UNIVERSITY OF CALCUTTA

Notification No. CSR/ 12 /18

It is notified for information of all concerned that the Syndicate in its meeting held on 28.05.2018 (vide Item No.14) approved the Syllabi of different subjects in Undergraduate Honours / General / Major courses of studies (CBCS) under this University, as laid down in the accompanying pamphlet:

List of the subjects

Sl. No.	Subject	Sl. No.	Subject
1	Anthropology (Honours / General)	29	Mathematics (Honours / General)
2	Arabic (Honours / General)	30	Microbiology (Honours / General)
3	Persian (Honours / General)	31	Mol. Biology (General)
4	Bengali (Honours / General /LCC2 /AECC1)	32	Philosophy (Honours / General)
5	Bio-Chemistry (Honours / General)	33	Physical Education (General)
6	Botany (Honours / General)	34	Physics (Honours / General)
7	Chemistry (Honours / General)	35	Physiology (Honours / General)
8	Computer Science (Honours / General)	36	Political Science (Honours / General)
9	Defence Studies (General)	37	Psychology (Honours / General)
10	Economics (Honours / General)	38	Sanskrit (Honours / General)
11	Education (Honours / General)	39	Social Science (General)
12	Electronics (Honours / General)	40	Sociology (Honours / General)
13	English ((Honours / General/ LCC1/ LCC2/AECC1)	41	Statistics (Honours / General)
14	Environmental Science (Honours / General)	42	Urdu (Honours / General /LCC2 /AECC1)
15	Environmental Studies (AECC2)	43	Women Studies (General)
16	Film Studies (General)	44	Zoology (Honours / General)
17	Food Nutrition (Honours / General)	45	Industrial Fish and Fisheries – IFFV (Major)
18	French (General)	46	Sericulture – SRTV (Major)
19	Geography (Honours / General)	47	Computer Applications – CMAV (Major)
20	Geology (Honours / General)	48	Tourism and Travel Management – TTMV (Major)
21	Hindi (Honours / General /LCC2 /AECC1)	49	Advertising Sales Promotion and Sales Management –ASPV (Major)
22	History (Honours / General)	50	Communicative English –CMEV (Major)
23	Islamic History Culture (Honours / General)	51	Clinical Nutrition and Dietetics CNDV (Major)
24	Home Science Extension Education (General)	52	Bachelor of Business Administration (BBA) (Honours)
25	House Hold Art (General)	53	Bachelor of Fashion and Apparel Design – (B.F.A.D.) (Honours)
26	Human Development (Honours / General)	54	Bachelor of Fine Art (B.F.A.) (Honours)
27	Human Rights (General)	55	B. Music (Honours / General) and Music (General)
28	Journalism and Mass Communication (Honours / General)		

The above shall be effective from the academic session 2018-2019.

SENATE HOUSE
KOLKATA-700073
The 4th June, 2018

Paul 4/6/18
(Dr. Santanu Paul)
Deputy Registrar

University of Calcutta

Under Graduate Curriculum under Choice Based Credit System (CBCS)

Syllabus forAbility Enhancement Compulsory Course-2 (AECC-2) in
Environmental Studies

Semester-2

Total Marks-100*(Credit -2)*
(50 Theory-MCQ type + 30 Project + 10 Internal Assessment + 10 Attendance)

[Marks obtained in this course will be taken to calculate SGPA & CGPA]

Theory

Unit 1	**Introduction to environmental studies**	2 lectures
	•Multidisciplinary nature of environmental studies; •Scope and importance; Concept of sustainability and sustainable development.	
Unit 2	**Ecology and Ecosystems**	6 lectures
	•Concept of ecology and ecosystem, Structure and function of ecosystem; Energy flow in an ecosystem; food chains, food webs; Basic concept of population and community ecology; ecological succession. •Characteristic features of the following: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, wetlands, rivers, oceans, estuaries)	
Unit 3	**Natural Resources**	8 lectures
	• Concept of Renewable and Non-renewable resources • Land resources and landuse change; Land degradation, soil erosion and desertification. •Deforestation: Causes, consequences and remedial measures •Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). •Energy resources: Environmental impacts of energy generation, use of alternative and nonconventional energy sources, growing energy needs.	
Unit 4	**Biodiversity and Conservation**	8 lectures
	•Levels of biological diversity: genetic, species and ecosystem diversity; • Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots •India as a mega-biodiversity nation; Endangered and endemic species of India •Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; •Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. •Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	
Unit 5	**Environmental Pollution**	8 lectures
	• Environmental pollution: concepts and types, • Air, water, soil, noise and marine pollution- causes, effects and controls • Concept of hazards waste and human health risks • Solid waste management: Control measures of Municipal, biomedical and e-waste.	

Unit 6	**Environmental Policies and Practices**	7 lectures
	•Climate change, global warming, ozone layer depletion, acid rain and their impacts on human communities and agriculture •Environment Laws: Wildlife Protection Act; Forest Conservation Act. Water (Prevention and control of Pollution) Act; Air (Prevention & Control of Pollution) Act; Environment Protection Act; Biodiversity Act. •International agreements: Montreal Protocol, Kyoto protocol and climate negotiations; Convention on Biological Diversity (CBD). •Protected area network, tribal populations and rights, and human wildlife conflicts in Indian context.	
Unit 7	**Human Communities and the Environment**	6 lectures
	•Human population growth: Impacts on environment, human health and welfare. •Case studieson Resettlement and rehabilitation. • Environmental Disaster: Natural Disasters-floods, earthquake, cyclones, tsunami and landslides; Manmade Disaster- Bhopal and Chernobyl. •Environmental movements: Bishnois.Chipko, Silent valley,Big dam movements. •Environmental ethics: Role of gender and cultures in environmental conservation. •Environmental education and public awareness	
Project/ Field work		Equal to 5 lectures
	•Visit to an area to document environmental assets: Natural resources/flora/fauna, etc. •Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. •Study of common plants, insects, fish, birds, mammals and basic principles of identification. •Study of ecosystems-pond, river,wetland, forest,estuary and agro ecosystem.	
	Total	50 Lectures

Suggested Reading:

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CU ROLL NO. – 202223-21-0001

CU REG NO.- 222-1111-0018-20

COLLEGE ROLL No.- PLSA20M627

SEMESTER- II

SUBJECT- AECC ENVS

TOPIC- WATER POLLUTION

Water Pollution may be defined as an alteration in physical, chemical and biological characteristics of water brought about mainly by human activities and natural resources which may cause harmful effects on human and aquatic biota.

Types of Water Pollution-

- Physical Pollution of water
- Chemical Pollution of water
- Biological Pollution of water
- Physiological Pollution of water

Physical Pollution of Water: This includes discharge of high-temperature water, floating debris, foam into a natural body of water affecting the downstream habitats, therefore altering the ecological balance.

Factors causing physical pollution of water-

- **Color-** It may affect the quality of sunlight that penetrates to a given depth inhibiting plant and animal metabolism.

- **Turbidity-** Turbidity in water mainly arises from colloidal matter and the degree of turbidity of a water course may be taken as a measure of the intensity of pollution which in unsuitable for industrial purpose and for domestic use.
- **Taste-** Industrial effluents containing Fe, Mn, free Chlorine, Phenols and aquatic actinomycetes and the decomposed organic matter, algae fungus, bacteria, and pathogens impart peculiar taste.
- **Odor-** Micro-organisms like algae, Oscillatoria cause muddy odor, algae, Anabaena produces a strong grassy odor. Protozoa imparts fishy odor to water.
- **Foam-** Foam is produced by soaps, detergents and untreated organic effluents from paper and pulp industries.
- **Thermal Pollution of water-** The heated water of power plants has reduced the amount of dissolved oxygen (DO) content due to which organic matter degrades faster.

Chemical Pollution of Water: The chemical pollution of water by organic pollutants or inorganic pollutants or by both causes changes in acidity, alkalinity or pH, dissolved oxygen (DO) and other gases in water. Industrial and agricultural work involves the use of many different chemicals that can run-off into water and pollute it. Metals and solvents from industrial work can pollute rivers and lakes. These are poisonous to many forms of aquatic life and may slow their development, make them infertile or even result in death.

Biological Pollution of Water: Biological Pollution is brought about by bacteria, viruses, algae, diatoms like protozoa, rotifers, crustaceans and plant toxins create infections of intestinal tract, polio and infectious hepatitis.

Physiological Pollution of Water: Physiological pollution of water is caused by chlorine, sulphur dioxide, hydrogen sulphide, ketones, phenols. It makes water taste like medicine and produces offensive odour.

Sources of Water Pollution-

I. **Sewage-** Municipal sewage consist of the faeces and nitrogenous waste of animals. It is rich in organic matter and nitrogen compounds. Due to the discharge of untreated sewage into the drinking water resources, such as river, lakes etc., and as it is allowed to accumulate, it will have serious effects in the ecosystem.

II. **Industrial Wastes and effluents-** Treated and untreated discharges from fertilizer factories, distilleries, paper mills etc., can cause dangerous water pollution. There is a depletion in the oxygen content of water. These wastes alter the temperature of the water and change the colour of the water.

III. **Thermal Pollution-** The discharge of heat from power station, raises the temperature of the water of river, streams, lakes, estuaries etc. The

metabolic rate and oxygen consumption of the micro-organisms is increased.

IV. **Mercury Pollution-** It is the by-product of various chemical processes and a constituent of certain agricultural fungicides. The level of mercury in freshwater lakes and rivers has been rising in recent years.

V. **Silt Pollution-** Dust and dirt are the components of soil, which all together are called silt. Silting can choke rivers and irrigation channels and many edible fishes, such as Salmon, are unable to spawn on silted gravel beds.

VI. **Pollution by asbestos-** Asbestos is a fibrous material and its full disintegration is almost impossible. The asbestos scraps reach the water bodies and cause pollution.

VII. **Fertilizers and detergents-** In agriculture to increase the yield large amounts of fertilizers and other soil activities are used. Some of these runoffs the soil through irrigation, rainfall, drainage, etc., into streams and rivers and causes environmental pollution.

Effects Of Water Pollution-

The effect of the water pollution depends on the type of pollutants which brings about physical and chemical changes that make the water unfit for drinking and harmful to aquatic life.

- **Effects on Aquatic Ecosystem**- Organic and inorganic wastes of water decreases the dissolved O2 (DO) content of the water. Water having DO

content bellow 8 mg/lit is considered as contaminated water. Several factors determine the amount of DO present in water.

- **Biological Magnification**- 'The process through which certain pollutants get accumulated in tissues in increasing concentration along the food-chain is called biological magnification. The non-degradable oregano chlorine compounds such as DDT, some other pesticides are the most persistent pesticides.
- **Eutrophication:** The process of nutrient enrichment of water, which often leads to the loss of species diversity is called eutrophication. The addition of inorganic compounds and decomposition of organic wastes in water bodies increase the nutrient content of water, which is responsible for growth of algae, especially blue green algae, and totally cover the water surface.
- **Effects on Human Health**- The water contaminated with heavy metals can cause serious health problems. Pathogens like virus, bacteria, parasitic protozoa and worms which is a source of water-borne disease like jaundice, cholera, typhoid etc.
- **Hazards of Groundwater Pollution**- Groundwater gets contaminated due to seepage from industrial wastes and agricultural run-off. Presence of high amount of nitrate in drinking water is dangerous for human health and may be fatal for infants.

Control Of Surface Water Pollution-

I. Controlling amount of nutrients and organic substances entering the lakes.
II. Microbial decomposition of bottom sediments by various means.
III. Removal of dissolved nutrients from water by chemical and physical process.
IV. Reducing the amount of nutrients recycled into water by the death of algae and higher plants by mechanical removal of the algal boom and higher plants.

V. Setting up of natural food-webs where fishes are the consumers, and which can remove the algae.

VI. Removal of asbestos fibres by filtration through diatomaceous earth.

VII. Monitoring of the levels of toxic materials in the aquatic ecosystem.

VIII. The effluent should meet the CPCB standards before discharge into the surface of water bodies.

IX. Disposal of treated municipal waste, regular monitoring of water quality rivers and lakes subjected to pollution.

X. The contaminant sources should be carefully surveyed in case of drinking water.

XI. In case of toxic industrial effluents, steps should be taken for predisposal ‘treatment by industry itself strictly.’

XII. Location of wells, tube wells for drinking water should be selected with utmost caution.

XIII. It is not advisable to tap the uppermost aquifer in case of drinking water wells.

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COLLEGE ROLL.NO – PLSA20F622.

CU ROLL.NO – 202223-11-0002.

CU REGISTRATION.NO – 223-1211-0002-20.

DEPARTMENT - BAHONS.POLITICAL SCIENCE .

SEMSTER – 2

PAPER NAME – ENVS.

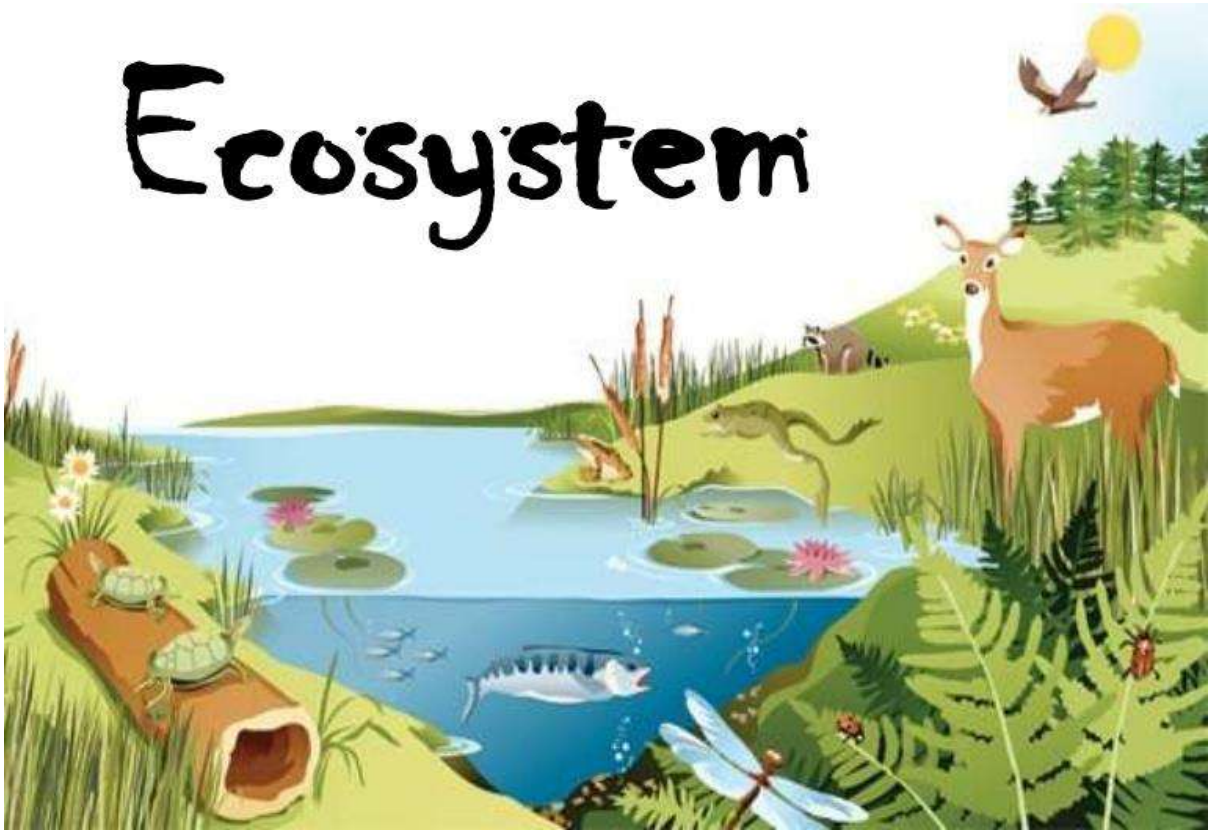
TITLE – ECO-SYSTEM.

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my Professor Gonsalves and other Professor for their able guidance and support in completing my Project . This was a wonderful project and I look forward for more such projects. I learnt a lot new things while doing this project. Also I would like to extend my sincere regards to my parents and friends to their timely support.

INTRODUCTION

ECOSYSTEM is a geographic area where plants, animals , and other organisms, as well as weather and landscape work together to form a bubble of life . Ecosystems contain biotic or living , parts, as well as abiotic factors .



ECO-SYSTEM

STRUCTURAL COMPONENTS OF ECO – SYSTEM :

1. **BIOTIC COMPONENTS-** All the living creatures in the eco system. Biotic factors refer to all living organism from animals and humans to plants, fungi etc.
2. **ABIOTIC COMPONENTS** – All the non-living factors present in the eco-system are known as abiotic components.

TYPES OF ECOSYSTEM :

1. **Terrestrial Ecosystem** – Terrestrial Ecosystem are exclusively land – based ecosystems.

   They are further classified into :

- **Forest Ecosystem** – consists of several plants , animals and micro organism that live in coordination with the abiotic factors of the environment . Forest help in maintaining the temperature of the earth and are the major carbon sink .

GRASSLAND ECOSYSTEM

- **Grassland Ecosystem** – In a grassland ecosystem , the vegetation is dominated by grasses and herbs . temperate grasslands . savanna grasslands are some of the examples of grassland ecosystem.
- **Tundra Ecosystem** – are devoid of trees and are found in cold climates or where rainfall is scarce . These are covered with snow for most of the year . The ecosystem in the Arctic or mountain tops is tundra type.
- **Desert Ecosystem** – Deserts are found throughout the world. These are regions with very little rainfall. The days are hot and the nights are cold.

