implemented on ground level to overcome the unfavorable growth of human population. Working on it has been an enriching experience.

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1. https://en.wikipedia.org/wiki/World_population#:~:text=In%20demographics%2C%20the%20term%20world,billion%20as%20of%20November%202021.
2.

Samanta 26/06/22

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ENVIRONMENTAL POLLUTION

ACKNOWLEGEMENT

I would like to express my profound gratitude towards many individuals, as without their kind support, it would not be possible for me to complete this tutorial. I would like to extend my sincere thanks to my teacher who gave me the golden opportunity in enhancing my hidden capabilities.

I am highly indebted to my subject teacher for her guidance, kind co-operation and encouragement as it helped me a lot in completion of this tutorial.Last but not the least, I end up thanking all who helped me in finalizing the tutorial within the limited time frame.

Samanta
25/05/22

CONTENTS

INTRODUCTION

Pollution is the introduction of contaminants into the natural environment that causes adverse change. Pollution can take the form of chemical substances or energy, such as noise, heat or light. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occuring contaminants.

Environmental pollution is one of the most serious problems facing humanity and other life forms on our planet today. Environmental Pollution is defined as the contamination of the physical and biological components of the earth/atmosphere system to such an extent that normal environmental processes are adversely affected. Pollutants can be naturally occuring substances or energies, but they are considered contaminants when in excess of natural levels. Any use of natural resources at a rate higher than nature's capacity to restore itself can result in pollution of air, water and land.

TYPES OF POLLUTION

1. **Air Pollution :** It is a mixture of solid particles and gases in the air. . Car emissions, chemicals from factories, dust, and pollen and mold spores may be suspended as particles. Ozone, a gas, is a major part of air pollution in cities. When ozone forms air pollution, it's also called smog. Some air pollutants are poisonous. Air pollution occurs when harmful or excessive quantities of substances are introduced into Earth's atmosphere.
Sources of air pollution include gases, particulates, and biological molecules. Air pollution refers to the release of pollutants into the air that are detrimental to human health and the planet as a whole. There are primary and secondary pollutants of air pollution where primary pollutant is emitted directly from a source. E.g: Toxic metals (Lead, Mercury). And secondary pollutant is not directly emitted. E.g: Smog.

Causes of Air Pollution: Some of the causes of air pollution are-

- ***Burning of fossil fuels***: The combustion of fossil fuels emits a large amount of sulphur dioxide. Carbon monoxide released by incomplete combustion of fossil fuels also results in air pollution.
- ***Automobiles:*** The gases emitted from vehicles such as jeeps, trucks, cars, buses, etc. pollute the environment. These are the major sources of greenhouse gases and also result in diseases among individuals.
- ***Agricultural activities:*** Ammonia is one of the most hazardous gases emitted during agricultural activities. The insecticides, pesticides and fertilizers emit harmful chemicals in the atmosphere and contaminate it.
- ***Factories and Industries:*** Factories and industries are the main source of carbon monoxide, organic compounds, hydrocarbons, and chemicals. These are released into the air degrading its quality.
- ***Mining Activities:*** In the mining process, the minerals below the earth are extracted using large pieces of equipment. The dust and chemicals released during the process not only pollute the air but also deteriorate the health of the workers and people living in the nearby areas.

Effects of Air Pollution: The hazarduous effects of air pollution are as follows:

- ***Diseases:*** Air pollution has resulted in several respiratory disorders and heart diseases among humans. The cases of lung cancer have increased in the last few decades. Children living near polluted areas are more prone to pneumonia and asthma.
- ***Global Warming:*** Due to the emission of greenhouse gases, there is an imbalance in the gaseous composition of the air. This has led to an increase in the temperature of the earth. This increase in earth's temperature is known as global warming.
- ***Acid Rain:*** The burning of fossil fuels releases harmful gases such as nitrogen oxides and sulphur oxides in the air. The water droplets combine with these pollutants, become acidic, and fall as acid rain which damages human, animal and plant life.
- ***Ozone Layer Depletion:*** The release of chlorofluorocarbons (CFC), halons, and hydrochlorofluorocarbons in the atmosphere is the major cause of depletion of the ozone layer. The depleting ozone layer does not prevent the harmful ultraviolet rays coming from the sun and causes skin diseases and eye problems among individuals.
- ***Effect on Animals:*** The air pollutants suspend on the water bodies and affect the aquatic life. Pollution also compels the animals to leave their habitat and shift to a new place.

Air Pollution Control: The measures one should adopt to control air pollution are:

- ***Avoid using Vehicles:*** People should avoid using vehicles for shorter distances. Rather they should prefer public modes of transport to travel from one place to another. This not only prevents pollution but also conserves energy.
- ***Energy Conservation:*** A large number of fossil fuels are burnt to generate electricity. Therefore, do not forget to switch off the electrical appliances when not in use. Thus, you can save the environment at the individual level. Use of energy-efficient devices such CFLs also controls pollution to a greater level.
- ***Use of energy efficient appliances:*** Whether at the domestic level or at the industrial level, we must push for appliances that use energy efficiently, which result in

Causes of Water Pollution: The causes of water pollution vary and may be both natural and anthropogenic. However, the common causes are as follows:

- ***Agrochemicals:*** Agrochemicals like fertilizers (containing nitrates and phosphates) and pesticides (insecticides, fungicides, herbicides etc.) washed by rain-water and surface runoff pollute water.
- ***Storm water runoff:*** Carrying various oils, petroleum products, and other contaminants from urban and rural areas (ditches). These usually forms sheens on the water surface.
- ***Sewage:*** Carrying various oils, petroleum products, and other contaminants from urban and rural areas (ditches). These usually forms sheens on the water surface.
- ***Mining Activities:*** Carrying various oils, petroleum products, and other contaminants from urban and rural areas (ditches). These usually forms sheens on the water surface.
- ***Industrial effluents:*** Industrial wastes containing toxic chemicals, acids, alkalis, metallic salts, phenols, cyanides, ammonia, radioactive substances, etc., are sources of water pollution. They also cause thermal (heat) pollution of water.

Effects of Water Pollution: The effects of water pollution are varied. They include poisonous drinking water, poisonous food animals (due to these organisms having bioaccumulated toxins from the environment over their life spans), unbalanced river and lake ecosystems that can no longer support full biological diversity, deforestation from acid rain, and many other effects. These effects are, of course, specific to the various contaminants.

- Water bodies in the vicinity of urban areas are extremely polluted. This is the result of dumping garbage and toxic chemicals by industrial and commercial establishments.
- Water pollution drastically affects aquatic life. It affects their metabolism, behavior, causes illness and eventual death. Dioxin is a chemical that causes a lot of problems from reproduction to uncontrolled cell growth or cancer. This chemical is bioaccumulated in fish, chicken and meat. Chemicals such as this travel up the food chain before entering the human body.
- The effect of water pollution can have a huge impact on the food chain. It disrupts the foodchain. Cadmium and lead are some toxic substances, these pollutants upon entering the food chain through animals (fish when consumed by animals, humans) can continue to disrupt at higher levels.
- Humans are affected by pollution and can contract diseases such as hepatitis through faucal matter in water sources. Poor drinking water treatment and unfit water can always cause an outbreak of infectious diseases such as cholera etc.
- The ecosystem can be critically affected, modified and destructured because of water pollution.

Control of Water Pollution: Water pollution, to a larger extent, can be controlled by a variety of methods. Rather than releasing sewage waste into water bodies, it is better to treat them before discharge. Practicing this can reduce the initial toxicity and the remaining substances can be degraded and rendered harmless by the water body itself. If the secondary treatment of water has been carried out, then this can be reused in sanitary systems and agricultural fields. A very special plant, the Water Hyacinth can absorb dissolved toxic chemicals such as cadmium and other such elements. Establishing these in regions prone to such kinds of pollutants will reduce the adverse effects to a large extent. Some chemical methods that help in the control of water pollution are precipitation, the ion exchange process, reverse, and coagulation. As an individual, reusing, reducing, and recycling wherever possible will advance a long way in overcoming the effects of water pollution.

to contaminants, because they come in close contact with the soil by playing in the ground; combined with lower thresholds for disease, (headaches, nausea, and vomiting, coughing, pain in the chest, and wheezing) this triggers higher risks than for adults. Therefore, it is always important to test the soil before allowing your kids to play there, especially if you live in a highly industrialized area.