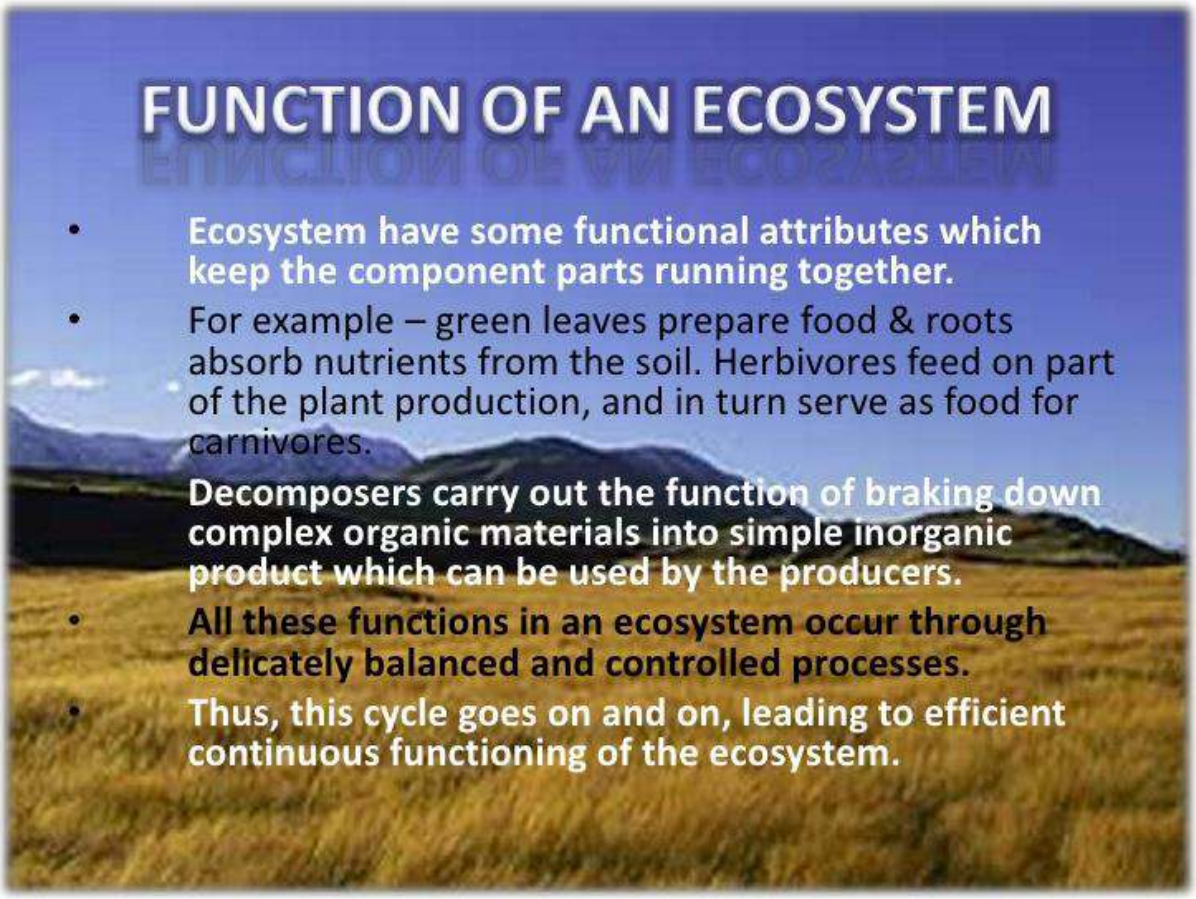
2. **Aquatic Ecosystem** – Aquatic Ecosystem are ecosystems present in a body of water. These can be further divided into two types:

- **Freshwater Ecosystem** – It is an aquatic ecosystem that includes lakes, ponds, rivers, streams and wetlands.
- **Marine Ecosystem** – It includes seas and oceans. These have a more substantial salt content and greater biodiversity in comparison to the freshwater ecosystem

MARINE ECOSYSTEM

FUNCTIONS OF ECOSYSTEM:

1. It regulates the essential ecological processes, supports life systems and renders stability.
2. It is also responsible for the cycling of nutrients between biotic and abiotic components.
3. It maintains a balance among the various trophic levels in the ecosystem.
4. The abiotic components help in the synthesis of organic components that involves the exchange of energy.



FUNCTIONS OF ECOSYSTEM

IMPORTANT ECOLOGICAL CONCEPTS:

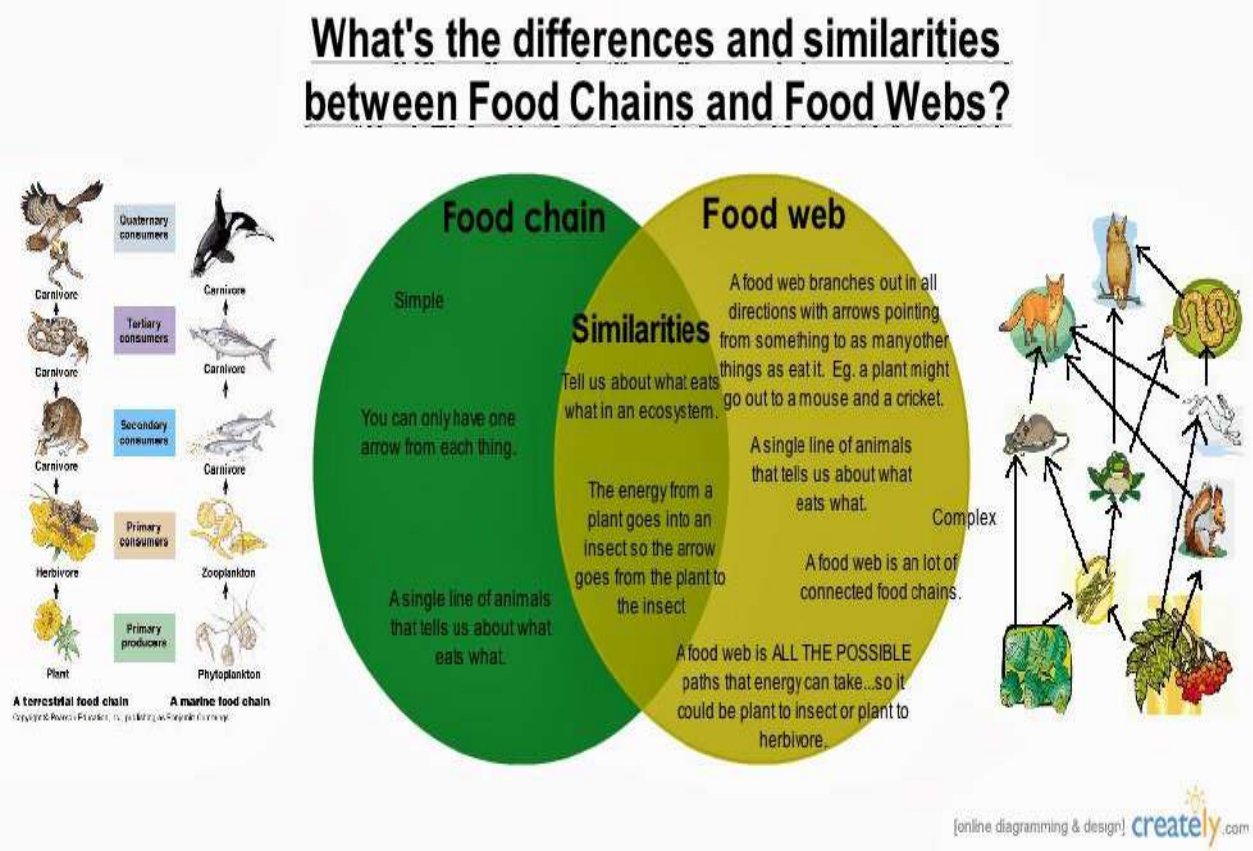
ENERGY FLOW - is the flow of energy through living things within an ecosystem . All living organisms can be organized into producers and consumers and those producers and consumers can further be organized into a food chain. Each of the levels within the food chain is a trophic level. In order to more efficiently show the quantity of organisms at each tropic level, these chain are then organized into trophic pyramids.

FOOD CHAIN – The sun is the ultimate source of energy on earth . It provides the energy required for all plant life. The plants utilize this energy for the process of photosynthesis which is used to synthesis their food.

During this biological process ,light energy is converted into chemical energy and is passed on through successive levels. The flow of energy from a producer to a consumer and eventually to an apex predator or a detritivore is called the Food Chain. Dead and decaying matter along with organic debris .is broken down into its constituents by scavengers . The reducers then absorb these constituents. After gaining the energy , the reducers liberate molecules to the environment ,which can be utilized again by the producers.

FOOD CHAIN

FOOD WEB – Food web is a network of interconnected food chains . It comprises all the food chains within a single ecosystem . It helps in understanding that plants lay the foundation of all the food chains. In a marine environment , phytoplankton forms the primary producer.



DIFFERENCE BETWEEN FOOD CHAIN AND FOOD WEB.

POPULATION ECOLOGY

Population Ecology is a sub- field of ecology that deals with the dynamics of species populations and how these populations interact with the environment , such as birth and death rates . The discipline is important in conservation biology especially in the development of population viability analysis which makes it possible to predict the long term probability of a species persisting in a given patch of habitat . Although population ecology is a subfield of biology.

ECOLOGICAL SUCCESSION

Ecological Succession is the process of change in the species structure of an ecological community over time. The time scale can be decades or even millions of years after mass extinction. The community begins with relatively few pioneering plants and animals and develops through increasing complexity until it becomes stable or self – perpetuating as a climax community . The “engine” of succession , the cause of ecosystem change , is the impact of established organisms upon their own environments . A consequence of living is the sometimes subtle and sometimes overt. It is a phenomenon or process by which an ecological community undergoes more or less orderly and predictable changes following a disturbance or the initial colonization of a new habitat .

CONCLUSION

Everyone in the world depends completely on Earth’s ecosystem and the services they provide such as food, water , disease management etc. Over the past 50 years , Humans have changed these ecosystem more rapidly than in any comparable period of time in Human history which effected the life of human beings and other animals severely common effects are flood, inferior oxygen quality etc. Recently there is an imbalance in ecosystem which need to be balanced by taking some efforts by human beings like planting of trees, reducing pollute.

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Water Pollution

Department Of Political Science

Semester 2

College Roll No: PLSA20M629

CU Roll No: 202223-21-0002

CU Registration No: 223-1111-0020-20

Acknowledgement

"It is impossible to prepare a project without the help and support of other people. This is of course no exception."

From the very beginning of this project, I wanted to express my sincerity and sincerity to all those who helped me in this project. Sincere obligation. Without your active guidance, help, cooperation, and encouragement from, the project would not progress. I am deeply grateful to my teacher, ***Dr. Sushmita Gonsalves***, for her guidance and support in the implementation of this project. I am also deeply grateful to my parents; they have always supported me mentally and financially. Last but not least, I would like to thank all my friends who directly or indirectly helped me complete this project. Any omission in this brief acknowledgment does not mean there is no gratitude.

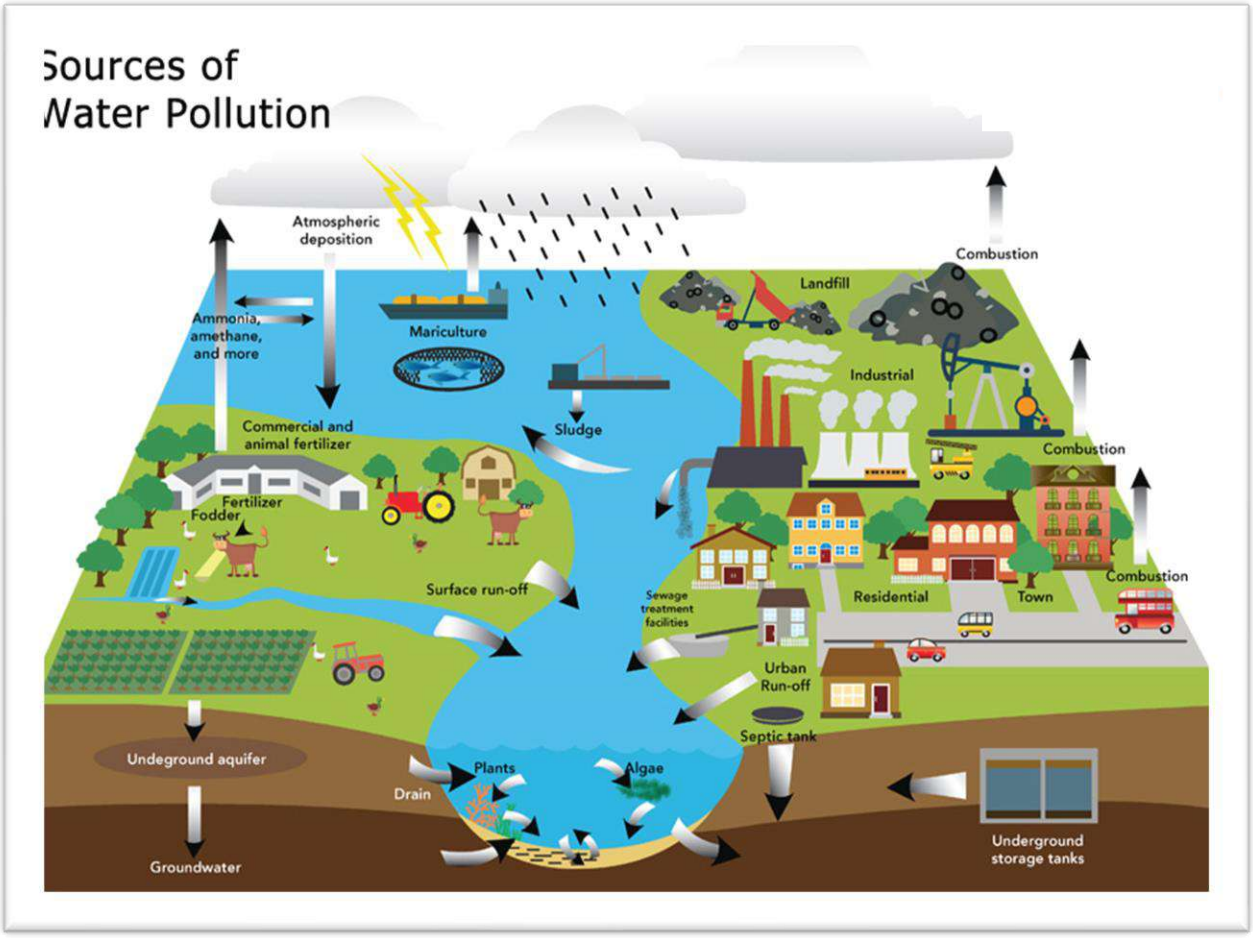
Water is the driving force of all nature

- Leonardo Da Vinci

Pollution occurs when *toxins* are introduced into the natural environment and cause harm. Chemical substances or energy, such as noise, heat, or light, can pollute the environment. Pollutants are either foreign substances/energies or naturally occurring pollutants that contribute to pollution.

Water pollution is described as the addition of *organic*, *inorganic*, *biological*, *radiological*, or *thermal* substances to water that impair the quality of the water and render it unfit for use. Water contamination has expanded to groundwater, as well as seas and oceans, and is no longer limited to the surface. Water contamination is wreaking havoc on most of the city's major water bodies. Water pollution is mostly caused by the disposal of waste water from industries, untreated trash from municipalities, and solid waste dumping near water sources.