Control of Soil Pollution: Several technologies have been developed to tackle soil remediation. Some important strategies followed for the decontamination of polluted soil are listed below.

- Excavation and subsequent transportation of polluted soils to remote, uninhabited locations.
- Extraction of pollutants via thermal remediation – the temperature is raised in order to force the contaminants into the vapor phase, after which they can be collected through vapors extraction.
- Bioremediation or phytoremediation involves the use of microorganisms and plants for the decontamination of soil.
- Mycoremediation involves the use of fungi for the accumulation of heavy metal contaminants.

4. MARINE POLLUTION: Marine pollution is a combination of chemicals and trash, most of which comes from land sources and is washed or blown into the ocean. This pollution results in damage to the environment, to the health of all organisms, and to economic structures worldwide.

Causes of Marine Pollution: Marine pollution is a growing problem in today's world. Our ocean is being flooded with two main types of pollution: chemicals and trash.

- Chemical contamination, or nutrient pollution, is concerning for health, environmental, and economic reasons. This type of pollution occurs when human activities, notably the use of fertilizer on farms, lead to the runoff of chemicals into waterways that ultimately flow into the ocean. The increased concentration of chemicals, such as nitrogen and phosphorus, in the coastal ocean promotes the growth of algal blooms, which can be toxic to wildlife and harmful to humans. The negative effects on health and the environment caused by algal blooms hurt local fishing and tourism industries.

flecks of microplastic pepper swirling around an ocean soup. Even some promising solutions are inadequate for combating marine pollution. So-called "biodegradable" plastics often break down only at temperatures higher than will ever be reached in the ocean.

Nonetheless, many countries are taking action. According to a 2018 report from the United Nations, more than sixty countries have enacted regulations to limit or ban the use of disposable plastic items.

CONCLUSION

Environmental pollution is causing a lot of distress not only to humans but also animals, driving many animal species to endangerment and even extinction.

The transboundary nature of environmental pollution makes it even more difficult to manage it – you cannot build brick walls along the borders of your country or put customs cabins at every point of entry to regulate its flows into your country. Everything on our planet is interconnected, and while the nature supplies us with valuable environmental services without which we cannot exist, we all depend on each other's actions and the way we treat natural resources. It's widely recognized that we are hugely overspending our current budget of natural resources – at the existing rates of its exploitation, there is no way for the environment to recover in good time and continue "performing" well in the future.

Perhaps we should adopt a holistic view of nature – it is not an entity that exists separately from us; the nature is us, we are an inalienable part of it, and we should care for it in the most appropriate manner. Only then can we possibly solve the problem of environmental pollution.

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ACKNOWLEDGEMENT

I would like to convey my gratitude towards Professor Santanu Samanta for always being supportive. While doing this project I have realised how important it is to protect and conserve our environment from pollution and make people aware about the harmful effects of Pollution to the environment. I would also like to thank the Principal of Gokhale Memorial Girl's to give us this opportunity to do this project.

CONTENTS:.

ENVIRONMENTAL POLLUTION-INTRODUCTION

Pollution is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of any substance or energy. Pollutants, the components of pollution, can be either foreign substances/energies or naturally occurring contaminants

Environmental pollution is defined as "the contamination of the. Physical and biological components of the earth/atmosphere system to such an extent that. Normal environmental processes are adversely affected."

CAUSES OF ENVIRONMENTAL POLLUTION

1) The Burning of fossil fuel
2) Industrial Emission. …
3) Indoor Air Pollution. …
4) Microbial Decaying Process.
5) Transportation

TYPES OF ENVIRONMENTAL POLLUTION

1) Air Pollution
2) Water Pollution
3) Noise Pollution
4) Soil Pollution
5) Marine Pollution

AIR POLLUTION

Pollutants when harm the air it is called air pollution.

CAUSES OF AIR POLLUTION *Certain gases in the atmosphere can cause air pollution. For example, in cities, a gas called ozone is a major cause of air pollution. Ozone is also a greenhouse gas that can be both good and bad for our environment. It all depends where it is in Earth's atmosphere.*

Ozone high up in our atmosphere is a good thing. It helps block harmful energy from the Sun, called radiation. But, when ozone is closer to the ground, it can be really bad for our health. Ground level ozone is cr.

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 like asthma, chronic bronchitis, emphysema, heart attacks and strokes along with cancer, among other threats to the body. Several million are known to have died due to the direct or indirect effects of Air pollution.

2) *Global Warming*

Another direct effect is the immediate alterations that the world is witnessing due to global warming. With increased temperatures worldwide, an increase in sea levels and melting of ice from colder regions and icebergs, displacement, and loss of habitat.

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 combine 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 humans, animals, and crops.

3) *Depletion of the Ozone Layer*
Ozone exists in the 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, hydrochlorofluorocarbons in the atmosphere.

4) *Effect on Wildlife*
Just like humans, animals also face some devastating effects of air pollution. Toxic chemicals present in the air.

CONTROLS FOR AIR POLLUTION 1)*Conserve Energy*
Switch off fans and lights when you are going out. A large number of fossil fuels are burnt to produce electricity. You can save the environment from degradation by reducing the number of fossil fuels to be burned.

1) *Switch off fans and lights when you are going out. A large number of fossil fuels are burnt to produce electricity. You can save the environment from degradation by reducing the number of fossil fuels to be burned.*

2) *Understand the Concept of Reduce, Reuse and Recycle*
Do not throw away items that are of no use to you. Instead, reuse them for some other purpose. For example, you can use old jars to store cereals or pulses.

3) *Emphasis on Clean Energy Resources*
Use of Clean energy technologies like solar, wind and geothermal is on the rise these days. Governments of various countries have been providing grants to consumers who are interested in installing solar panels for their homes. Undoubtedly, this can go a long way to curb air pollution.

4) *Energy-Efficient Devices*
CFL lights consume less electricity than their counterparts. They live longer, consume less electricity.

WATER POLLUTION

Water pollution is the contamination of water sources by substances which make the water unusable for drinking, cooking, cleaning, swimming, and other activities. Pollutants include chemicals, trash, bacteria, and parasites. All forms of pollution eventually make their way to water.

CAUSES OF WATER POLLUTION **1)** *Sewage or wastewater:*

The waste from households, factories, or agricultural land gets discharged into rivers or lakes. This waste can either be in the form of liquid waste, garbage, or sewage. The harmful chemicals oozing out of this waste can damage aquatic life.

2) Dumping:

Most water bodies get converted into dumping grounds by nearby localities. And this causes a huge problem because the dump contains everything from plastic, aluminum to glass, Styrofoam, etc. And since all the waste takes different time to degrade in the water, they tend to harm the aquatic life until degraded.

3) Oil pollution:

One of the worst types of water pollution is oil pollution. This is because the oil spills from tankers and ships tend to create a thick layer above the water in seas or oceans. And since oil doesn't dissolve, the sludge stays forever.

4) Acid rain:

Even though acid rain may seem like a natural problem but it is wise to note that Acid rains are caused due to acidic particles in the contaminated air. These particles in the atmosphere get mixed with water vapor and result in acid rains.

5) Industrial waste:

Industrial waste is filled with lead, asbestos, petrochemicals, and even mercury. All of these chemicals are highly hazardous for both humans and aquatic life. But, many industries tend to discharge the waste into major water bodies like rivers and lakes around living localities, thus, contaminating the fresh water.

EFFECTS OF WATER POLLUTION

1- Diseases:

CONTROLS FOR WATER POLLUTION

1) Wastewater treatment

Wastewater treatment consists of removing pollutants from wastewater through a physical, chemical or biological process. The more efficient these processes are, the cleaner the water becomes.

2) Green agriculture

Globally, agriculture accounts for 70% of water resources, so it is essential to have climate-friendly crops, efficient irrigation that reduces the need for water and energy-efficient food production. Green agriculture is also crucial to limit the chemicals that enter the water.

NOISE POLLUTION

Noise pollution is an invisible danger. It cannot be seen, but it is present nonetheless, both on land and under the sea. Noise pollution is considered to be any unwanted or disturbing sound that affects the health and well-being of humans and other organisms. Sound is measured in decibels.

CAUSES OF NOISE POLLUTION

Poor urban planning may give rise to noise disintegration or pollution, side-by-side industrial and residential buildings can result in noise pollution in the residential areas. Some of the main sources of noise in residential areas include loud music, transportation (traffic, rail, airplanes, etc.), lawn care maintenance, construction, electrical generators, wind turbines, explosions, and people.

EFFECTS OF NOISE POLLUTION

High noise levels can contribute to cardiovascular effects in humans and an increased incidence of coronary artery disease.[7][8] In animals, noise can increase the risk of death by altering predator or prey detection and avoidance, interfere with reproduction and navigation, and contribute to permanent hearing loss.[9] A substantial amount of the noise that humans produce occurs in the ocean. Up until recently, most research on noise impacts has been focused on marine mammals, and to a lesser degree, fish

CONTROLS FOR NOISE POLLUTION

1) In commercial, hospital, and industrial buildings, adequate soundproof systems should be installed.

2) Musical instruments' sound should be controlled to desirable limits.

4) Dense tree cover is useful in noise pollution prevention.

5) Explosives should not be used in forest, mountainous and mining areas.

SOIL POLLUTION *Soil pollution refers to anything that causes contamination of soil and degrades the soil quality. It occurs when the pollutants causing the pollution reduce the quality of the soil and convert the soil inhabitable for microorganisms and macro organisms living in the soil.*

CAUSES OF SOIL POLLUTION

1) *Heavy metals (such as lead and mercury, at excessively high amounts) in the soil can make it very poisonous to humans.*
2) *PAHs (polycyclic aromatic hydrocarbons) are a class of organic chemicals where only carbon and hydrogen atoms are present.*
3) *Coke (coal) production, automobile emissions, cigarette smoke, and shale oil extraction are all sources of PAHs in the soil.*
4) *Industrial Waste Soil contamination can come from the dumping of industrial waste into soils.*

EFFECTS OF SOIL POLLUTION

Inferior Crop Quality

It can decrease the quality of the crop. Regular use of chemical fertilizers, inorganic fertilizers, pesticides will decrease the fertility of the soil at a rapid rate and alter the structure of the soil. This will lead to decrease in soil quality and poor quality of crops. Over the time the soil will become less productive due to the accumulation of toxic chemicals in large quantity.

Harmful Effect on Human Health

It will increase the exposure to toxic and harmful chemicals thus increasing health threats to people living nearby and on the degraded land. Living, working or playing in the contaminated soil can lead to respiratory diseases, skin diseases, and other diseases. Moreover, it can cause other health problems.

Water Sources Contamination : The surface run-off after raining will carry the polluted soil and enter into different water resource. Thus, it can cause underground water contamination thereby causing water pollution. This water after contamination is not fit for human as well as animal use due to the presence of toxic chemicals.

CONTROLS FOR SOIL POLLUTION

1) *Revent soil pollution and stop the devastation caused to plant and animal life.*
2) *The solution to reduce the soil pollution*
3) *Use of correct farming techniques*
4) *Recycling of Waste before disposal, Recycle and Reuse Products*
5) *Use of organic fertilizers instead of chemical fertilizers and pesticides*
6) *Community education and awareness, Get the Locals Involved*

MARINE POLLUTION *Pollutants in the ocean make their way back to humans. Small organisms ingest toxins and are eaten by larger predators, many of which are seafood that we eventually eat. When the toxins in contaminated animals get deposited in human tissue, it can lead to long-term health conditions.*

CAUSES OF MARINE POLLUTION

1) Nonpoint source pollution (Runoff)
Nonpoint source pollution comes from a variety of different locations and sources. The result of this is runoff, which occurs when rain or snow moves pollutants from the ground into the ocean. For instance, after a heavy rainstorm, water flows off roads into the ocean, taking oil left on streets from cars with it.

2) Intentional discharge
Manufacturing plants in some areas of the world release toxic waste into the ocean, including mercury. While it's intentionally being released into the sea, sewage also contributes to ocean pollution, as well as plastic products. According to Ocean Conservancy, eight million metric tons of plastic goes into our oceans every year.
3) Spills: Ships are major contributors to ocean pollution, especially when crude oil spills occur. Crude oil lasts for years in the ocean and is difficult to clean up.

4) Littering
Atmospheric pollution, which refers to objects carried by the wind to the ocean, is a big problem. Items such as plastic bags and styrofoam containers become suspended in the water and don't decompose.

5) Ocean mining
Deep-sea ocean mining causes pollution and disruption at the lowest levels of the ocean. Drilling for substances such as cobalt, zinc, silver, gold and copper creates harmful sulfide deposits deep in the ocean.

EFFECTS OF MARINE POLLUTION

1) Harmful to marine animals :Sea animals are common victims of ocean pollution. Oil spills, for instance, will ensnare and suffocate marine animals by permeating their gills. When the oil gets into seabird feathers, they may not be able to fly or feed their young. Animals that aren't killed by crude oil may suffer from cancer, behavioral changes and become unable to reproduce.

2) Marine animals also mistake small plastic debris for food or become entangled in or strangled by plastic bags and discarded fishing nets. Animals most vulnerable to harm from plastic debris in the ocean include dolphins, fish, sharks, turtles, seabirds and crabs.

3) Depletion of oxygen in seawater
As excess debris in the ocean slowly degrades over many years it uses oxygen to do so, resulting in less 02 in the ocean. Low levels of oxygen in the ocean lead to the death of ocean animals such as penguins, dolphins, whales and sharks.

4) Excess nitrogen and phosphorus in seawater also cause oxygen depletion. When a great deal of oxygen depletion occurs in an area of the ocean, it can become a dead zone where no marine life can survive.

5) A threat to human health
Pollutants in the ocean make their way back to humans. Small organisms ingest toxins and are eaten by larger predators, many of which are seafood that we eventually eat. When the toxins in contaminated animals get deposited in human tissue, it can lead to long-term health conditions.

CONTROLS FOR MARINE POLLUTION

1) Reduce chemical fertilizer use
Excess chemical fertilizer eventually makes its way into the oceans. Choose organic fertilizers, which tend to be lower in nutrients, and use them at half strength or half as often as suggested.

2) Opt for reusable bottles and utensils
Throw-away plastic bottles and utensils, including straws, are massive ocean polluters. Rather than contributing to the threat to marine life, opt for reusable bottles and utensils.

3) Hold a cleanup Organize a social distancing cleanup at the beach or a nearby park. The more trash you pick up and properly dispose of, the less waste goes.

CONCLUSION

Pollution is a big problem now. A lot of people thinks that they don`t pollute because they don`t throw trash on the floor, but this is just one little part of pollution. Pollution is any damage that we cause to the environment and nobody can live without polluting our planet.

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25/05/2022

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EVS project

Acknowledgement

First of foremost, I would like to praise and thank the Almighty God for giving me the strength and because of His blessings, I finally managed to accomplish this assignment.

Therefore,I would like to express my special thanks of gratitude to my teacher Sri Santana Samantha as well as our principal Dr Atashi karpha Who gave me the golden opportunity to do this wonderful project on the topic water pollution, which also helped me in doing a lot of research and I came to know about so many new.

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Water Pollution

Introduction

Water pollution is the contamination of water sources by substances which make the water unusable for drinking, cooking, cleaning, swimming, and other activities. Pollutants include chemicals, trash, bacteria, and parasites. All forms of pollution eventually make their way to water. Air pollution settles onto lakes and oceans. Land pollution can seep into an underground stream, then to a river, and finally to the ocean. Thus, waste dumped in a vacant lot can eventually pollute a water supply. Water is one of the renewable resources essential for sustaining all forms of life, food. Production, economic development, and for general well being. It is impossible to substitute for most of its uses, difficult to de pollute, expensive to transport, and it is truly a unique gift to mankind from nature. Water is also one of the most manageable natural resources as it is capable of diversion, transport, storage, and recycling. All these properties impart to water its great utility for human beings. The surface water and groundwater resources of the country play a major role in caricature, hydropower generation, livestock production, industrial activities, forestry, fisheries, navigation recreational activities etc. The freshwater ecosystems of the world comprise only about 0.5% of the earth's surface and have a volumes of 2.81x105 Km. Rivers constitute an insignificant amount (0.1%) of the land surface. Only 0.01% of the waters of the earth occur in river channels. Inspite of these low quantities, running waters are of enormous significance.