❖ **An illustration showing different types of waste dumped into water bodies**

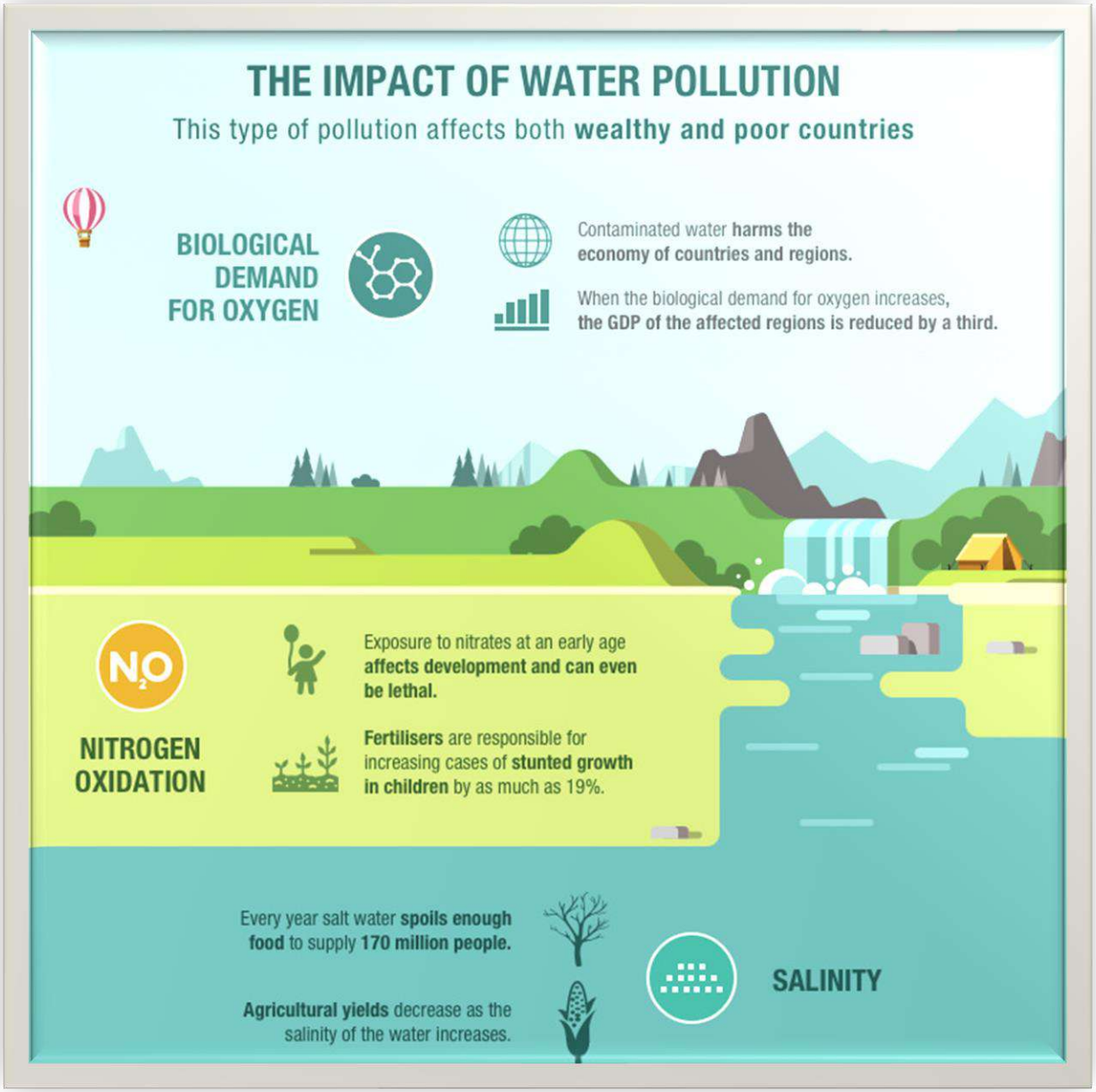


❖ **A diagram showing sources of water pollution**

Sources of water pollution can either be **point** or **non-point sources**. Point sources are those whose impact can be traced back to them. The pollution is carried directly from the source to the water body in this case. Point sources are simple to control. Diffused sources are another name for non-point sources. They are difficult to identify and can be numerous. They change both spatially and temporally, making them difficult to predict. Wastewater from home, commercial, and industrial enterprises that are connected to the public sewerage system is referred to as *community wastewater*. Human and animal excreta, food leftovers, cleaning chemicals, detergents, and other pollutants are all found in sewage. **Industrial wastes**: Industries emit a variety of inorganic and organic pollutants that can be extremely hazardous to living things. **Agricultural sources**: Fertilizers contain plant nutrients such as nitrogen, phosphorous, and potassium. Excess fertilizers may reach the groundwater by leaching or may get mixed with surface water bodies such as rivers, lakes, and ponds via drainage and runoff. Chemicals such as pesticides, insecticides, herbicides, fungicides, rodenticides, and soil fumigants contain harmful substances such as chlorinated hydrocarbons, organophosphates, metallic salts, carbonates, thiocarbonates,

derivatives of acetic acid etc. Many of these chemicals are non-biodegradable and have a long residue life. Animal wastes such as excreta from cattle, poultry farms, piggeries, and slaughterhouses can also reach the local water bodies through runoff and surface leaching during the rainy season. **Thermal Pollution**: Thermal and nuclear power facilities that use water as a coolant are major sources of thermal pollution. They return the hot water to its original source after utilising it. An abrupt increase in water temperature depletes dissolved oxygen levels, resulting in the death of many fish and other aquatic species. **Groundwater Pollution**: Due to seepage, groundwater is at risk of contamination. **Marine Pollution**: Oceans are the ultimate sinks for all pollutants, both natural and man-made. Pollutants are discharged into the sea by rivers. Coastal cities' sewage and rubbish are usually thrown into the sea. Navigational discharges of oil, grease, detergents, ballast waters, sewage, garbage, radioactive wastes, and offshore oil spills are all sources of ocean pollution.

❖ **An oil spill in the middle of an ocean causing the greenish colour of water**



❖ **A diagram showing impact of water pollution**

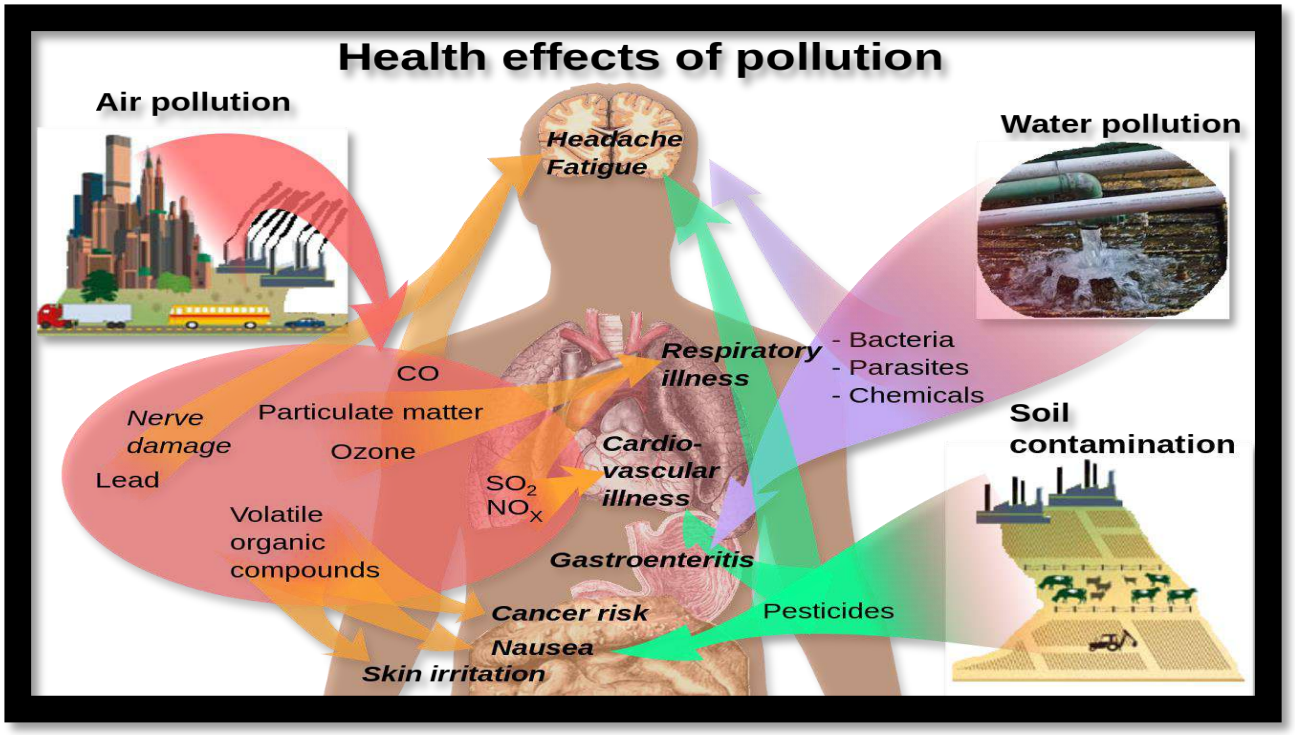
<u>Effects of water pollution</u>: Because of the increased biological and chemical oxygen demand required to decompose the organic and inorganic pollutants present in the water, polluted water has lower dissolved oxygen levels, which can endanger or even kill delicate creatures like *plankton, molluscs*, and some fish species. Hot waters released by industry reduce dissolved oxygen levels, putting the viability of aquatic life at jeopardy.

Effects of water pollution on human health: Presence of abundance nitrate in drinking water is perilous for human wellbeing and might be lethal for new-born children. Abundance nitrate in drinking water collaborates with haemoglobin to shape non-useful methaemoglobin which disables oxygen transport. This condition is called methemoglobinemia or blue child disorder. Overabundance fluoride in drinking water causes neuro-solid issues, gastrointestinal issues, teeth distortion, solidifying of bones and hardened and excruciating joints (skeletal fluorosis). High convergence of fluoride particles is available in savouring water 13 territories of India. The greatest degree of fluoride, which the human body can endure is 1.5 parts per million. Long haul ingestion of fluoride particles causes fluorosis. Overexploitation of groundwater may prompt draining of arsenic from soil and rock sources and debase groundwater. Ongoing openness to arsenic causes dark foot illness. It likewise causes loose bowels, fringe neuritis, hyperkeratosis and furthermore lung and skin disease. Arsenic tainting is a major issue in the cylinder very much burrowed spaces of the Gangetic delta. Natural amplification and eutrophication.

❖ **Creative representation of the phrase "just like a tin can rusts (i.e., fades) away, so will the water bodies if we keep polluting them**

❖ **Artist's interpretation on how humans are rapidly destroying the nature**,

❖ **An oil spill in the middle of a river**



- **Health effects of water pollution shown in the above diagram**

Control measures: Before releasing sewage water and industrial effluents into bodies of water, they should be treated. Before being released from power plants, hot water should be allowed to cool. Domestic washing (clothing and utensils) should be forbidden in drinking water sources such as tanks, streams, and rivers. Use of fertilisers and pesticides in excess should be avoided. It is important to promote organic farming and the efficient use of animal waste as fertiliser. The aquatic weed water hyacinth can detoxify water by absorbing harmful chemicals and a variety of heavy metals. ***Bigoli,*** a by-product of the paper industry that resembles sawdust and contains oil zapper microorganisms, can be used to clean oil spills in water.

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Calcutta University Registration number: 223-1211-0003-20

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I would like to thank our professor of Environmental Science, our Principal and the University of Calcutta, for giving me the opportunity to do this project work. I came across a lot of new information about Pollution. I would also like to thank my family and my fellow friends who helped me to make this project possible.

Pollution in India

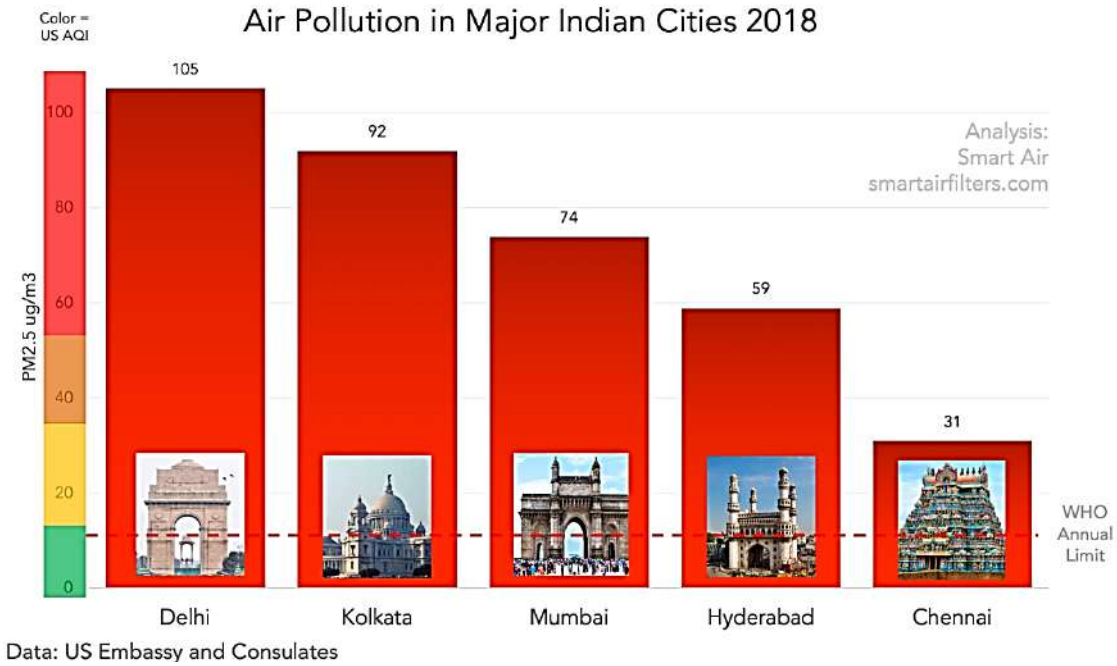
Vehicular Pollution in New Delhi

Indian industries have expanded very rapidly in the last 30 years, especially in urban areas. Rapid growth in industrialization is leading to many environmental issues, including emission of uncontrolled pollutants (CPCB, 2010). The emission of vehicles, municipal solid waste dumping sites, real estate development, e-waste processing sites, destruction of forests, and land degradation due to urbanization are the other sources of pollution. Several industries established near or in urban areas are polluting the environment heavily. These are aluminum (Al) and zinc (Zn) smelter industries, cement, chlorine (Cl), copper (Cu) smelters, fertilizer, iron and steel industries, oil refineries, pharmaceuticals and petrochemicals, pulp and paper industries.

Pollution in the slums in Mumbai

In India, urbanization has witnessed unique growth over the past 40 years. During the last 50 years, the urban population of India has grown nearly five times (around 400 million people live in cities, in sharp contrast to 60 million in 1947). About 140 million people will move to the cities by 2020 in India, and another 700 million by 2050. The number of Indian megacities will increase from the current three (Mumbai, Delhi, and Kolkata) to six (including Bangalore, Chennai, and Hyderabad) by 2021. That increasing population results in rapid consumption of energy and other resources, which is contributing to urban population. Indian urban areas contain high levels of criteria pollutants like SO2 and NOx, greenhouse gases, ozone precursors, and aerosols. The state of world cities report (2012) shows that Mumbai and New Delhi perform weakly on economic and environment dimension. Thus, Indian cities are growing in an unsustainable manner compared to other global cities, like Vienna and Tokyo.

Air pollution is a serious health issue. Of the 30 most polluted cities in the world, 21 were in India. As per a study based on 2016 data, at least 140 million people in India breath air that is 10 times or more over the WHO safe limit. Emissions come from vehicles and industry, whereas in rural areas, much of the pollution stems from biomass burning for cooking and keeping warm. In autumn and spring months, large scale crop residue burning in agricultural fields – a cheaper alternative to mechanical tilting – is a major source of smoke, smog and particulate pollution. India has a low per capita emissions of greenhouse gases but India as a whole is the third largest greenhouse gas producer after China and the United States. A 2013 study on non-smokers has found that Indians have 30% weaker lung function than the Europeans. The AIR (Prevention and Control of Pollution) Act was passed in 1981 to regulate air pollution but has failed to reduce pollution because of poor enforcement of the rules.



Air Pollution in major Indian cities

Crop Residue burning in villages causes air pollution

Around 80% of India's water is severely polluted because people dump raw sewage, silt and garbage into the country's rivers and lakes. This has led to water being undrinkable and the population have to rely on illegal and expensive sources. Each year, more than 1.5 million Indian children die from diarrhea. Around 70% of wastewater goes untreated and each day, more than 40 million liters of wastewater flows directly into India's lakes, rivers and ocean. Eventually, contaminated water also enters the groundwater. Because of this, proper waste management and sewage pollution cannot occur, upsetting the irrigation system. The crops are not able to grow because of the infectious bacteria and disease in the water. Due to the poor infrastructure and absence of sewage control, 38 million Indians suffer from waterborne diseases like typhoid, cholera and hepatitis every year. Over the last decade, the frequency of this illnesses remained at the same level.

Toxic foam in the Yamuna River

LURKING DANGER

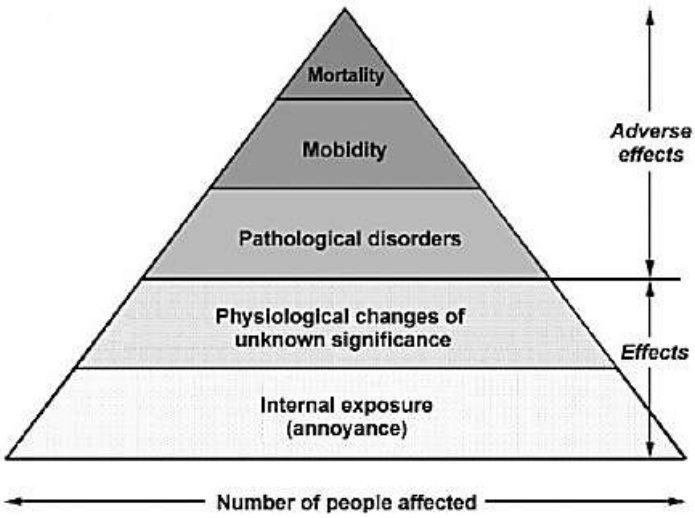
WATER-BORNE DISEASES CLAIMING LIVES

Year	Cholera	ADD*	Typhoid	Viral Hepatitis
2014	05	1,337	425	400
2015	04	1,353	452	435
2016	03	1,555	511	451
2017	03	1,362	496	537
2018	06	1,450	399	584
TOTAL	21	7,057	2,283	2,407

SOURCE: CBHI & Ministry of health | *Acute Diarrhoeal Diseases

Figure 2: In 2018, polluted water claimed 7 lives every day

Noise pollution is one of the major environmental concerns in India today and sadly many are unaware of the hazards it can cause. It is very unfortunate that we all are subjected to some form of loud noises for a considerable amount of time, during the day. It is a daily dilemma to bear with the unnecessary havoc created by the blowing of horns on the road, the madness created by the loudspeakers, the festive-time expression of happiness, any procession being carried through the streets, the too much of background scores of Indian melodramatic serials creating a mess in every household.



The Effects of noise pollution from most common (bottom) to most severe (top)

Soil pollution as a part of land degradation is caused by the presence of xenobiotics (human-made) chemicals or other alteration in the natural soil environment. It is typically caused by industrial activity, agricultural chemicals or improper disposal of waste. The most common chemicals involved are petroleum hydrocarbons, polynuclear aromatic hydrocarbons, pesticides, lead, and other heavy metals.