Thus, India supports about 1/6th of world population. 1/50h of world's land and 1/25th of world's water resources (Water Management Form, 2003).

In the last few decades, there has been a tremendous increase in the demand for freshwater due to rapid growth of population and the accelerated pace of industrialization. (Ramakrishna et al., 2009). Human health is threatened by most of the agricultural development activities particularly in relation to excessive application of fertilizers and unsanitary conditions. Water bodies can be polluted by a wide variety of substances, including pathogenic microorganisms, putrescible organic waste, fertilizers and plant nutrients, toxic chemicals, sediments, heat, petroleum (oil), and radioactive substances. Several types of water pollutants are considered below. For a discussion of the handling of sewage and other forms of waste produced by human activities, see waste disposal and solid-waste management.

Sources of water pollution

Water pollution can occur from two sources, 1. Point source and 2. Non-point source (Table) 1). Point sources of pollution are those which have direct identifiable source Example includes pipe attached to a factory, oil spill from a tanker, effluents coming out from industries. Point sources of pollution include wastewater effluent (both municipal and industrial) and storm sewer discharge and affect mostly the area near it. Whereas non-point sources of pollution are those which arrive from different sources of origin and number of ways by which contaminants enter into groundwater or surface water and arrive in the environment from different non identifiable sources. Examples are runoff from agricultural fields, urban waste etc. Sometimes pollution that enters the environment in one place has an effect hundreds or even thousands of miles away. This is known as trans boundary pollution. One example is the radioactive waste that travels through the oceans from nuclear reprocessing plants to nearby countries. Water pollutants may be i)Organic and ii) Inorganic water pollutant.

1. Organic water pollutants: They comprise of insecticides and herbicides, organ halides and other forms of chemicals; bacteria from sewage and livestock's farming; food processing wastes; pathogens; volatile organic compounds etc.

2 Inorganic water pollutants: They may arise from heavy metals from acid mine drainage Silt from surface run-off, logging, slash and burning practices and land filling: fertilizers from agricultural run-off which include nitrates and phosphates etc. and chemical waste from industrial effluents.

Point Sources
Nonpoint Sources
Wastewater
Effluent(municipal And Industrial)
-Runoff and leachable from waste disposal sites-Runoff from pasture and range

-Runoff and infiltration from animal feed lot
Flow from irrigated agriculture)
Runoff from agriculture (including return
-Urban runoff unseeded and skewered areas
With a population <100,000
Runoff from mines, oil fields, unseeded
Industrial sites
- Storm sewer outfalls from cities with a Septic systems
Runoff from construction sites
Septic tank leachate and runoff from failed.
Population >100,000
-Overflows of combined storm and sanitary Runoff from abandoned mines
Sewers
-Runoff from construction sites
-Atmospheric deposition over a water surface
Activities on land that generate contaminants,
Such as logging, wetland conversion.
Construction, and development of land or waterways

Some of the important sources of water pollution are discussed below:

Urbanization: Urbanization generally leads to higher phosphorus concentrations in urban catchments (Paul and Meyer, 2001). Increasing imperviousness, increased runoff from urbanized surfaces, and increased municipal and industrial discharges all result in increased loadings of nutrients to urban streams. This makes urbanization second only to agriculture as the major cause of stream impairment.Sewage and other Oxygen Demanding Wastes: Management of solid waste is due to huge volumes of organic and non-biodegradable wastes generated a consequence, garbage in most parts of India is unscientifically disposed and ultimately increase in the pollutant load of surface and groundwater courses. Sewage can be a fertilizer as it releases important nutrients to the environment such as nitrogen and phosphors which

plants and animal need for growth. Chemical frizzed by farmers also add nutrients to the still, which drain into rivers and seas and add to the fertilizing effect of the sewage. Together, sewage and fertilizers can cause a massive increase in the growth of algae or plankton that facilitate huge areas of oceans, lakes, or rivers creating a condition known as algal bloom thereby reducing the dissolved oxygen content of water and killing other forms of life like fish.

Industrial Wastes: Many of the industries are situated along the banks of river such as steel and paper industries for their requirement of huge amounts of water in manufacturing processes and finally their wastes containing acids, alkalis, dyes and other chemicals are dumped and poured down into rivers as effluents. Chemical industries concerning with manufacture of Aluminum release large amount of fluoride through their emissions to air and effluents to water bodies Fertilizer industries generate huge amount of ammonia whereas steel plants generate cyanide. Chromium salts are used in industrial process for the production of sodium dichromate and other compounds containing chromium. All such discharges finally arrive at water bodies in the form of effluents affecting human health and the organism living there

Agro-chemical Wastes: In the agricultural sector, water and electricity for irrigation are subsidized for political reasons. This leads to wasteful flood irrigation rather than adoption of more optimal practices such as sprinkler and drip irrigation. Cropping patterns and farming practices also do not necessarily encourage the judicious use of water. There are losses of water due to breaches and seepage resulting in water logging and salinity. Agro-chemical wastes include fertilizers, pesticides which may be herbicides and insecticides widely used in crop fields to enhance productivity. Improper disposal of pesticides from field farms and agricultural activities contributes a lot of pollutants to water bodies and soils. Some of the pesticides are: DDT, Aldrin, Delran. Malathion, Hexachord Benzene etc. Pesticides reach water bodies through surface runoff from agricultural fields, drifting from spraying, washing down of precipitation and direct dusting and spraying of pesticides in low lying areas polluting the water quality. Most of them are non-biodegradable and persistent in the environment for long period of time. These chemicals may reach human through food chain leading to bio magnification.

Nutrient enrichment: The sources of nutrients in surface water can be divided broadly into natural and anthropogenic types Contribution to pollution by natural source is low due to balance established by the natural system between the production and consumption of nutrients over the course of time. Anthropogenic sources of contaminants are contributed from domestic and industrial wastes. Nutrient concentrations in streams and rivers.

Thermal pollution: Changes in water temperature adversely affect water quality and aquatic biota. Majority of the thermal pollution in water is caused due to human activities. Some of the important sources of thermal pollution are nuclear power and electric power plants, petroleum refineries, steel melting factories, coal fire power plant, boiler from industries which release large amount of heat to the water bodies leading to change in the physical, chemical and biological characteristics of the receiving water bodies. High temperature declines the oxygen content of water, disturbs the reproductive cycles, respiratory and digestive rates and other physiological changes causing difficulties for the aquatic life.

Oil spillage: Oil discharge into the surface of sea by way of accident or leakage from cargo tankers carrying petrol, diesel and their derivatives pollute sea water to a great extent. Exploration of oil from offshore

also lead to oil pollution in water. The residual oil spreads over the water surface forming a thin layer of water-in-oil emulsion

The disruption of sediments: Construction of dams for hydroelectric power or water reservoirs can reduce the sediment flow affecting adversely the formation of beaches, increases coastal erosion and reduces the flow of nutrients from rivers into seas (potentially reducing coastal fish stocks). Increased sediment flow can also create a problem. During construction work, soil, rock, and other fine powders sometimes enter nearby rivers in large quantities, causing water to become turbid (muddy or silted). The extra sediment can block the gills of fish, causing them suffocation.

Acid rain pollution: Water pollution that alters a plant's surrounding pH level, such as due to Acid rain, can harm or kill the plant. Atmospheric Sulfur dioxide and nitrogen dioxide emitted from natural and human-made sources like volcanic activity and burning fossil fuels interact with atmospheric chemicals, including hydrogen and oxygen, to form sulfuric and nitric acids in the air. These acids fall down to earth through precipitation in the form of rain or snow. Once acid rain reaches the ground, it flows into waterways that carry its acidic compounds into water bodies, Acid rain that collects in aquatic environments lowers water pH levels and affects the aquatic biota.

Radioactive waste: Radioactive pollution is caused by the presence of radioactive materials in water. They are classified small doses which temporary stimulate the metabolism and large Doses which gradually damage the organism causing genetic mutation. Sor radioactive sediment, waters used in nuclear atomic plants, radioactive mi nuclear power plants and use of radioisotopes in medical and research purposes.

1-Types of water pollution

- Surface water pollution is a type of pollution that occurs above ground, such as in oceans, streams, lakes and rivers. These waters become polluted due to contaminated rainwater runoff that gets transported into nearby water sources.-Surface Water Pollution Groundwater Pollution,Contaminant,Groundwater,Pesticide,Sewage.
- PATHOGENS IN SURFACE WATER POLLUTION-One of the biggest risks to humans from surface water pollution are pathogens that cause types of waterborne diseases. These come from human waste, as well as industrial sources which include organic chemicals and heavy metals.
- Contamination most commonly occurs when food is prepared using contaminated water or by a person drinking it. This is a common cause of illness, particularly in developing countries. Surface water contamination can also lead to toxic products remaining in fish because of exposure to pathogens. Municipal water suppliers need to access the expertise of surface water treatment services to diagnose and treat the problem before it becomes a major hazard to health.The color and turbidity of the water are affected when there is contamination. Typically, tannins are formed from organic material and include branches, soil, fish, debris and more.The type of tannin will depend on the location and nature of the contamination. Some are difficult to see so having regular checks of the water supply is important. Turbidity occurs when there are sediments in the water which typically settle or cloud the appearance of the liquid. This is not necessarily harmful. Turbidity is more common in surface water as it lacks the natural filtration found in groundwater.

Working with a municipal water treatment expert like AOS to address the problem will improve the quality of the supply.

- River water pollution- If large amounts of fertilizers or farm waste drain into a river the concentration of nitrate and phosphate in the water increases considerably. Algae use these substances to grow and multiply rapidly turning the water green. This massive growth of algae, called eutrophication, leads to pollution. There are many causes of river water ter pollution, some of them are-
- • 1- Sewage or wastewater: The waste from households, factories, or agricultural land gets discharged into rivers or lakes,2- Dumping, 3- Oil pollution,4- Acid rain,5- Industrial waste,Diseases,Ruination of the ecosystem, Eutrophication.

  What are the effects of river pollution-Bathing in contaminated river waters causes skin diseases, allergies, and other such ailments. Consuming polluted water can cause cancer, depletion of calcium from bones of humans and animals (Osteoporosis), loss of vision, imputer among men, sterility among women, Tuberculosis and other severe medical conditions.

  - Oil spillage-oil spill is the release of a liquid petroleum hydrocarbon into the environment, especially the marine ecosystem, due to human activity, and is a form of pollution. The term is usually given to marine oil spills, where oil is released into the ocean or coastal waters, but spills may also occur on land.

Oil spills into rivers, bays, and the ocean most often are caused by accidents involving tankers, barges, pipelines, refineries, drilling rigs, and storage facilities. Spills can be caused by: people making mistakes or being careless, equipment breaking down.

The effects will be long-lasting. Oil can kill surface-dwelling animals and birds by poisoning or suffocation, as well as affecting buoyancy and natural waterproofing. Contaminated food supplies mean animals may become malnourished or poisoned over time.

- Groundwater pollution (also called groundwater contamination) occurs when pollutants are released to the ground and make their way into groundwater. This type of water pollution can also occur naturally due to the presence of a minor and unwanted constituent, contaminant, or impurity in the groundwater, in which case it is more likely referred to as contamination rather than pollution. Groundwater pollution can occur from on-site sanitation systems, landfill leachate, effluent from wastewater treatment plants, leaking sewers, petrol filling stations, hydraulic fracturing (fracking) or from over application of fertilizers in agriculture. Pollution (or contamination) can also occur from naturally occurring contaminants, such as arsenic or fluoride. Using polluted groundwater causes hazards to public health through poisoning or the spread of disease. The pollutant often creates a contaminant plume within an aquifer. Movement of water and dispersion within the aquifer spreads the pollutant over a wider area. Its advancing boundary, often called a plume edge, can intersect with groundwater wells and surface water, such as seeps and springs, making the water supplies unsafe for humans and wildlife. The movement of the plume, called a plume front, may be analyzed through a hydrological transport model or groundwater model. Analysis of groundwater pollution may focus on soil characteristics and site geology, hydrogeology, hydrology, and the nature of the

are various ways to help to limit water pollution. If a person experiences any effects of water pollution, they should speak to their doctor.

Conclusion

Water pollution stems from many sources and causes, only a few of which are discussed here. Rivers and streams demonstrate some capacity to recover from the effects of certain pollutants, but lakes, bays, ponds, sluggish rivers, and oceans have little resistance to the effects of water pollution. All type of pollution has their kind of negative impact on our environment. The lives of humans and animals get impacted due to this. It is our responsibility to take various initiatives to protect nature. We need to fight against pollution to take steps towards a better tomorrow.

Samanta
25/05/2022

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COLLEGE ROLL NO - 21/BAH/0045

SUBMISSION DATE - 24/05/22

LOKENATH

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ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my teacher as well as our principal (Dr. Atashi Karpha) who gave me the golden opportunity to do this wonderful project on the topic (Pollution) which also helped me in doing a lot of Research and I came to know about so many new things I am really thankful to them.

Secondly I would also like to thank my parents and friends who helped me a lot in finalizing this project within the limited time frame.

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What is Pollution?

Pollution is the introduction of contaminants into a natural environment that causes instability, disorder, harm or discomfort to the ecosystem i.e. physical systems or living organisms. In 2015 pollution killed 9 million people worldwide.

Types Of Pollution

The three major types of pollution are -

Air Pollution

Water Pollution and

Land Pollution.

What is Air Pollution?

Air pollution is the introduction into the atmosphere of chemicals, particulates or biological materials that cause discomfort, disease, etc. to humans, damage other living things such as food crops or damage the natural environment or built environment.

Causes Of Air Pollution

1) Natural Causes :-

- Dust.
- Smoke from wildfire.

2) Man made Causes :-

- Burning of Fossil Fuels
  - Vehicles
  - Road construction
  - Building construction
- Agricultural activities
- Exhaust from factories and industries
  - Bad smoke
  - Waste
  - Liquid chemicals
- Indoor Air Pollution
  - Household cleaning products.

- Painting supplies emit toxic chemicals.
- Smoking.

Serious Effects of Air Pollution on the Environment are -

- Global Warming
- Climatic Change
- Acid Rain
- Smog effect
- Deterioration of fields
- Extinction of animal species
- Respiratory health problems
- Deterioration in building materials
- Chemical Sensitivity
- Skin damage

Solution Of Air Pollution

1) Use public mode of transportation.
2) Conserve Energy
3) Understand the concept of Reduce, Reuse and Recycle.
4) Emphasis on clean energy resources.

5) Use energy efficient devices.

Water Pollution

Water is a precious resource and without it life is not possible on earth. Water is getting polluted day by day due to excessive and careless use so the percent of available drinking water is reducing. There are many ways which causes water pollution and the effects of it are very harmful for all living and non living objects.

Water Pollution Causes by ...

- Marine Dumping
- Industrial Waste
- Sewage and Domestic waste
- Underground storage leaks
- Nuclear waste
- Detergents and fertilizers

Effects Of Water Pollution

- Destruction of biodiversity
- Contamination of the Food Chain
- Lack of Potable Water

- Health Problems such as Cholera, Hepatitis A. and Dysentery.
- Infant Morality

Solution for Water Pollution

- The factory waste should be filter first and then disposed properly into sea or river.
- Instead of using clean water we can use filtered industrial water for flushing toilets, washing the car and watering the plant.
- The government should ask the citizens to proper clean the beach once in year.
- There should be fine in people who throw their waste in river or sea.

Land Pollution

Land Pollution is the destruction of the earth's land surfaces, often directly or indirectly as a result of human activities and their misuse of land resources.