The concern over soil contamination stems primarily from health risks, from direct contact with the contaminated soil, vapor from the contaminants, or from secondary contamination of water supplies within and underlying and underlying the soil.

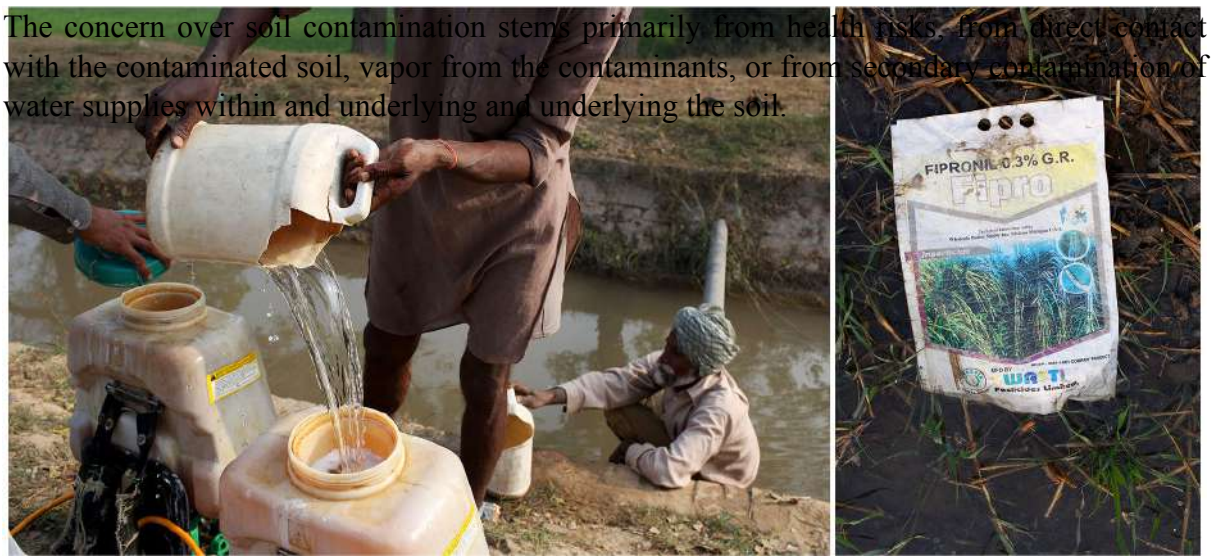


Figure 3: In 2013, Pesticides spiked Uranium and Mercury levels in Punjab's soil

However, various policies and programs have been implemented in India to address the issue of pollution. The success and efficacy of these programs has been contingent across various stakeholders. The most recent policy to tackle air pollution is the National Clean Air Program (NCAP) launched in early 2019. It sets a target of reducing pollution PM10 and PM2.5 by 20-30 percent by 2024. Pollution can be battled with appropriate implementation and a strong compliance mechanism.

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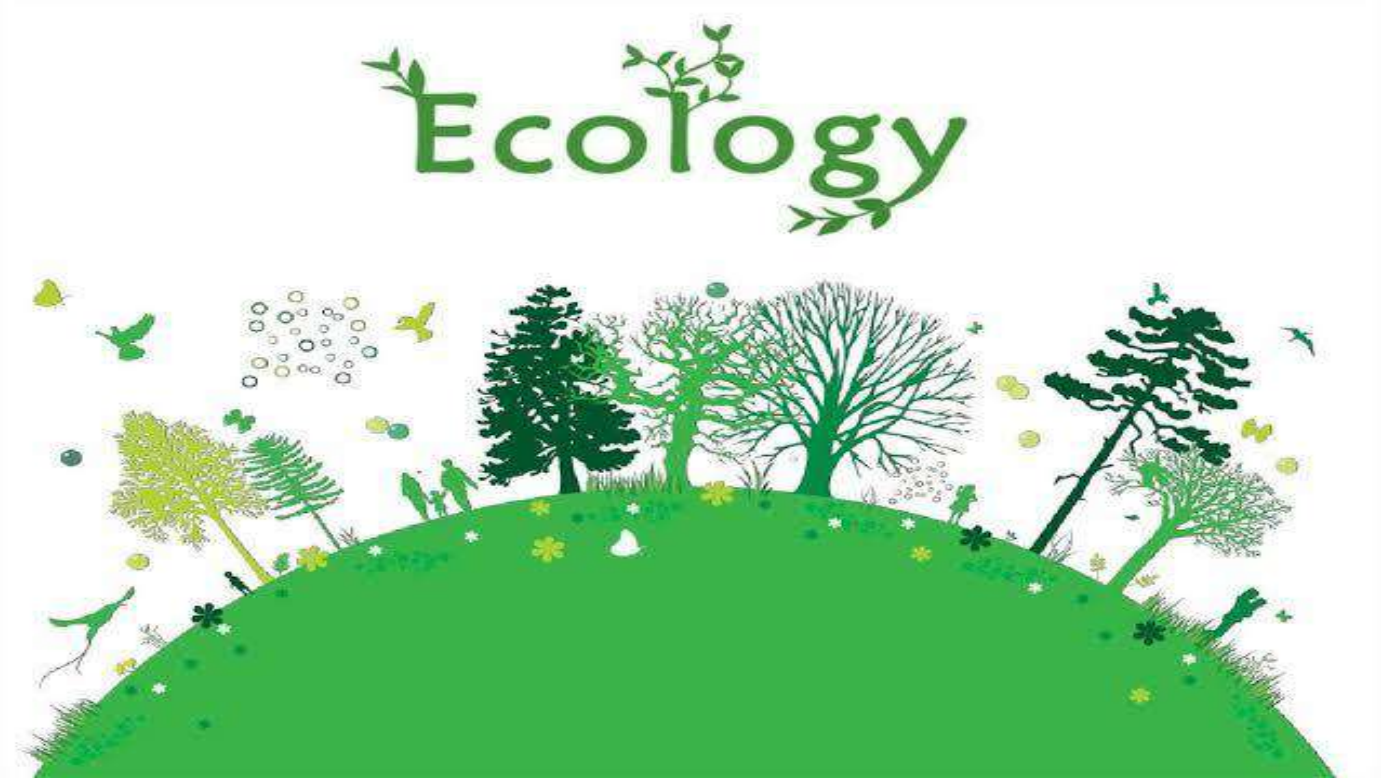
ECOLOGY:

AQUATIC ECOSYSTEM

Ecology

- **The meaning of the word ‘ecology’ was given by German Biologist Haeckel in 1869.**
- **Ecology is defined as the interrelationships of different organisms with each other and with their environment.**
- **The word ‘ecology’ is derived from a Greek word ‘Oikos’ meaning House, habitat or a place of living and ‘Logos’ meaning to Study.**



ECOLOGY

CLASSIFICATION OF ECOLOGY

- ❖ Based on study area
- ❖ Based on Environment or Habitat
- ❖ Based on advancement in the field of ecology

❖ Based on study area:

1. Autecology: It deals with the study of an individual species of organisms and it's population. It is also called the Species ecology.
2. Synecology: It deals with the study of communities, their composition, their behavior and relation with the environment. It is also called as Ecology of communities.

❖ Based on Environment or Habitat:

1. Aquatic ecology: The study of interaction of organisms in the water.
   a) Marian water Ecology
      i) Ocean.
      ii) Deep sea.
      iii) Estuary.
   b) Freshwater Ecology
      i)River
      ii)Stream.
      Iii) Spring
      iv)pond
      V) lake

2. Territorial Ecology: The study of interaction of organisms on land:
   a) Grassland Ecology
   b) Forest Ecology
   c) Desert Ecology

❖ Based on advancement in the field of ecology:

a)Productive ecology.
b)Population ecology.
c)Space ecology.
d)Microbial ecology.
e)Pollution ecology
f) Radiation ecology
g) Ecosystem ecology
h) Community ecology

ECOSYSTEM : AQUATIC ECOSYSTEM

- An ecosystem is a community of organisms that live and interact within a particular environment.
- In an aquatic ecosystem, that environment is water, and all the system's plants and animals live either in or on that water. The specific setting and type of water, such as a freshwater lake or saltwater marsh, determines which animals and plants live there.
- These living creatures whose food, shelter, reproduction and other essential activities depend in a water-based environment are known as Aquatic organisms.

TYPES OF AQUATIC ECOSYSTEM

1. MARINE WATER ECOSYSTEM:

This particular ecosystem is the largest aquatic ecosystem and covers over 70% of the earth's total surface. It is relatively more saline in nature.

The body of aquatic organisms is well-adjusted to saline water, and they may find it challenging to survive.

TWO IMPORTANT MARINE ECOSYSTEMS

1)**Ocean Ecosystem:** Pacific Ocean, Atlantic Ocean, Indian Ocean, Artic Ocean and the Southern Ocean are the five major oceans of the earth. The largest and the deepest is the Pacific Ocean. The southern Ocean

harbors the largest population of Krill among them. The oceans,3 as home to aquatic organisms like- turtles, crustaceans, plankton, etc.

Ocean Ecosystem

2) **Estuaries**: It is the meeting point of a sea and river, which makes the water slightly more saline when compared to Freshwater and more diluted when compared to the marine ecosystem. Examples: tidal marshes, river mouth and coastal bay.

ESTUARIES: Chesapeake Bay

2. FRESHWATER ECOSYSTEM: This aquatic ecosystem covers less than 1% of the earth's surface and is broadly divided into- wetlands, lentic and lotic ecosystems.

TWO IMPORTANT FRESHWATER ECOSYSTEM

1.Swamps and Wetlands: These are marshy areas that are often covered with water and harbor a variety of flora and fauna. It is a home to water lilies, marshes, swamps, dragonflies ,etc.

SWAMPS

2. **Lentic Ecosystem:** It includes standing water bodies like ponds and lakes and is a home to both floating and rooted plants, algae and vertebrates. Salamander, frogs and water snakes are few examples.

LENTIC ECOSYSTEM: Frog in a pond

FUNCTIONS OF AQUATIC ECOSYSTEM

- Facilitates recycling of nutrients.
- Helps to purify water.
- Recharges groundwater.
- Is a habitat for aquatic flora and fauna.
- Mitigates flood.

BENEFITS OF AQUATIC ECOSYSTEM:

1. A habitat for fish and aquatic plants.
2. Improvement of water quality.
3. Stabilized shorelines and floor.
4. A food source for aquatic organisms.

FACTORS AFFECTING AQUATIC ECOSYSTEM:

1. Water flow rate
2. Salinity
3. Acidity
4. Oxygen
5. Temperature and depth
6. Photosynthesizing plants and predation.

METHODS OF CONSERVING AQUATIC ECOSYSTEM:

1.Maintain and conserve the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations, and communities are uniquely adapted.

2.Maintain and conserve spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include flood plains, wetlands, up slope areas and headwater tributaries. These linkages must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species.

3.Maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations.

4.Maintain and preserve water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities.

CONSERVATION OF AQUATIC LIFE

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DEPARTMENT– DEPT. OF POLITICAL SCIENCE
SEMESTER–2
TOPIC– BIODIVERSITY

BIODIVERSITY

THE CONCEPT OF BIODIVERSITY

INTRODUCTION:

The term 'BIODIVERSITY' refers to the totality of the genes, species, and ecosystems of a region. In other words , Biological Diversity means variety and variability among living organisms and the ecological complexes in which they occur.

BIODIVERSITY AT GLOBAL, REGIONAL AND LOCAL LEVELS:

- There are nearly 1.8 million species known and documented by the scientists in the world.
- Most of the world's bio-rich nations are in the South; in contrast, majority of the countries capable of exploiting biodiversity are the Northern Nations.
- BRAZIL, MALAYSIA, INDONASIA have greater biodiversity than INDIA.
- Among the Bio-rich nations , INDIA is among the top 10 countries for its great variety of plants and animals, many of which are not found elsewhere.

LEVELS OF BIODIVERSITY

There is a fascinating variety of organisms , complex ecological relationships among organisms , genetic diversity among species and a great variety of ecological systems. Biological diversity includes three hierarchial levels:

- **Genetic Diversity**
- **Species Diversity**
- **Community and Ecosystem Diversity**

- **GENETIC DIVERSITY :**

Genetic Diversity refers to the variation of genes within species; the differences could be in alleles, in entire genes or in chromosomal structures. The genetic diversity enables a population to adapt to its environment and to respond to natural selection. If a species has more genetic diversity, it can adapt better to the changed environmental conditions.

- **SPECIES DIVERSITY**:

Species are distinct units of diversity , each playing a specific role in the ecosystem. Therefore, loss of species has consequences for the ecosystem as a whole. Species diversity refers to the variety of species within a region.

- **COMMUNITY AND ECOSYSTEM DIVERSITY**:

Diversity at the level of community and ecosystem has thee perspectives:

- **ALPHA DIVERSITY**
- **BETA DIVERSITY**
- **GAMMA DIVERSITY**

- **ALPHA DIVERSITY:**

It refers to the diversity of organisms sharing the same community or habitat. The term was introduced by R.H. WHITTAKER together with terms beta and gamma diversity.

- **BETA DIVERSITY**:

It is the ratio between regional and local species diversity. It can also be defined as the rate of replacement of species along with gradients of habitats or communities.

- **GAMMA DIVERSITY**:

It is the diversity of the habitats over the total landscape or geographical area.

USES OF BIODIVERSITY

Humans derive many direct and indirect benefits from the living world. Biodiversity is the source of food, medicines, pharmaceuticals, drugs , timber , rubber and fibres. The uses of biodiversity are briefly described below:

- **SOURCES OF FOOD AND IMPROVED VARIETY**: Biodiversity is of use to modern agriculture in three ways:
  - as a source of new crops
  - as a source material for breeding improved variety
  - as a source of new biodegradable pesticides

Of the several thousand species of edible plsnts, less than 20 plant species are cultivated to produce about 85% world's food. Wheat, corn and rice,the three major carbohydrate crops, yield nearly two-third of the food sustaining the human population. Fats, oils, fibres, etc. are other uses for which more amd more new species need to be investigated.

- **DRUGS AND MEDICINES**: Biodiversity is a rich source of substances with therapeutic properties. Several important pharmaceuticals have originated as plant breed substances. Examples of plant derived substances developed into valuable drugs are: MORPHINE(*Papver somniferum*),used as an analgesic; and TAXOL an anti-cancer drug obtained from the bark of the Yew tree (*Taxus brevifolia*).
- **AESTHETIC AND CULTURAL BENEFITS:** Biodiversity has also great aesthetic values, e.g. of aesthetic rewards include

Eco-tourism, bird-watching , wildlife , pet keeping, gardening etc. Throughout human history, people have related biodiversity to the very existence of human race through cultural and religious beliefs. In a majority of Indian villages plants like TULSI, PIPAL and various other trees are planted, which are considered sacred and worshipped by people.

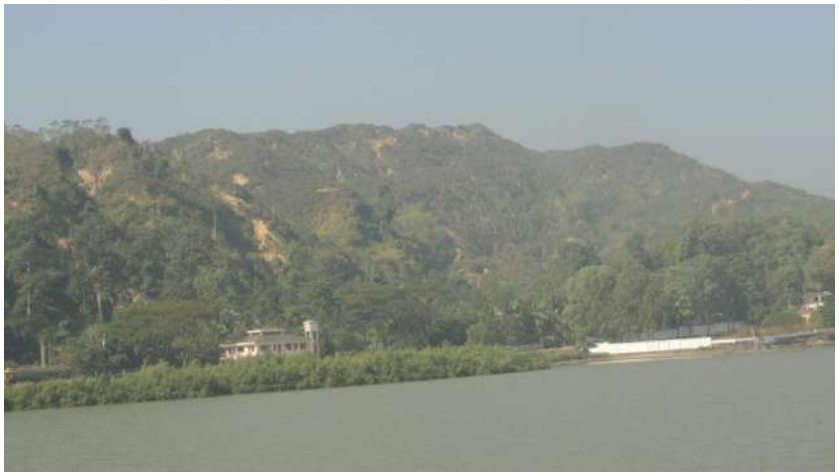
- **ECOSYSTEM SERVICES**: These diversity is essential for the maintenance and sustainable utilization of goods and services for ecological system as well as the individual species. These services include maintenance of gaseous composition of the atmosphere , climate control by forests and oceanic systems, natural pest control, pollination of plants by insects and birds, formation and protection of soil, conservation and purification of water and nutrient cycling etc.

THREATS ON BIODIVERSITY

Important factors leading to the extinction of species and consequent loss of biodiversity are: habitat loss and fragmentation; soil, water and atmospheric pollution; and intensive agriculture and forestry.

- **HABITAT LOSS AND FRAGMENTATION**: The destruction of habitats is the primary reason for the loss of biodiversity. When people cut down trees, fill a wetland, plough a grassland or burn a forest, the natural habitat or species is destroyed.

- The most important threats to biodiversity are degradation of environment and human interferences which led to the habitat loss, due to deforestation and large scale conversion of land to agriculture and urban centres, introduction of invasive alien species, overexploitation of biodiversity resources



- **Human actions/ interferences:** Due to human actions, species are being lost at a rate that is estimated to be up to 100 times the natural rate of extinction. **Population pressure;** as the human population passes the six billion mark , we have transformed, degraded or destroyed roughly half of the word's forests. **Over-hunting** has been a significant cause of the extinction of hundreds of species and the endangerment of many more, such as whales and many African large mammals. Most extinctions over past several hundred years are mainly due to over-harvesting for food, fashion, and profit.