Causes Of Land Pollution

- Deforestation and soil erosion
- Agricultural activities
- Mining activities
- Overcrowded landfills
- Industrialization
- Construction activities
- Nuclear waste
- Sewage treatment

Effects Of Land Pollution

- Can cause respiratory problems like asthama attacks.
- Causes problems on the skin.
- Causes cancer
- Harms and destroys ecosystems

Prevention Of Land Pollution

- More and land should be brought under farming.

- Trees should be planted everywhere.
- Avoid drilling the land for more underground water.

Conclusion

Environmental pollution is causing a lot of distress not only to humans but also animals, driving many animal species to endangerment and even extinction. Much is being done to control, monitor and rectify damage done by pollutants. The problems are diverse and some are only being recognise but it is important to keep a close control over pollutants so that we can maintain the environment in an acceptable condition for future generations.

Samanta 25/05/2022

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Air

Pollution

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Air Pollution

Air Pollution is the contamination of air due to the presence of substances in the atmosphere that are harmful to the health of humans and other living beings, or cause damage to the climate or to material. There are many different types of air pollutants, such as gases (including ammonia, carbon monoxide, sulfur dioxide, nitrous oxides, methane, carbon dioxide and chlorafluorocarbons), particulates (both organic and inorganic) and biological molecules. Air pollution is the introduction into the atmosphere of chemicals, particulates or biological materials that cause discomfort, disease or death to humans, damage other living organisms such as food crops, or damage the natural environment or built environment.

Air Pollutants

An air pollutant is a material in the air that can have adverse effect on humans and the ecosystem. The substance can be solid particles, liquid droplet

or gases. A pollutant can be of natural origin. or man made pollutants are classified as primary or secondary.

Types Of Air Pollutants.

There are two types of air pollutants:

Primary Pollutants :- The pollutants that directly cause air pollution are known as Primary pollutants. Sulphur-dioxide emitted from factories is a primary pollutant.

Secondary Pollutants :- The pollutants formed by the intermingling and reaction of primary pollutants are known as Secondary Pollutants. Smog, formed by the inter-

mingling of smoke and fog, is a Secondary Pollutant.

Sources Of Air pollution

Following are the important sources of air pollution:

Burning of Fossil fuels :- The combustion of fossil fuels emits a large amount of Sulphur dibxide. Carbon monoxide released by uncomplete combustion of fossil fuels also results in air pollution.

Automobiles :- The gases emitted from vehicles such as jeeps, trucks, cars, buses, etc. pollute the environment. These are the major sources of greenhouses gases and also result in disease among individuals.

Agricultural Activities :- Ammonia is one of the most hazardous gases emitted during agricultural activities

The insecticides, pesticides and fertilizers emit harmful chemicals in the atmosphere and contaminate it.

Factories and Industries :- Factories and Industries are the main source of carbon monoxide, organic compounds, hydrocarbons and chemicals. These are released into the air, degrading its quality.

Mining Activities :- In the mining process, the minerals below the earth are extracted using large peices of equipment. The dust and chemical released during the processes not only pollute the air, but also deteriate the health of the workers and people living in the nearby areas.

Domestic Sources :- The house hold cleaning product and paints contain toxic chemicals that are released in the air. The smell from the newly painted walls is the smell of the chemicals present in the paints. It not only pollutes the air but also affects breathing.

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Effects Of Air pollution

The hazardous effect of air pollution on the environment include :-

Disease :- Air pollution has resulted in several respiratory disorders and heart diseases among humans. The cases of lung cancer have increased in the last few decades. Children living near polluted areas are more prone to pneumonia and asthma. Many people die every year due to the direct or indirect effects of air pollution.

Global Warming :- Due to the emission of greenhouse gases, there is an imbalance in the gaseous composition of the air. This has led to an increase in the temperature of the earth. This increase in earth's temperature is known as

Global Warming: This has resulted in the melting of glaciers and an increase in sea levels. Many areas are submerged underwater.

Acid Rain :- The burning of fossil fuels releases harmful gases such as nitrogen oxides and sulphur oxides in the air. The water droplets combine with these pollutants, become acidic and fall as acid rain which damages human, animal and plant life.

Ozone Layer Depletion :- The release of chlorafluro-carbons, halons and hydro-chlorafluro carbons in the atmosphere is the major cause of depletion of the ozone layer. The depleting ozone layer doesn't prevent the harmful UV rays coming from the sun and cause skin diseases and eyes problems among individuals.

Effect of Animals :- The air pollutant suspend in the water bodies and effect aquatic life. Pollution also compels the animals to leave their habitat and shift to a new place. This renders them stray and has also led to the extinction of a large number of animal species.

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Measures to reduce Air Pollution

following are the measures one should adopt to control air Pollution :-

Avoid using vehicles :- people should avoid using vehicles for shorter distance. Rather, they should prefer public modes of transport to travel from one place to another. This not only prevents pollutants but also conserves energy.

Energy conservation :- A large number of fossil fuels are burnt to generate electricity. Therefore, do not forget to switch off the electrical appliances when not in use. Thus, you can save the environment at the individual level. Use of energy-efficient devices such as CFLs also controls pollutions to a greater level.

Use of clean Energy Resources :- The use of solar, wind and geothermal energies reduce air pollution.

at a larger level. Various countries including India have implemented the use of these resources as a step towards a cleaner environment.

Other air pollution control measures include:-

1. By minimising and reducing the use of fire and fire products.

2. Since industrial emissions are one of the major causes of air pollution, the pollutants can be controlled or treated at the sources itself to reduce its effects. for examples if the reactions of a certain raw material yield a pollutant, then the raw material can be substituted with other less polluting materials.

3. Fuel substitution is another way of controlling air pollution. In many parts of India, petrol and diesel are being replaced by CNG- Compressed Natural Gas fueled vehicles. These are mostly adopted by vehicles that aren't fully operating with ideal emission engines.

4. Although there are many practices in India, which focus on repairing the quality of air most of them are either forgotten or not being enforced properly. There are still a lot of vehicles on road which haven't been tested for vehicle emissions.

5. Another way of controlling air pollution caused by industries is to modify and maintain existing pieces of equipment so that the emission of pollutants is minimised.

6. Sometimes controlling pollutants at the source is not possible. In that case, we can have process control equipment to control the pollution.

7. A very effective way of controlling air pollution is by diluting the air pollutants.

8. The last and the best way of reducing the ill effects of air pollution is tree plantation. Plants and trees reduce a large number of pollutants in the air. Ideally, planting trees in areas of high pollution level will be extremely effective.

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Conclusion

Air Pollution can be prevented only if unduiduals and bussiness stop using toxic substances that cause air pollution in the first place. This would require the cessation of all fossil-fuel burning processes, from industrial manufacturing to home use of air conditioner. This is an unlikely sknario at this time. However we have to make rules which set stringet regulations on industrial and power supply manufacturing and handling. The regulation are to be designed to further reduce harmful emissions into the Earth's atmosphere.

Saumya
26/05/20

GOKHALE MEMORIAL GIRLS' COLLEGE

NAME :- SRIZA CHEL

SEMESTER :- 2nd

COLLEGE ROLL NO :- 21/BAH/0044

C.U ROLL NO :- 212013-11-0114

C.U REGISTRATION NO :- 013-1214-0010-21

ENVIRONMENTAL STUDIES :- AECC2 TUTORIAL

Environmental Pollution

- Environmental pollution: types, causes, effects and controls; Air, water, soil and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste.

AIR POLLUTION

Degradation of air quality and natural atmospheric condition constitute air pollution. The air pollutant may be a gas or particulate matter.

Air pollutants and their effects

Particulate matter – it comprises of small suspended particles such as soot, dust, pesticides, etc., and biological agents such as spores, pollen and dust mites. It causes respiratory ailments such as asthma, chronic bronchitis, etc.,

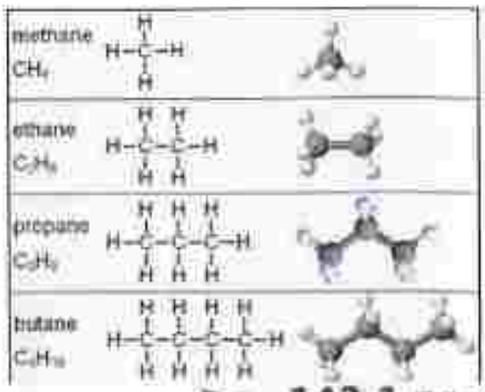
Carbon monoxide – is a product of incomplete combustion of fossil fuels in automobiles. It is highly poisonous to most animals. When inhaled, carbon monoxide reduces the oxygen carrying capacity of blood.

Air pollutants and their effects

Hydrocarbons – hydrocarbons such as methane, are evolved from soil microbes (methanogens) in flooded rice fields and swamps. They are also generated during the burning of coal and petroleum products.

Sulphur dioxide – is released from oil refineries and ore smelters which use the sulphur containing fuels. It causes harmful effects on plants and animals. It causes chlorosis (loss of chlorophyll) and necrosis (localised death of tissues). In human, it causes health problems such as asthma, bronchitis and emphysema.

Nitrogen oxides – It causes reddish brown haze (brown air) in traffic congested city air which contributes to heart and lung problems.

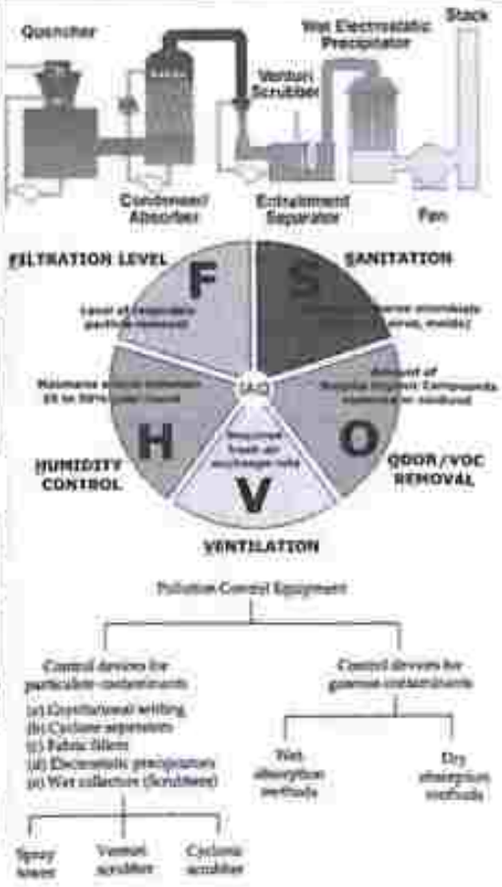


NOx (Nitrogen Oxide)

Nitric Oxide (NO)	Nitrogen Dioxide (NO_2)

Control of air pollution

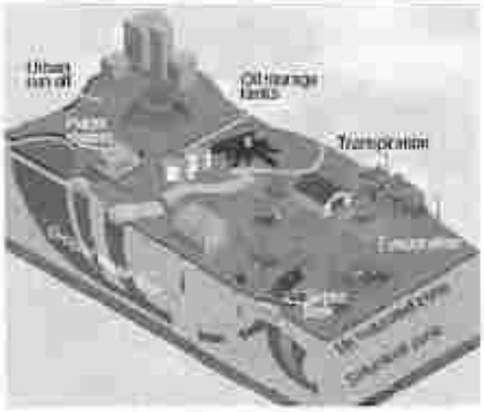
1. The particulates emitted by industries should be controlled by devices such as scrubbers, precipitators and filters.
2. Use of unleaded or low sulphur fuel is to be encouraged.
3. Shifting to non-conventional sources of energy (e.g solar energy, hydel energy, tidal energy, etc.,) in order to reduce the dependance of conventional sources.
4. Smoking in public places should be prohibited, because the cigarette smoke contains carcinogens such as benzopyrene. An average smoker runs the risk of developing heart and lung diseases.
5. Planting of trees along the road sides and around industrial areas.



WATER POLLUTION

Water pollution is defined as the adding of unwanted substances or the change of physical and chemical characteristics of water in any way which makes it unfit for human consumption.

It is caused by waste products of industries (effluents), domestic sewage, oil spillage, agricultural and industrial run off etc..



MORE TO KNOW

REVERSE OSMOSIS (RO)

It is the most efficient way of obtaining purified drinking water. During this process, pressure is applied on the solution which has more concentration. This reverses the natural direction of water flow and osmosis from high gradient to low gradient. This process involves energy expenditure. The membranes used for RO process have a dense barrier layer which allow only the water to pass through and prevents the passage of solutes. Hence, it is best suited for **desalination** of sea water (removal of salt).

Sources and effects of water pollution

Industrial wastes –The industrial effluents containing heavy metals and chemicals such as arsenic, cadmium, copper, chromium, mercury, zinc, nickel, etc,. are directly released into the water bodies such as lakes, ponds and rivers without proper treatment.

These wastes contaminate the water bodies and make them unsuitable for human consumption.

Hot water is another noted pollutantfrom industries.

MORE TO KNOW

MINAMATA DISEASE

Mercury poisoning due to the consumption of fish captured from mercury contaminated **Minamata Bay in Japan** was detected in **1952**. Mercury compound in waste water are converted by bacterial action into extremely toxic **methyl mercury** which can cause numbness of limbs, lips and tongue. It can also cause deafness, blurring of vision and mental derangement.

MORE TO KNOW

Biological magnification of DDT (Dichloro diphenyl trichloroethane) is seen in aquatic food chain. The concentration of DDT gradually increases at each trophic level. DDT inhibits calcium carbonate deposition in the oviducts of certain birds which result in the laying of thin shelled eggs. These eggs can easily break during incubation and the developing embryos are destroyed.

Sources and effects of water pollution...

4. Oil spills – An oil spill is an accidental discharge of petroleum products in oceans and estuaries from capsized oil tankers, offshore drilling and exploration operations.It can cause drastic damage to the marine and coastal bio diversity.
5. Domestic Sewage – It is rich in organic matter and detergents. Decomposition of organic matter increases the nutrient content of the water bodies.
6. Availability of excess nutrients results in algal bloom on the surface of water resulting in the deficiency of oxygen content(BOD – Biological Oxygen Demand). This in turn leads to the death of aquatic organisms. This process is known asEutrophication.

Control of water pollution

1. Sewage treatment plants should be installed to treat sewage before releasing into water bodies.
2. Excessive use of pesticides, herbicides and fertilizers should be avoided.
3. Biological control of insect pests and organic farming is to be followed in order to reduce the dependence on pesticides and inorganic fertilizers.
4. By legislation and strict enforcement.
5. By creating social awareness among people about the water pollution and the need for pure water.

SOIL POLLUTION

Soil pollution is the unfavorable alteration of soil by the addition or removal of substances which decrease soil productivity and ground water quality.

It usually results from different human activities likedumping of waste, use of agrochemicals, mining operationsand urbanization.

SOIL POLLUTION : Causes and effects

Agricultural chemicals such as pesticides, insecticides and inorganic fertilizers may pollute drinking water and can change the chemical properties of the soil adversely affecting the soil organisms.

- Natural Fertilisers
  - Inorganic Fertilisers
    - (a) Gypsum
    - (b) Crushed limestone
    - (c) Sulphur rock phosphates
  - Organic Fertilisers
    - (a) Manure
    - (b) Animal excreta
    - (c) Plant wastes
    - (d) Humus
- Chemical or Synthetic Fertilisers

RADIOACTIVE POLLUTION

The emission of protons, electrons and electromagnetic radiations released by the disintegration of radioactive substances such as radium, thorium, uranium, etc., causeair, water and land pollution.

Effects :

- The ionising radiations can cause mutations.
- Strontium-90 accumulates in bones causing bone cancer.
- Iodine-131 can damage bone marrow, spleen, lymph nodes and can cause leukemia (blood cancer).