- Human actions

Effect of exotic species plantation

- POPULATION PRESSURE

- **In the future, the only species that survive are likely to be those whose habitats are highly protected, or whose habitat corresponds to the degraded state associated with human activity**

- In the new world tropics, lowland, seasonal, deciduous forest began to disappear after 15th C with Spanish and Portuguese colonization of the New World. These were the forested regions most easily converted to agriculture, and with a more welcoming climate. The more forbidding, tropical humid forests came under attack mainly in 20th C, under the combined influences of population growth, inequitable land and income distribution, and development policies that targeted rain forests as the new frontier to colonize
- **Hill Forest on the verge of extinction**

Deciduous Sal Forest reducing day by day


Known Causes of Animal Extinctions Since 1600
Hunting 23%
Species Introductions 39%
Other 2%
Habitat Destruction 36%

- The poor are particularly related to these consequences - they are directly dependent on biodiversity for their day to day survival and are generally not in a position to afford substitutes.



- 70% of the world's poor people live in rural areas and depend directly on biodiversity for their survival and wellbeing. The urban poor also rely heavily on biodiversity.


CONSERVATION OF BIODIVERSITY

We know that ecosystems are undergoing changes due to pollution, invasive species, overexploitation by humans and climate change. Most people are beginning to recognize the diversity at all levels-gene pool, species and biotic communities are important and need to be conserved.

There are two basic strategies to conserve biodiversity: EX-SITU and IN-SITU.

- **IN-SITU CONSERVATION STRATEGY-** The in-situ strategy emphasizes protection of total ecosystem. The in-situ approach includes protection of a group of typical ecosystems through a network of protected areas.

- **PROTECTED AREAS** – These are areas of land or sea especially dedicated to the protection and maintenance of natural and associated cultural resources. These are managed through legal and other effective means, e.g. National parks and Wildlife sanctuaries.

  JIM CORBETT NATIONAL PARK WAS THE FIRST NATIONAL PARK ESTABLISHED IN INDIA.

- **BIOSPHERE RESERVES** – These are special categories of protected areas of land or coastal environments, wherein people are integral components of the system. These are representative of natural biomass and contain unique biological communities. The concept of Biosphere Reserves was launched in 1975 as a part of UNESCO'S man and Biosphere programme. Till May 2002, there were total 408 biosphere reserves located in 94 countries. In India, Biosphere Reserves are also notified as National Parks. Presently, there are total of 18 Biosphere Reserves in India.

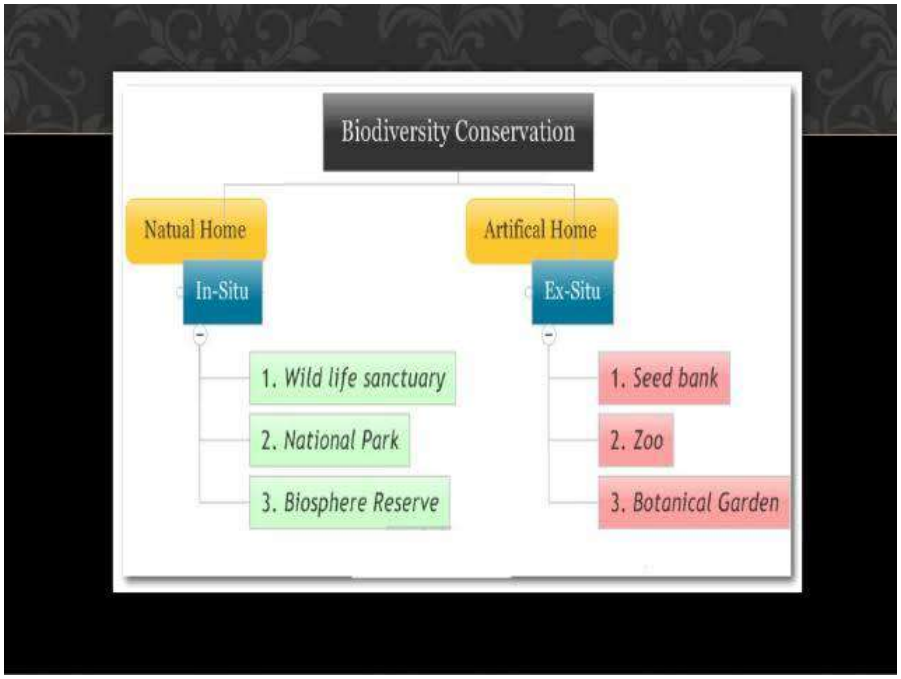
- Biosphere Reserves in India

- **There are 18 biosphere reserves in India**:
  - Cold Desert, Himachal Pradesh
  - Nanda Devi, Uttrakhand
  - Kangchenjunga, Sikkim
  - Dehang-Debang, Arunachal Pradesh
  - Manas, Assam
  - Dibru-Saikhowa, Assam
  - Nokrek, Meghalaya
  - Panna, Madhya Pradesh
  - Panchmarhi, Madhya Pradesh
  - Achanakmar-Amarkantak, Madhya Pradesh-Chhattisgarh
  - Kachha, Gujarat (Largest Area)
  - Simlipal, Odisha
  - Sundarban, West Bengal
  - Seshachalam, Andhra Pradesh
  - Agasthyamala, Karnataka-Tamil Nadu-Kerala
  - Nilgiri, Tamil Nadu-Kerala ,Gulf of Mannar, Tamil Nadu
  - Great Nicobar, Andaman & Nicobar Island

EX- SITU CONSERVATION STRATEGIES-

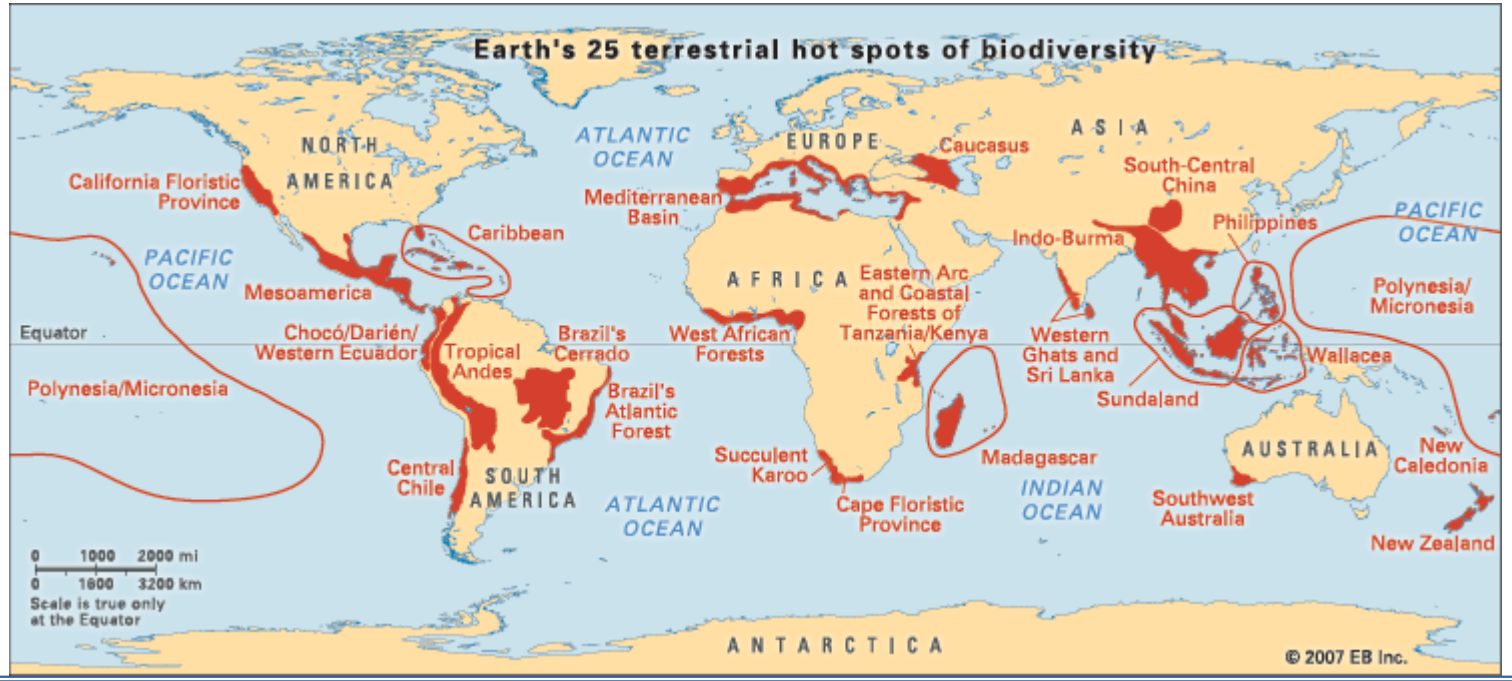
The ex-situ conservation strategies include botanical gardens, zoos, conservation stands, pollen, seed , tissue culture and DNA banks etc. **Ex situ conservation** is the technique of **conservation** of all levels of biological diversity outside their natural habitats through different techniques like zoo, captive breeding, aquarium, botanical garden, and gene bank.

NOW THE DIFFERENCE BETWEEN THE TWO:

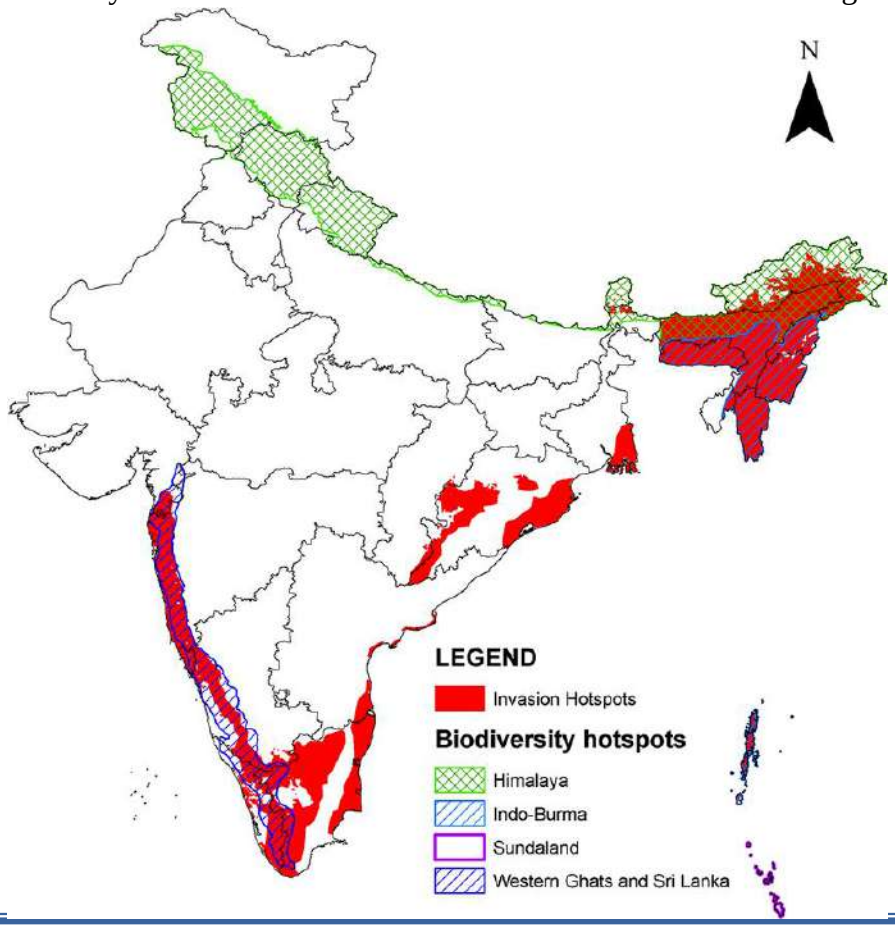


HOTSPOTS OF BIODIVERSITY

Biodiversity is not uniformly distributed across the geographical regions of the earth. Certain regions of the world are mega diversity zones where a very large no. of species are found. NORMAN MYRES developed the hot spots concept in 1988 to designate priority areas for in situ conservation. The hot spots are the most rich and threatened reservoirs for plant and animal life on earth. 25 terrestrial hotspots for conservation of biodiversity have been identified world wide. The hotspots together now cover 1.4% of the earth's land area . Among the 25 world hotspots 4 are found in India. These areas are rich in reptiles, amphibians, swallow-tailed butterflies and some mammals and also show a wide variety of endemics.



4 out of the 25 **Biodiversity Hotspots** in the world are present in **India**: the Himalayas, the Western Ghats, the Indo-Burma region and the Sundaland. To these may be added the Sundarbans and the Terrai-Duars. Savana grasslands for their unique foliage and animal species.



"India as a mega-diversity nation"

- 1. Geological events in the land mass of India have provided conditions for high levels of biodiversity.
- 2. India's special geographical position or 'niche' is responsible for our rich and varied biodiversity.
- 3. India has varied diversity in traditional cultivated plants belonging to cereals, pulses, fruits and vegetables(about 30,000 to 50,000).

Reasons for richness of biodiversity in tropics:

- 1. Tropics have more stable climate than the temperate zones.
- 2. Tropical communities are older than temperate ones.
- 3. Warm temperatures and high humidity in most tropical areas provide favourable conditions for many species that are unable to survive in temperate areas.
- 4. In tropics, there may be greater pressure from pests, parasites and disease.
- 5. Among plants, rates of outcrossing appear to be higher in tropics. Higher rates of outcrossing may lead to higher levels of genetic variability.
- 6. Tropical areas receive more solar energy over the year. Thus tropical communities are more productive that can support a wider range of species.

INTERNATIONAL EFFORTS FOR BIODIVERSITY CONSERVATION

The Earth Summit held n 1992 at Rio de Janerio resulted into Convention on Biodiversity which came into force on 29 Dec, 1993. The convention has three stages:

- Conservation of biological diversity
- Sustainable use of biodiversity
- Fair and equitable sharing of benefits arising out of the utilisation of genetic resources.
- The World Conservative Union and the World Wide Fund for Nature support worldwide to promote conservation and appropriate development of biosphere reserves.

CBD

Convention of Biological Diversity

CONCLUSION

As we know that the total habitat of plants and animals around the world is being depleted due to various reasons, so we should focus over the conservation of biodiversity by protecting the habitat loss. Ultimately, the diversity in plants and animal species provides stable living community which is very essential for our security with respect to food , shelter, clothing , medicine, scientific research , environment protection etc. Therefore, we need to conserve the global biodiversity.

ACCORDING TO ARTICLE 2 OF CBD-

“Biological diversity” means the variability among living organisms from all sources including inter alia , terrestrial, marine and other aquatic ecosystems and their ecological complexes of which they are a part , this includes diversity within species, between species and of ecosystems. About 300,000 species of flowering plants occurring throughout the world are known to have been identified with the recognition of 25 biodiversity hotspots including 4 in India.

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Thank
You

A PROJECT ON AIR POLLUTION

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POLLUTION:

The word “pollution” comes from the Latin word “polluere” that means contamination.Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants. Pollutants can be natural, such as volcanic ash or can also be created by human activity, such as trash or runoff from factories. All living things—from one-celled microbes to blue whales—depend on Earth’s supply of air and water. When these resources are polluted, all forms of life are threatened. Pollution is also consequential after effect of activities which upsets the biodiversity of the ecosystem. Pollution is a global problem. Although urban areas are usually more polluted than the countryside, pollution can spread to remote places where no people live.Major forms of pollution include air pollution, light pollution, noise pollution, plastic pollution, land pollution, radioactive contamination, thermal pollution, visual pollution, and water pollution.

AIR POLLUTION:

Sometimes, air pollution is visible. More often, however, air pollution is invisible.Polluted air can be dangerous, even if the pollutants are invisible. It can make people’s eyes burn and make them have difficulty breathing. It can also increase the risk of lung cancer. In 1984, an accident at a pesticide plant in Bhopal, India, released a deadly gas into the air. At least 8,000 people died within days. Hundreds of thousands more were permanently injured.

FACTORS:

Natural disasters can cause air pollution to increase quickly. When volcanoes erupt, they eject volcanic ash and gases into the atmosphere. Volcanic ash can discolor the sky for months. Volcanic gases, such as sulfur dioxide, can kill nearby residents and make the soil infertile for years.

VOLCANIC ERUPTION

Most air pollution is not natural, however. It comes from burning fossil fuels—coal, oil, and natural gas. When gasoline is burned to power cars and trucks, it produces carbon monoxide, a colorless, odorless gas. The gas is harmful in high concentrations, or amounts. City traffic produces highly concentrated carbon monoxide. Cars and factories produce other common pollutants, including nitrogen oxide, sulfur dioxide, and hydrocarbons.

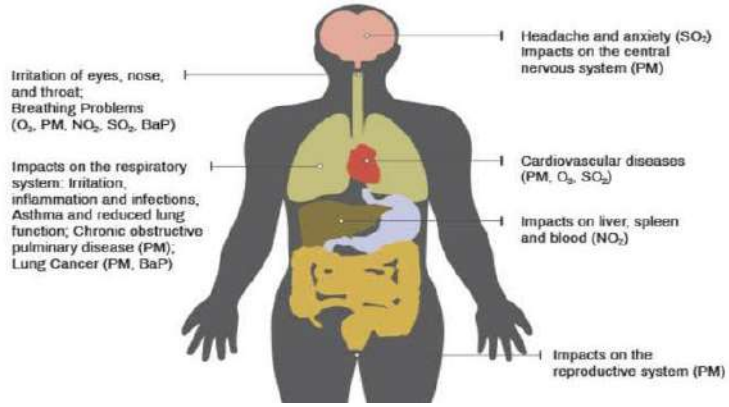
CAR AND FACTORY EMISSIONS

Air pollution is becoming out of control because of cutting down trees randomly. Thus, amount of CO2 is increasing and the air quality is decreasing.

CUTTING DOWN OF TREES

EFFECTS OF AIR POLLUTION

Air pollution is a significant risk factor for a number of pollution-related diseases, including respiratory infections, heart disease, COPD, stroke and lung cancer. Overall, air pollution causes the deaths of around 7 million people worldwide each year, and is the world's largest single environmental health risk. The major effects of industrial air pollution on wildlife include direct mortality, debilitating industrial-related injury and disease, physiological stress, anaemia, and bioaccumulation. Some air pollutants have caused a change in the distribution of certain wildlife species.



IMPACTS OF AIR POLLUTION ON HUMAN HEALTH

DEATH OF BIRDS DUE TO AIR POLLUTANTS: A COMMON ISSUE

SOME EXAMPLES OF EFFECTS OF AIR POLLUTUON:

After the eruption of the Indonesian volcano of Krakatoa in 1883, ash darkened the sky around the world. The dimmer sky caused fewer crops to be harvested as far away as Europe and North America. For years, meteorologists tracked what was known as the “equatorial smoke stream.”

VOLCANO OF KRAKATOA,INDONESIA

Mount Vesuvius, a volcano in Italy, famously erupted in 79, killing hundreds of residents of the nearby towns of Pompeii and Herculaneum. Most victims of Vesuvius were not killed by lava or landslides caused by the eruption. They were choked, or asphyxiated, by deadly volcanic gases.

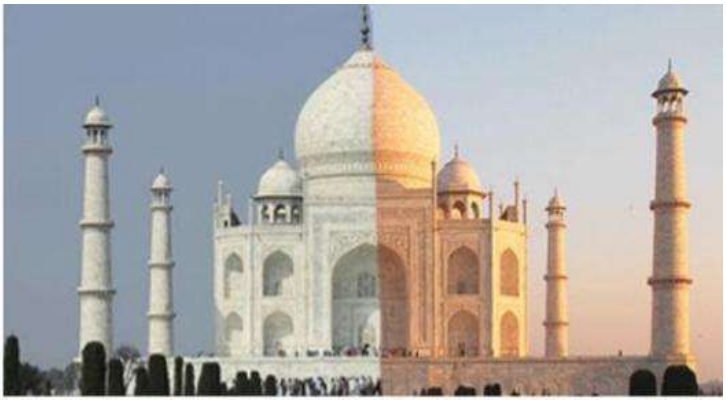
MOUNT VESUVIUS

In 1986, a toxic cloud developed over Lake Nyos, that sits in the crater of a volcano in Cameroon. The volcano ejected volcanic gases into the lake. The heated gases passed through the water of the lake and collected as a cloud that descended the slopes of the volcano and into nearby valleys. Moving across the landscape, it killed birds and other organisms in their habitat. This air pollution also killed thousands of cattle and alnost 1,700 people.

LAKE NYOS,CAMEROON

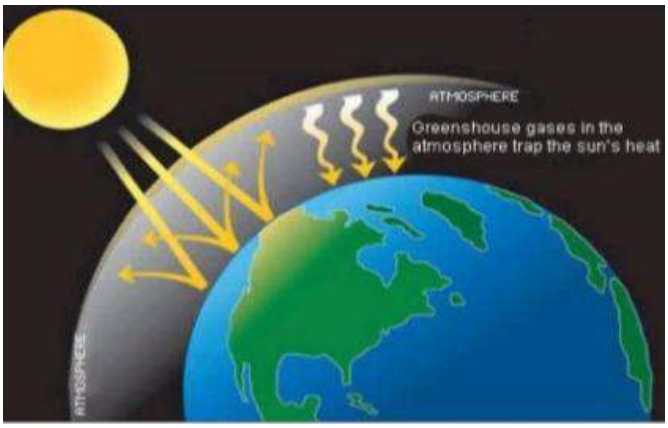
Most air pollution is man-made though. Cars and factories produce common pollutants, including sulfur dioxide, and hydrocarbons. These chemicals react with sunlight to produce smog, a thick fog or haze. Smog can be brown or grayish blue, depending on which pollutants are in it. Smog makes breathing difficult.

When air pollutants such as nitrogen oxide and sulfur dioxide mix with moisture, they change into acids, and fall back to earth as acid rain. Wind often carries acid rain far from the pollution source. It can also devastate lakes, streams, and other waterways. When lakes become acidic, fish can't survive. In Sweden, acid rain created thousands of "dead lakes," where fishes no longer live. It also wears away marble and other kinds of stone. It has damaged many historic buildings and monuments. The Taj Mahal, in Agra, India, was gleaming white,acid rain has left it pale.



TAJMAHAL:THEN AND NOW

Greenhouse gases occur naturally in the atmosphere. In fact, they are necessary for life on Earth. They absorb sunlight reflected from Earth, preventing it from escaping into space. By trapping heat in the atmosphere, they keep Earth warm enough for people to live. This is called the greenhouse effect.



GREENHOUSE EFFECT

But human activities such as burning fossil fuels and destroying forests have increased the amount of greenhouse gases in the atmosphere and average temperatures are rising. The decade that began in the year 2000 was the warmest. This increase in wworld-widetemperatures, caused in part by human activity, is called global warming.Global warming is causing ice sheets and glaciers to melt. The melting ice is causing sea levels to rise at a rate of 2 millimeters per year. The rising seas will eventually flood low-lying coastal regions. Entire nations, such as the islands of Maldives, are threatened by this climate change.

REMEDIES :

- Switch to power sources such as wind power, solar power, hydro power.
- conversion to electric vehicles.
- Plant More Plants
- Take public transportation.
- Replace energy-hungry incandescent lights with florescent light bulbs.
- Avoid burning leaves, trash, and other materials.

CONCLUSION

We can’t seem to stop burning up all those buried trees . And there remains ancient planktons in form of oil and gas. If we could, we’d be pollution free climate wise. Instead, we’re dumping CO2 into atmosphere at the rate, the world hasn’t seen since the great climate catastrophic in the past. We can’t just seem to break our addiction to the kind of fuels that bring back our climate last seen by dinosaurs. All the while the glorious sun pours emasculating free energy down upon us. More than we’ll ever need!Why can’t we summon the ingenuity and courage of the generations that came before us!

What is our excuse?

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SCOTTISH CHURCH COLLEGE

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TOPIC : AIR POLLUTION

INDEX

AIR POLLUTION

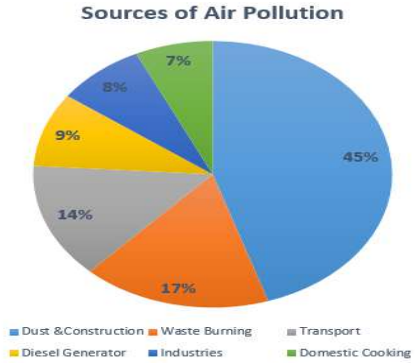
1. What Is Air Pollution?

Air pollution refers to the release of pollutants into the air—pollutants which are detrimental to human health and the planet as a whole. According to the World Health Organization (WHO) , each year air pollution is responsible for nearly seven million deaths around the globe. Nine out of ten human beings currently breathe air that exceeds the WHO's guideline limits for pollutants, with those living in low- and middle-income countries suffering the most. In the United States, the Clean Air Act, established in 1970, authorizes the U.S. Environmental Protection Agency (EPA) to safeguard public health by regulating the emissions of these harmful air pollutants.

2. What Causes Air Pollution?

“Most air pollution comes from energy use and production,” says John Walke, director of the Clean Air Project, part of the Climate and Clean Energy program at NRDC. “Burning fossil fuels releases gases and chemicals into the air.” And in an especially destructive feedback loop, air pollution not only contributes to climate change but is also exacerbated by it. “Air pollution in the form of carbon dioxide and methane raises the earth’s temperature,” Walke says. “Another type of air pollution, smog, is then worsened by that increased heat, forming when the weather is warmer and there’s more ultraviolet radiation.” Climate change also increases the production of allergenic air pollutants, including mold (thanks to damp conditions caused by extreme weather and increased flooding) and pollen (due to a longer pollen season).

“We’ve made progress over the last 50 years improving air quality in the United States thanks to the Clean Air Act,” says Kim Knowlton, senior scientist and deputy director of the NRDC Science Center. “But climate change will make it harder in the future to meet pollution standards, which are designed to protect health.”



3) EFFECT OF AIR POLLUTION

The effects of air pollution on the human body vary depending on the type of pollutant and the length and level of exposure—as well as other factors, including a person's individual health risks and the cumulative impacts of multiple pollutants or stressors.

Smog and soot

These are the two most prevalent types of air pollution. Smog (sometimes referred to as ground-level ozone) occurs when emissions from combusting fossil fuels react with sunlight. Soot (also known as particulate matter) is made up of tiny particles of chemicals, soil, smoke, dust, or allergens—in the form of either gas or solids—that are carried in the air. The sources of smog and soot are similar. "Both come from cars and trucks, factories, power plants, incinerators, engines, generally anything that combusts fossil fuels such as coal, gas, or natural gas," Walke says.

Smog can irritate the eyes and throat and also damage the lungs, especially those of children, senior citizens, and people who work or exercise outdoors. It's even worse for people who have asthma or allergies: these extra pollutants can intensify their symptoms and trigger asthma attacks. The tiniest airborne particles in soot, whether gaseous or solid, are especially dangerous because they can penetrate the lungs and bloodstream and worsen bronchitis, lead to heart attacks, and even hasten death. In 2020 a report from Harvard's T. H. Chan School of Public Health showed COVID-19 mortality rates in areas with more soot pollution were higher than in areas with even slightly less, showing a correlation between the virus's deadliness and long-term exposure to fine particulate matter and illuminating an environmental justice issue.

Because highways and polluting facilities have historically been sited in or next to low-income neighbourhoods and communities of color, the negative effects of this pollution have been disproportionately experienced by the people who live in these communities. In 2019 the Union of Concerned Scientists found that soot exposure was 34 percent higher for Asian Americans, on average, than for other Americans. For Black people, the exposure rate was 24 percent higher; for Latinos, 23 percent higher.

Hazardous air pollutants

A number of air pollutants pose severe health risks and can sometimes be fatal even in small amounts. Almost 200 of them are regulated by law; some of the most common are mercury, lead, dioxins, and benzene. “These are also most often emitted during gas or coal combustion, incinerating, or—in the case of benzene—found in gasoline,” Walke says. Benzene, classified as a carcinogen by the EPA, can cause eye, skin, and lung irritation in the short term and blood disorders in the long term. Dioxins, more typically found in food but also present in small amounts in the air, can affect the liver in the short term and harm the immune, nervous, and endocrine systems as well as reproductive functions. Mercury attacks the central nervous system. In large amounts, lead can damage children’s brains and kidneys, and even minimal exposure can affect children’s IQ and ability to learn.

Another category of toxic compounds, polycyclic aromatic hydrocarbons (PAHs), are by-products of traffic exhaust and wildfire smoke. In large amounts they have been linked to eye and lung irritation, blood and liver

issues, and even cancer. In one study, the children of mothers exposed to PAHs during pregnancy showed slower brain-processing speeds and more pronounced symptoms of ADHD.

Greenhouse gases

By trapping the earth's heat in the atmosphere, greenhouse gases lead to warmer temperatures, which in turn lead to the hallmarks of climate change: rising sea levels, more extreme weather, heat-related deaths, and the increased transmission of infectious diseases. In 2018 carbon dioxide accounted for 81 percent of the country's total greenhouse gas emissions, and methane made up 10 percent. "Carbon dioxide comes from combusting fossil fuels, and methane comes from natural and industrial sources, including large amounts that are released during oil and gas drilling," Walke says. "We emit far larger amounts of carbon dioxide, but methane is significantly more potent, so it's also very destructive." Another class of greenhouse gases, hydrofluorocarbons (HFCs), are thousands of times more powerful than carbon dioxide in their ability to trap heat. In October 2016 more than 140 countries reached an agreement to reduce the use of these chemicals—which are found in air conditioners and refrigerators—and develop greener alternatives over time. Though President Trump was unwilling to sign on to this agreement, a bipartisan group of senators overrode his objections in 2020 and set the United States on track to slash HFCs by 85 percent by 2035. According to David Doniger, senior strategic director of NRDC's Climate and Clean Energy program, "the agreed-to HFC phasedown will avoid the equivalent of more than 80 billion tons of carbon dioxide over the next 35 years."

Pollen and mold

Mold and allergens from trees, weeds, and grass are also carried in the air, are exacerbated by climate change, and can be hazardous to health. Though they aren't regulated and are less directly connected to human actions, they can be considered a form of air pollution. "When homes, schools, or businesses get water damage, mold can grow and can produce allergenic airborne pollutants," Knowlton says. "Mold exposure can precipitate asthma attacks or an allergic response, and some molds can even produce toxins that would be dangerous for anyone to inhale."

Pollen allergies are worsening because of climate change. "Lab and field studies are showing that pollen-producing plants—especially ragweed—grow larger and produce more pollen when you increase the amount of carbon dioxide that they grow in," Knowlton says. "Climate change also extends the pollen production season, and some studies are beginning to suggest that ragweed pollen itself might be becoming a more potent allergen." If so, more people will suffer runny noses, fevers, itchy eyes, and other symptoms.

Air pollution is now the world's fourth-largest risk factor for early death. According to the most recent *State of Global Air* report—which summarizes the latest scientific understanding of air pollution around the world—4.5 million deaths were linked to outdoor air pollution exposures in 2019, and another 2.2 million deaths were caused by indoor air pollution. "Despite improvements in reducing global average mortality rates from air pollution, the world's most populous countries, India and China, continue to bear the highest burdens of disease," says Vijay Lamaye, staff scientist at the NRDC Science Center. "This report is a sobering reminder that the climate crisis threatens to worsen air pollution problems significantly if we fail to act to cut carbon pollution."

4)How can Air Pollution be Prevented?

Some important measures that can be adopted by individuals to contribute towards the prevention of air pollution have been listed below.

- **Usage of public transport and carpooling –** by reducing the amount of fuel combusted for an individual's transportation needs, he/she can lower the amount of pollutants being released into the atmosphere and cause less air pollution. Furthermore, these options are also economically efficient and can help save money as well.

- **Switching off the lights when they're not in use –** the majority of our electricity is produced from the combustion of fossil fuels, which are a huge contributor towards air pollution. Therefore, conserving electricity is an effective way of preventing air pollution.

- **Reusing and recycling products –** By reusing products (that can be reused), the amount of energy that goes into manufacturing another one of those products is conserved. Furthermore, recycling of products is also more energy-efficient than the manufacture of new ones.

- **Avoiding the burning of garbage and smoking –** burning of garbage is a huge contributor to air pollution. Another contributor to air pollution is cigarette smoking. Avoiding these activities and spreading awareness of their negative consequences can be of great help in the prevention of air pollution.

- **Avoiding the use of firecrackers –** firecrackers are generally used to celebrate certain occasions. However, they are known to cause severe air pollution and are, therefore, extremely harmful to the environment. Personally avoiding the use of firecrackers and spreading awareness about their negative consequences is a great way to help prevent air pollution.

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my teacher as well as our principal who gave me the golden opportunity to do this wonderful project on the topic – air pollution , which also helped me in doing a lot of research and I came to know about soo many new things . I am really thankful to them.

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Thank You...!!!

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Thank You

Andrea Louisa Dias

ENVIRONMENTAL POLLUTION

INTRODUCTION

Pollution is the introduction of contaminants into the environment that cause harm or discomfort to humans or other living organisms or that damage the environment which can come in the form of chemical substances or energy such as noise, heat or light. Pollutants can be naturally occurring substances or energies but are considered contaminants when in excess of natural levels.

Environmental pollution takes place when the environment cannot process and neutralize harmful by-products of human activities (poisonous gas emissions) in due course without any structural or functional damage to its system.

Pollution occurs on the one hand, because the natural environment does not know how to decompose the unnaturally generated elements (i.e., anthropogenic pollutants) and on the other, there is a lack of knowledge on the part of humans on how to decompose these pollutants artificially. It may last many years during which the nature will attempt to decompose the pollutants in one of the worst cases – that of radioactive pollutants – it may take as long as thousands of years for the decomposition of such pollutants to be completed.

CAUSES OF ENVIRONMENTAL POLLUTION.

- INDUSTRIES – Industries have been polluting our environment, especially since the beginning of the industrial revolution, as mentioned above, notably due to the increasing use of *fossil fuels.*

- TRANSPORTATION – Ever since men abandoned animal power to travel*, pollution of the environment* has become higher and higher. Its levels have only been increasing until now. Similarly to industries, pollution caused by transport can mainly be attributed to *fossil fuels*

- AGRICULTURAL ACTIVITIES- Agriculture is mainly responsible for the contamination of water and soil. This is caused by the increased use of pesticides, as well as by the intensive character of its production. All pesticides are made of chemical substances and are meant to keep away disease and threatening animal away from the crops. However, by keeping these forms of life away, the harm is almost always made to the surrounding environment as well.