Example :

Chernobyl disaster (Ukraine)

The explosion at the Chernobyl nuclear power station was undoubtedly the world's worst nuclear disaster. The deadly radioactive material was released into the atmosphere. The inhabitants of Chernobyl were exposed to radioactivity which was hundred times greater than Hiroshima bomb. Babies were born with stillbirths and people suffered from serious diseases like thyroid cancer.

RADIOACTIVE POLLUTION: PREVENTIVE MEASURES

- Care should be taken to preventthe leakage of radioactive substances from nuclearreactors.
- Radioactive wastes should be disposed off safely.
- Strict measures should be followed in the construction and maintenance of nuclear power plants to prevent nuclearaccidents.
- Control or prevention of nucleartests.

Effects of Radio Active Pollution

- The Diseases include blood in cough
- Ulcer
- Swelling of bone joints
- Cancer
- Lung Cancer
- Skin Cancer
- Bone Cancer
- Eye Problems

MORE TO KNOW

Various laws and rules have been promulgated by the government of India from time to time to control pollution. Some of them are 1974 - Water (prevention, control of pollution) Act.

1980 - Forest Act.

1981 - Air (prevention, control of pollution) Act.

1986 - Environmental pollution Act.

1988 - Motor vehicles Act

NOISE POLLUTION

- Noise may be defined as anunwanted and unpleasantsound that may have adverse effects on animals and humans.
- The unit of sound level is decibels (db).
- Noise level above 120 db is considered harmful to human beings.

a alamy stock photo

MORE TO KNOW

Jet Aircraft (take off)	145 db
Heavy city traffic	90 db
Vaccum cleaner	85 db
Window Air conditioner	60 db
Normal speech	60 db

NOISE POLLUTION..

Sources

- The different sources associated with noise pollution are industrial machinery, road, rail and air transport, loudspeakers, construction equipments,household appliances, crackers, etc..

Effects

- Noise seriously affects heartbeat, breathing, and can cause constriction of blood vessels.
- It can cause headache, sleeplessness, irritability and may seriously affect the productive performance of human.

NOISE POLLUTION

- Loud noises (above 130 db) can cause damage to the ear drum, hair cells of cochlea (organ of hearing) and thereby resulting in temperory or permanent loss of hearing.
- It can also seriously affect the concentration of students while learning.

Effects of noise pollution

- Generally, problems caused by noise pollution include stress related illnesses, speech interference, hearing loss, sleep disruption, and lost productivity.
- Rise in blood pressure
- Physical development of fetous.
- Reduce concentration.
- Causes serious mental disorders.

Decibels	Sources	Intensity
170 – 200	stun grenades/space shuttle engine	shatters eardrum
140 – 170	jet engine/firearms/rock concert peak level	damage to eardrum
120 – 130	thunder/jackhammer/loud car stereo	damage to eardrum
90 – 110	train/motorcycles/chainsaw/ marching band	extremely loud
80 – 90	most alarm clocks/vacuum cleaners	extremely loud
60 -70	street noise/conversation/dishwasher/ AC	loud
50 – 55	rain/normal office or home noise/AC	medium
30 – 40	library/whispers/sleeping bedroom/PC	low
0 - 20	almost total quiet	

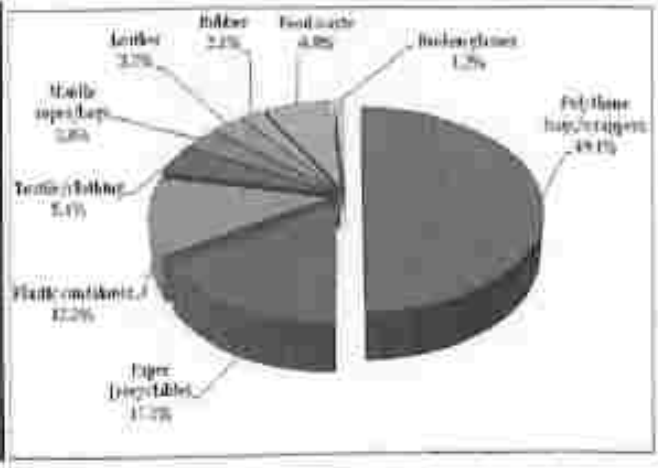
Waste Generation in India

- India produces 55 million tons of municipal solid waste annually atpresent.
- Per capita generation of waste varies from 200 gm to 600 gm percapita / day.
- Average generation rate at 0.4 kg per capita per day in towns.
- Collection efficiency ranges between 50% to 90% of the solid wasteare generated.

4.7 million tonnes of garbage generated daily in the world.

55 million tons of MSW is generated in India per year

The estimated annual increase in per capita waste generation is about **1.33 % per year**



WHAT IS SOLID WASTE?

- Solid or semi-solid material (including gases and liquids in containers) which are non soluble in nature are solid waste.

- Solid waste includes agricultural refuse, demolition waste, industrial waste, mining residues, municipal garbage, sewage sludge, etc.

[Biodegradable] can be degraded paper, wood, fruits and others)

[Non-biodegradable] cannot be degraded plastics, bottles, old-machines, containers and others)

WASTE is a any material, Thrown away" regarded as useless and unwanted (at a certain time and place)

TYPES OF SOLID WASTE

- Solid waste can be classified into different types depending on their source:
- Household waste or municipal waste: includes food, paper, cardboard, plastic, textiles, leather, glass, metal, ashes, electronics waste etc.
- Industrial waste: includes toxic chemicals, oil, debris from construction site, packaging waste, ashes etc.
- Biomedical waste or hospital waste: medicine bottles, expired medicines, syringes, medical instruments such as scissors, blades etc.

TYPES OF SOLID WASTE

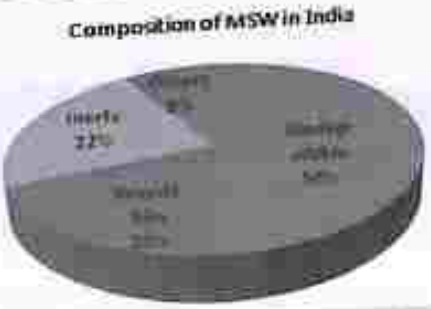
Agricultural waste includes pesticides, crops, water coming from the fields also consists of small amount of toxic chemicals

Nuclear waste includes radioactive substances coming from reactors, fuel (uranium, thorium, plutonium etc). Its highly dangerous and requires proper disposal.

Hazardous waste includes toxic chemical, acids, corrosive, ignitable and reactive materials, gases etc.

MAGNITUDE OF PROBLEM

- With urban population increasing between 3 – 3.5% per annum
- Yearly increase in waste generation is around 5% annually India produces 42.0 million tons of municipal solidwaste annually at present.
- Per capita generation of waste varies from 200 gm to 600 gm per capita / day.



Municipal Solid Waste in India

- 30% - 55% Compostable / Bio-degradable Matter
  (can be converted into manure)
- 40% - 45% Inert material
  (to go to landfill)
- 5% - 10% Recyclable materials
  (Recycling)
- These percentages vary from city to city depending on food habits

9,000 tonnes

Daily garbage generation

50%
Amount of waste fit for composting

30%
Amount of waste is recyclable

20%

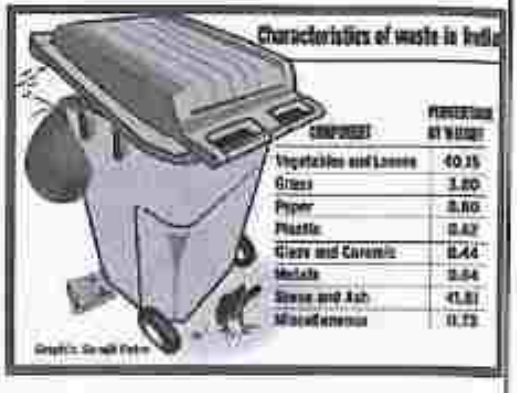
Only 20 per cent waste would reach the landfills, if effective segregation is done

Kinds of waste generated in Delhi daily

- Electronic waste **30 tonnes**
- Biomedical waste **15 tonnes**
- Construction/ demolition waste **4,000 tonnes**
- Plastic **800 tonnes**

15%
Delhi covered under formal door-to-door collection. This means the rest goes to landfills

New Delhi: Capital of India



Samanta
25/05/2022