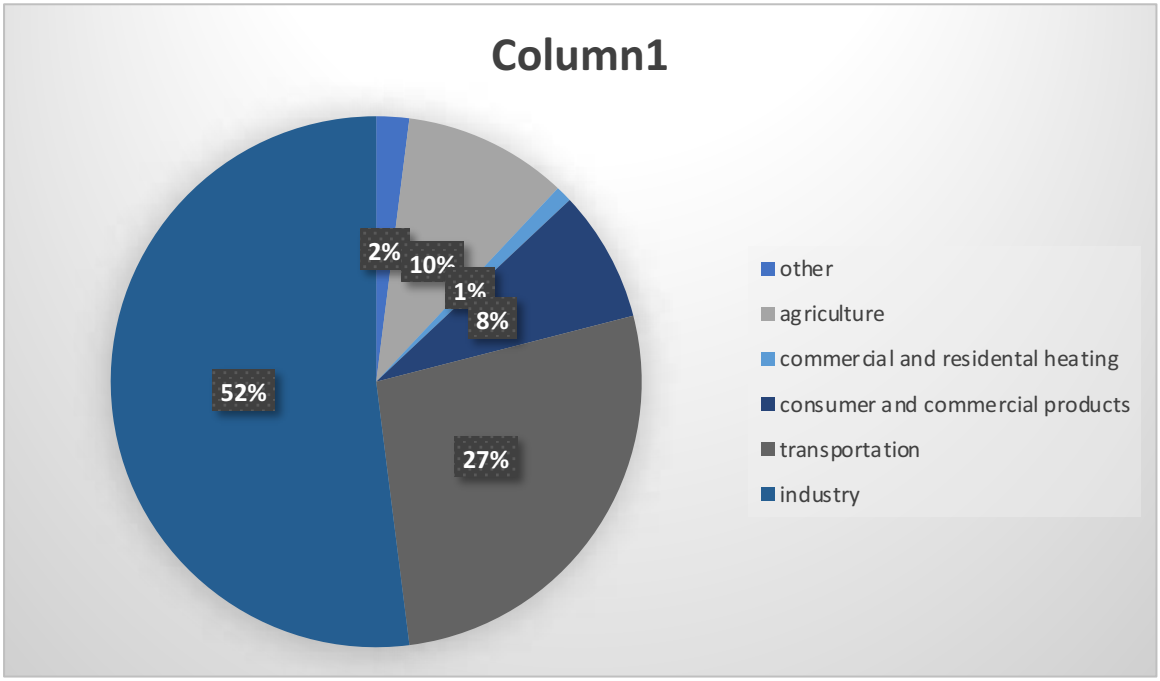
- TRADING ACTIVITIES- Trading activities include the production and exchange of goods and services. As regards goods, pollution can be caused by packaging (which often involves the use of plastic, which is made from fossil fuels) or transport, mainly..

- RESIDENCE- Finally, residential areas provide their fair share of pollution a well. First, to be able to build homes the natural environment has to be destroyed in one way or another. Wildlife and plats are driven away and replaced by human constructions. Following that, when people settle in, they will produce waste every day, including a part that cannot be processed by environment without any harm yet.

TYPES OF ENVIRONMENTAL POLLUTION

Generally speaking, there are many types of environmental pollution, but the most important ones are:

- AIR POLLUTION- some of the most notable are sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, volatile organic compounds and airborne particles with radioactive pollutants probably among the most destructive ones (specifically when produced by nuclear explosions)



- WATER POLLUTION- includes insecticides and herbicides, food processing waste, pollutants from livestock operations, volatile organic compounds, heavy metals, chemical waste and others.

- SOIL POLLUTION (CONTAMINATION) – hydrocarbons solvents and heavy metals. In modern industrialized societies, fossil fuels (oil, gas, coal) transcended virtually all imaginable barriers and firmly established themselves in our everyday lives.

Among other pollution sources, agriculture (livestock farming) is worth mentioning as the largest generator of ammonia emissions resulting in air pollution. Of the total amount of greenhouse gasses, in agriculture production occurs about 30%. Thereof agricultural soil produce 32%, livestock 31%, crops cultivation 12% from manure management occur 6% and 19% other emissions.

Environmental pollution is causing a lot of distress not only to humans but also animals, driving many animals species to endangerment and even extinction. The trans boundary nature of environmental pollution makes it even more difficult to manage it.

Everything on out 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.

EFFECTS OF ENVIRONMENTAL POLLUTION.

- EFFECTS ON HUMANS- The effects of environmental pollution on humans are mainly physical, but can also turn into neuro - affections in the long term. The best known troubles to us are respiratory, in the form of allergies, asthma, irritation of the eyes and nasal passages, or other forms of respiratory infections. Notably, these well spread affections can be observed when air pollution in high in cities, when the weather gets hot, for instance.

- EFFECTS ON ANIMALS- Environmental pollution mainly affects animals by causing harm to their living environment, making it toxic for them to live in. Acid rains can change the composition of rivers and seas, making them toxic for fishes; an essential quantity of ozone in the lower parts of atmosphere can cause lung problems to all animals.

- EFFECTS ON PLANTS- As for animals, plants, and especially trees, can be destroyed by acid rains (and this will also have a negative impact on animals as well as their natural environment will be modified), ozone in the lower atmosphere block the plant respiration, and harmful pollutants can be absorbed from the water or soil.

- EFFECTS ON THE ECOSYSTEM- In short, environmental pollution, almost exclusively created by human activities has a negative effect on the ecosystem destroying crucial layers of it and causing an even more negative effect on the upper layers.

CONCLUSION

SOLUTIONS TO ENVIRONMENTAL POLLUTION.

- Environmental planning should be considered as a base tone for developmental planning. Hence, before starting any project, a study to evaluate the environmental impacts has to be conducted.
- Shifting to eco-friendly transportation such as electric vehicles and hydrogen vehicles and promoting shared mobility (i.e., carpooling, and public transports) could reduce air pollution significantly.
- Basic solutions for air pollution must involve moving away from fossil fuels replacing them with sustainable renewables like solar, geothermal, and wind producing clean energy. The world is phasing out coal.
- Now, as solar radiation is at a climatic peak, solar power is a fantastic solution. We can reap power from the sun using solar panel systems and provide energy from home systems to large scale systems powering entire communities and cities. Wind power is also coming into play. Solar power and wind turbine are both powerful forces against radioactive power and fossil fuel power.
- Green building can help solve environmental problems to an extent. From planning to demolition, the objective of green building is to create environmentally responsible and resource efficient structures to reduce their carbon footprint.

Finally, in order to produce effective solutions for environmental problems, a national approach towards the problems is crucial.

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TITLE: ENVIRONMENTAL POLLUTION

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ENVIORMENTAL POLLUTION

Definition

Pollution is the introduction of contaminants into the natural environment that cause 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.

Types Of Pollution

- There are four type of pollution

1. Air Pollution
2. Water Pollution
3. Noise Pollution
4. Land Pollution

Air Pollution

- Air pollution refers to any physical, chemical or biological change in the air. It is the contamination of air by harmful gases, dust and smoke which affects plants, animals and humans drastically.
- There is a certain percentage of gases present in the atmosphere. An increase or decrease in the composition of these gases is harmful to survival. This imbalance in the gaseous composition has resulted in an increase in earth's temperature, which is known as global warming.

Causes Of Air Pollution

•Following are the important causes of air pollution:

•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.

Effects Of Air Pollution

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. 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 chlorofluorocarbons, halons, and hydro chlorofluorocarbons in the atmosphere is the major cause of depletion of the ozone layer.

How To Control Air Pollution

- 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.

Water Pollution

Water pollution, the release of substances into subsurface groundwater or into lakes, streams, rivers, estuaries, and oceans to the point where the substances interfere with beneficial use of the water or with the natural functioning of ecosystems. In addition to the release of substances, such as chemicals or microorganisms, water pollution may also include the release of energy, in the form of radioactivity or heat, into bodies of water.

Causes Of Water Pollution

- Following are the causes of water pollution:
- **Sewage and wastewater:**
- Many households dump their waste directly into water bodies. Moreover, households which are not served by municipal treatment plant may use septic tanks, which eventually infiltrates into the soil, causing pollution of groundwater.
- **Industrial effluents and Industrial Usage:**
- Some industries may directly pump their untreated wastes into water bodies such as rivers. Moreover, various industries also use water as a coolant, thereby causing thermal pollution. Increased water temperatures can cause a reduction in the levels of oxygen; which can cause the death of fish and other organisms.
- **Eutrophication**
- Eutrophication is caused when large quantities of nutrients are introduced into a body of water, causing the rapid growth of algae. This can decrease the oxygen level in the water, rendering the fish unable to breathe. Moreover, this phenomenon can also introduce dangerous toxins into the water body, which can harm or kill most organisms, including humans
- **Deforestation**
- Deforestation can cause soil erosion. When these loose soil particles enter a water body, they can make the water murky.

Effects Of Water Pollution

- The effect of water pollution depends upon the type of pollutants and its concentration. Also, the location of water bodies is an important factor to determine the levels of pollution.
- 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, behaviour, 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.

How To Control Water Pollution

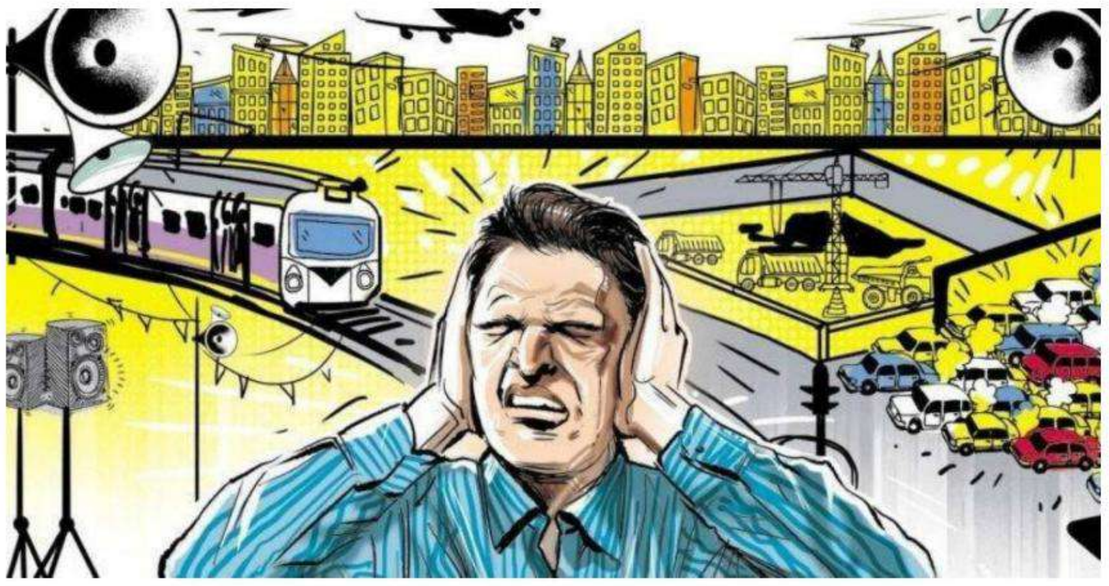
- Water pollution, to a larger extent, can be controlled by a variety of methods. Rather than releasing sewage waste into water bodies, it is better to treat them before discharge. Practising this can reduce the initial toxicity and the remaining substances can be degraded and rendered harmless by the 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 osmosis, and coagulation. As an individual, reusing, reducing, and recycling wherever possible will advance a long way in overcoming the effects of water pollution.

Noise Pollution

The word noise is derived from a Latin word 'Nausea' which means sickness in which one feels the need to vomit. Noise is the unpleasant and undesirable sound which leads to discomfort in human beings. **The intensity of sound is measured in decibels (dB)**. The faintest sound which can be heard by the Human ear is 1 Db. Due to increasing noise around the civilizations, noise pollution has become a matter of concern. Some of its major causes are vehicles, aircraft, industrial machines, loudspeakers, crackers, etc. Some other appliances also contribute to noise pollution like television, transistor, radio, etc. when used at high volume.



Causes Of Noise Pollution

- Following are the causes and sources of noise pollution:

- Industrialisation: Industrialisation has led to an increase in noise pollution as the use of heavy machinery such as generators, mills, huge exhaust fans are used, resulting in the production of unwanted noise.

- Vehicles: Increased number of vehicles on the roads are the second reason for noise pollution.

- Events: Weddings, public gatherings involve loudspeakers to play music resulting in the production of unwanted noise in the neighbourhood.

- Construction sites: Mining, construction of buildings, etc add to the noise pollution.

Effects Of Noise Pollution

- Noise pollution can be hazardous to human health in the following ways:

- Hypertension: It is a direct result of noise pollution which is caused due to elevated blood levels for a longer duration.
- Hearing loss: Constant exposure of human ears to loud noise that are beyond the range of sound that human ears can withstand damages the eardrums, resulting in loss of hearing.
- Sleeping disorders: Lack of sleep might result in fatigue and low energy level throughout the day affecting everyday activities. Noise pollution hampers the sleep cycles leading to irritation and an uncomfortable state of mind.
- Cardiovascular issues: Heart-related problems such as blood pressure level, stress and cardiovascular diseases might come up in a normal person and a person suffering from any of these diseases might feel a sudden shoot up in the level.

How To Control Noise Pollution

- . Honking in public places like teaching institutes, hospital, etc. should be banned.
- In commercial, hospital, and industrial buildings, adequate soundproof systems should be installed.
- Musical instruments sound should be controlled to desirable limits.
- Dense tree cover is useful in noise pollution prevention.
- Explosives should be not used in forest, mountainous and mining areas.

Land Pollution

- Land Pollution refers to the deterioration of the earth's land surfaces. Furthermore, it occurs mainly due to the indirect and direct effects of human activities. Similarly, when we misuse the land resources, land pollution happens.
- It is a global issue that needs to be fixed immediately. The unnecessary materials contaminate the quality of our land. For instance, even the garbage on the streets is a kind of land pollution only.

Causes Of Land Pollution

- Various Causes of Land Pollution are listed below.

- Agricultural Activities – As animal production grows, it becomes decoupled from crop production, causing normal nutrient cycles between plants, soil, and animals to be severely disrupted, resulting in the widespread use of synthetic herbicides, insecticides, bactericides, and fertilizers, all of which contribute to pollution.

- Mining Activities – Mining has the potential to pollute the air and water supply, damage biodiversity and ecosystems, and permanently alter natural landscapes. Mining harms the ecosystem by destroying habitats, causing soil erosion, and polluting surface water, groundwater, and soil.

- Urbanization – Intensive urbanization will exacerbate poverty by preventing local municipalities from providing services to all residents. Increased air pollution from concentrated energy usage has a direct effect on human health. Lead levels in urban air are elevated as a result of automobile emissions.

Effect Of Land Pollution

Various Effects of Land Pollution are listed below.

Climate Change – Land contamination, such as that caused by mining, farming, and factories, may allow harmful chemicals to enter the soil and water. These chemicals have the potential to kill animals and plants, destroying the food chain. Landfills emit methane, a greenhouse gas that contributes to global warming.

Acid Rain – Forests, especially those at higher elevations, are also harmed by acid rain and fog. Acid deposits deplete vital nutrients like calcium and allow aluminum to be released into the soil, making it difficult for trees to absorb water. Acids also damage the leaves and needles of trees.

Deterioration of fields – A chain reaction occurs as a result of soil contamination. It alters soil biodiversity, decreases soil organic matter, and reduces soil's filtering ability. It also contaminates water contained in the soil and groundwater, resulting in nutrient imbalances in the soil.

How To Control Land Pollution

- To reduce land emissions, reduce, reuse, and recycle. It is essential to practice reforestation and afforestation. Organic fertilizers, an integrated pest control method, and crop rotation can all be used by farmers. One of the most important ways to help minimize landfill waste, protect natural resources, preserve wildlife, reduce noise, reduce energy use, and slow global warming is to incorporate recycling habits into your everyday life.

- Reforestation avoids river and lake silting by reducing surface erosion and preserving the fertile topsoil. It prevents the soil surface from sealing and cuts down on the amount of rainwater that runs off. When compared to petroleum-based plastics, biodegradable plastics produce significantly less waste. As biodegradable plastics degrade, they decompose into nontoxic, harmless components. Just 32% of the greenhouse gases released by petroleum-based plastics are produced by them.

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Thank You

SCOTTISH CHURCH COLLEGE

ENVIRONMENTAL STUDIES (ENVS) PROJECT

CALCUTTA UNIVERSITY ROLL: 202223-11-0016

CALCUTTA UNIVERSITY REGISTRATION: 223-1211-0019-20

NAME: OINDRILA GHOSH

COLLEGE ROLL NUMBER: PLSA20F628

DEPARTMENT: POLITICAL SCIENCE

SEMESTER: II

SESSION: 2020-2021

TOPIC: CONCUSSION CAUSED TO THE ENVIRONMENT DUE TO HUMAN ACTIONS WITH REFERENCE TO GLOBAL WARMING AND CLIMATE CHANGE

ACKNOWLEDGEMENT

I am very thankful to our honourable Calcutta University, our college Scottish Church College and our departmental professors of the respective subject for giving us an opportunity to do the term paper on such an interesting topic.

I am also very thankful to my parent for their constant guidance and help for completing my assignment on time.

Therefore I wish to convey my heartfelt regards and gratitude to each one of them.

INDEX

INTRODUCTION

Climate change refers to the long-term changes in the climate that occur over decades, centuries or longer. It is caused due to rapidly increase in greenhouse gases in the Earth's atmosphere primarily because of burning fossil fuels. For example, coal, oil, natural gas.

These heat trapping gases are warming the rock bed and oceans of our planet, thus resulting in melting of polar ice caps and rise in sea level. Changes also occur in storm patterns, altered ocean currents, changes in the rainfall, melting snow and ice, more extreme heat event, fires and drought. These impacts are projected to continue and in some cases, intensify, affecting human health, infrastructure, forests, agriculture, freshwater supplies, coastlines and marine ecosystems.

Earth is on the verge of end: Myth or reality?

Earth is sick. Let's cause uproar to save our planet.

PRESENTATION

GLOBAL WARMING

Global warming is the temperature of earth's surface, oceans and atmosphere rising over ten to thousand of years. Average temperature today are about $1^{o}C(1.8^{o}F)$ higher than before. People started burning a lot of coal around 1750. But in some parts of the world it is less than this .Some more, most of the scientists say that by the year 2100 temperatures will be $2^{o}C$ $(3.6^{o}F)$ TO $4^{o}C$ that is $(7.2^{o}F)$ higher than it was before 1750.The changes people can see easily is the increase in temperature causing melting of ice caps all around the world.

Sea level is rising for two reasons. one is because of ice on the land, like Greenland, melting into the sea. The other reason is because of water getting expanded when it gets warmer. Many cities will be partly submerged into the ocean being flooded in the 21^{st} century.

Rate of global warming is mostly increasing because of people flaming things like gasoline to run cars and natural gas to keep house warm. But the heat from burning itself only makes the world a tiny bit warmer: it is the carbon dioxide from the burning which is the biggest part of the problem.

"Pampering our earth is the need of hour"

Alarm of nature is ringing high.

CAUSES OF GLOBAL WARMING;

Global warming is caused by several things, which include manmade or anthropogenic cause and also by natural causes.

- **NATURAL CAUSES:** Natural causes are created by nature and its various phenomena's. Natural causes are release of methane gas from arctic tundra and wetlands. Methane is a greenhouse gas which is very dangerous to our environment. Another natural cause is that the earth goes through a cycle of climate change. This climate change usually lasts about 40,000 years. Volcanic eruption, forest fire is some other natural causes of global warming.

- **MANMADE CAUSES:** Manmade causes probably do the most damage to our planate. There are innumerable manmade causes of global warming. Pollution is one of the biggest man made issue. Burning of fossil fuels extensively without any limitation causes much pollution in the environment. Fossil fuels are the fuels made of organic matter such as petroleum, coal and natural oil. Thus when they are burnt they give out CO_2, a greenhouse gas. When we dig up the fossil fuel, we dig up the methane as well as we let to escape it in the atmosphere.

FACTORY EMMISSIONS BEING A MANMADE CAUSE

FOREST FIRE, A NATURAL CAUSE

EFFECTS OF GLOBAL WARMING:

Global warming has adverse effects on the environment and also in our life.

- **EFFECT ON WEATHER AND CLIMATE:** Climate changes are the most evident. With increase in temperature, the moisture carrying capacity of wind also increases. As a result currents of air and water change directions. Frequency of precipitation will change, keeping back the threats of floods and droughts. This will in turn the life cycle of pathogens and vectors, further increasing threats for human health.

CLIMATE CHANGE IS ACCELERATING RESULTING TO THE FREQUENT OCCURANCE OF FLOODS, DROUGHTS, CYCLONE AND SOIL ERUPTIONS

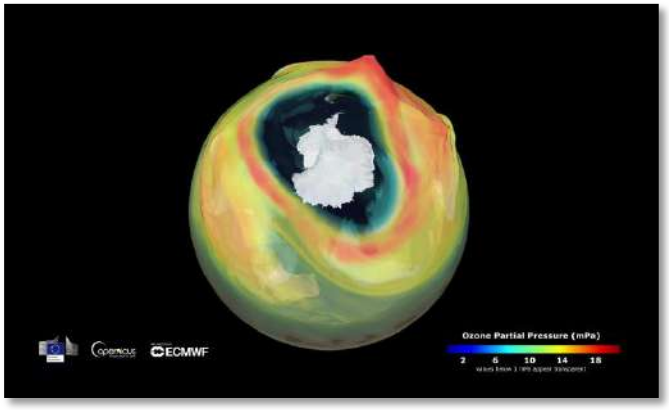
- **EFFECT ON AGRICULTURE:** Due to climate change crop productivity is also affected. Increased rate of transpiration, growth of weeds cause disease incidence especially in the tropics. It has been estimated that for every 1 degree rise in temperature rice yield will decrease by 5% in South East Asia. Increase in temperature abruptly. If not checked then these effects will soon reach to the temperate grasslands also.

- **EFFECT ON FLORA AND FAUNA:** The latitudinal arrangement of the earth will get altered for rise in temperature. The temperate zone will shift towards poles by about 250-260 km. The flora sensitive to temperature will die out along with whipping out the animals depending on the same. So, arid regions will develop in several parts of the earth.

Regions being transformed to arid landmass

Fate of fauna due to global warming in near future

- **CHANGES IN SEA LEVEL:** The Inter Governmental Panel on Climate Change (IPCC)'s third assessment report finds that in the last 40 years, the global average sea level has risen, ocean heat content has increased and snow cover and ice extent have decreased, which threatens to inundate low lying island nations and coastal regions throughout the world.
- **OZONE LAYER DEPLETION:** The ozone layer protects the earth from the harmful ultraviolet rays emitted by sun. If the ozone layer is degraded by human actions then its impacts would be catastrophic.



OZONE HOLE FORMED DUE TO EXCESSIVE USAGE OF CLOROFLURO CARBONS : PICTURE TAKEN IN THE YEAR 2018.

PRECAUTIONS TO PREVENT GLOBAL WARMING:

Some major precautions that can help in preventing global warming are as follows:

1. Afforestation at a huge scale throughout the world.
2. Replacement of CFCs with ozone friendly substitutes.
3. Reducing use of artificial fertilizers and dependence more on natural measure and organic farming.
4. Encouraging use of solar energy, hydel power, wind energy.
5. CNG and hydrogen operated vehicles should be used.
6. Ruthless usage of ACs and refrigerators should be controlled.

PROTOCOLS TO PREVENT GLOBAL WARMING:

Various protocols were singed to control global warming among which the major two are as follows:

- **MONTREAL PROTOCOL 1987:** The purpose of this treaty is to check the emission of the quantity of Ozone reducing substances, after recognising the validity of the harmful effects of Ozone depletion.
- **KYTO PROTOCOL 1992:** Through this treaty the UNFCCC commits state parties to reduce greenhouse gas emission, based on the scientific consensus that global warming is occurring and it is extremely like that human made CO_2 have prominently caused it.

SUMMITS AND CONFERENCES ON CLIMATE CHANGE AND GLOBAL WARMING

So this was a very brief presentation on climate change and global warming.

CONCLUSION

Human induced climate change has contributed to changing patterns of extreme weather across the globe, from longer and hotter heat waves to heavier rains. From a broad perspective, all weather events are now connected to climate change. While natural variability continues to play a key role in extreme weather, climate change has shifted the odds and changed the natural limits, making certain types of extreme weather that is more intense and frequent.

While our understanding of how climate change affects extreme weather is still developing, evidences suggests that extreme weather may affect even more than anticipated. Extreme weather is on the rise, and indications are that it will continue to increase, in both predictable and unpredictable ways.

Our planate, our responsibility to act conscientiously

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Thank you

BIODIVERSITY AND CONSERVATION

NAME – JESSICA DINGDOH

COLLEGE ROLL NO – PLSA20F630

CU ROLL NO – 202223-11-0019

CU REG NO – 223-1211-0024-20

2nd SEMESTER

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I would like to express my special thanks of gratitude to my teacher Mrs. Sushmita Gonsalves, who gave me the golden opportunity to do this wonderful project. I am really thankful to her. Secondly, I would like to thank my parents and friends who helped me in finalizing this project within a limited time frame

INTRODUCTION

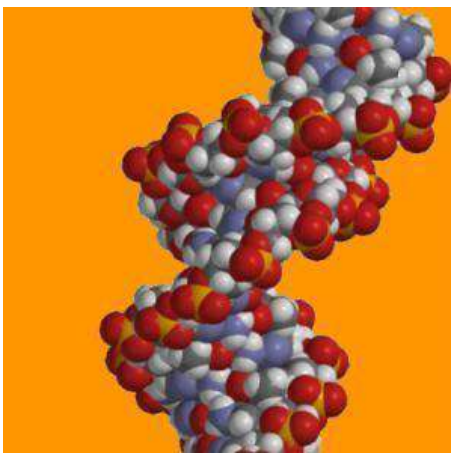
The great variety of life on earth has provided for man's needs over thousands of years. This diversity of living creatures forms a support system which has been used by each civilization for its growth and development. Those that used this "bounty of nature" carefully and sustainably survived. Those that overused or misused it disintegrated. Biodiversity plays a critical role in sustaining human population across the globe. We depend on it for sustained food growth, for clean air and water and for medicine and shelter. Ecosystem degradation threatens our most basic necessity- a healthy environment to live and thrive in. The diversity of life on earth is so great that if we use it sustainably, we can go on developing new products from biodiversity for many generations. This can only happen if we manage biodiversity as a precious resource and prevent the extinction of species.

What is Biodiversity?

'Biological Diversity' or biodiversity is that part of nature which includes the differences in genes among the individuals of a species, the variety and richness of all the plant and animal species at different scale in space, locally, in a region, in the country and the world, and various types of ecosystems, both terrestrial and aquatic, within a defined area. The variety can be observed at three levels; the genetic variability within a species, the variety of species within a community, and the organization of species in an area into distinctive plant and animal communities constitutes ecosystem diversity. Biodiversity is usually explored at three levels :

- **Genetic diversity**
- **Species diversity**
- **Ecosystem diversity**

GENETIC DIVERSITY



Each member of any animal or plant species differs widely from others individuals in its genetic makeup because of the large number of combinations possible in the genes that give every individual specific characteristic. It can be defined as Genetic variability present within species. This genetic variability is essential for a healthy breeding population of a species. If the number of breeding individuals is reduced, the dissimilarity of genetic makeup is reduced and in- breeding occurs. Eventually this can lead to the extinction of the species. Mutation of genes, genetic drift and gene flow are also responsible for genetic diversity. For e.g. There are more than 50,000 varieties of rice and more than a thousand varieties of mangoes found in India. Different breeds of dogs. Dogs are selectively bred to get the desired traits.

SPECIES **DIVERSITY**

The number of species of plants and animals that are present in a region constitutes its species diversity. The population of species of that particular location is called species richness. This diversity is seen in both natural ecosystems and in agricultural ecosystems. A natural forest ecosystem provides a large number of non-wood products that local people depend on such as fruits, fuel wood, fodder, fiber, gum, resin and medicines. Various species are helpful in purification of water, purification of air, enhance fertility of soils, maintain climatic stability and various other environmental functions. It contributes to a healthy ecosystem as each species has a specific link with a wealthy ecosystem. For e.g. woodland forest comprising 4-5 different species of trees. Tens of hundreds of fish species, coral and crustaceans found in a specific reef etc. At present conservation scientist have been able to identify and categories about 1.8 million species on earth. Areas that are rich in species diversity are called ‘Hotspots’ of diversity and India is among the world’s 15 nations that are exceptionally rich in species diversity.

ECOSYSTEM DIVERSITY

There are a large variety of different ecosystems on earth, which have their own complement of distinctive inter linked species based on the differences in the habitat. Ecosystem diversity can be described for a specific geographical region, or a political entity such as a country, a state or a taluka. An ecosystem is referred to as 'natural' when it is relatively undisturbed by human activities, or 'modified' when it is changed to other types of uses, such as farmland or urban areas. It incorporates both habitat and community diversity. An ecosystem is a unique combination of plant, animal and microorganism communities and their non-living physical characteristics interacting as a functional unit. Inherent in ecosystem diversity are thus both biotic (living) and abiotic (non-living) components, which makes it different from both genetic and species diversity. For e.g. deserts, wetlands, forest, grasslands, ocean etc.

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INDIA AS A MEGA DIVERSITY NATION

India stands among the top 10 or 15 countries for its great variety of plants and animals, many of which are not found elsewhere. India has 350 different mammals, 1,200 species of birds, 453 species of reptiles and 45,000 plant species, of which most are angiosperms, these include especially high species diversity of ferns and orchids. It has 50,000 known species of insects. It is estimated that 18% of Indian plants are endemic to the country and found nowhere else in the world. Flowering plants have much higher degree of endemism. Among amphibians found in India, 62% are unique to this country. It can be seen that India has a large variety of mammals, birds, reptiles, amphibia etc.

HOTSPOTS OF DIVERSITY

The earth's biodiversity is distributed in specific ecological regions. The rate at which the extinction of species is occurring throughout our country remains obscure. It is likely to be

extremely high as our wilderness areas are shrinking rapidly. Our globally accepted national 'Hot spots' are in the forests of the North-East and the Western Ghats, which are included in the world's most bio rich areas. Andaman and Nicobar Islands are extremely rich in species and many subspecies of animals and birds have evolved. The Andaman and Nicobar Islands alone have as many as 2200 species of flowering plant and 120 species of ferns. Out of 135 genera of land mammals in India, 85(63%) are found in the Northeast. The Northeast States have 1,500 endemic plant species. A major proportion of amphibian and reptile species, especially snakes, are concentrated in the Western Ghats, which is also a habitat for,1,500 endemic plant species.

ENDANGERED ND ENDEMIC SPECIES OF INDIA

There are several species which are endangered by human activity. They are categorized as Vulnerable, Rare, Indeterminate and Threatened. Other species are found only in India and are thus endemic or restricted to our country. Several plants and animals species are found in one or a few protected areas. Some important endangered animals are tiger, elephant, the rhino etc. The mammals restricted to a single area include the Indian wild ass, the hangul, the

golden langur, the pygmy etc. The endangered bird species are Siberian crane, the Great Indian bustard, the florican and several birds of prey. Vultures have suddenly disappeared and are now highly threatened. Equally threatened are several species of reptiles, amphibians, and invertebrates. Many plant species are now increasingly threatened. Major trees, shrubs, climbers are endangered. Small herbs and several orchids are yet another group of plants that are under threat. To protect endangered species India has created the Wildlife Protection Act. We need to find ways to support the conservation of our incredible wildlife for future generations.

SOME OF THE WILDLIFE SANCTUARIES AND NATIONAL PARKS OF INDIA

KAZIRANGA NATIONAL PARK

(famous for elephant, wild buffalo, gaur, wild

Boar, swamp deer, tiger, leopard etc.)

GIR NATIONAL PARK

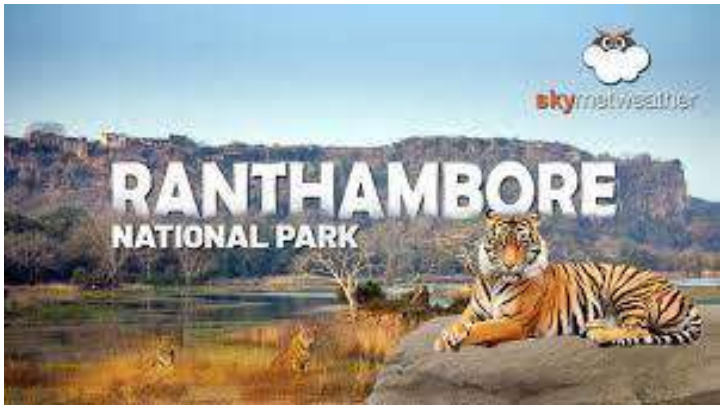
(famous for Asiatic lions and innumerable species Of plants and animal)

b

BANDRA WILDLIFE SANCTUARY

(famous for tiger, elephant, panther, bison,

sloth bear, wild dog, flying squirrel)



RANTHAMBORE NATIONAL PARK

(famous for Bengal tiger, Indian leopard, nilgai, wild boar, sambar, striped hyena, sloth bear, southern plains gray langur, rhesus macaque, mugger crocodile and chital. The sanctuary is home to a wide variety of trees, plants, birds and reptiles, as well as one of the largest banyan trees in India.)

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CU ROLL NO. – 202223-11-0021

CU REGISTRATION NO. – 223-1211-0032-20

ACKNOWLEDGEMENT

I, Anwesha Sangma the student of political science department, would like to express my special thanks of gratitude to my guide SUSHMITA GONSALVES maam, who gave me the golden opportunity to do this wonderful project on – ENVIRONMENTAL POLLUTION. I came to know about so many new things, for which I am really thankful.

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

Environmental pollution

Environmental pollution is the addition of contaminants into the natural environment that causes detrimental effects to nature, natural resources and mankind. Any unnatural and negative changes in all the dimensions like chemical, physical and biological characteristics of any component of the ecosystem i.e. air, water, soil which can cause harmful effects on various forms of life and property is called environmental pollution.

Though it is not a new phenomenon, yet it remains the world's greatest problem. Due to this both the developed and developing nations share this burden together, though awareness and stricter laws in developed countries have contributed to a larger extent in protecting their environment. Despite the global attention towards pollution, the impact is still being felt due to its severe long term consequences.

The types of pollution are:

1. **Air pollution**
2. **Water pollution**
3. **Soil pollution**
4. **Noise pollution**
5. **Marine pollution**

Air pollution is 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 materials. Air pollution may cause diseases, allergies and even death to humans.

Some of the air pollutants their sources and effects are:

- Nitrogen oxides is one of the pollutants which is found in industries, vehicles and power plants and it causes problem in the lungs, respiratory systems and also causes asthma and bronchitis.
- Smog is another such pollutants which is found in industries and vehicular pollution and it causes trouble in the respiratory system and human eye.
- Hydrocarbons is also another pollutants which is formed from the burning of fossil fuels and it causes kidney problems, irritation in eyes, nose, throat, asthma, hypertension etc.

The control measures are:

- Policy measures
- Collection of pollutants and convert it into less toxic forms by different methods.

Government initiatives:

- **NATIONAL AIR QUALITY MONITORING PROGRAMME (NAMP)**
- **NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)**

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. Some of the sources are industrial and community wastewater, marine pollution (river discharge, man-made pollution and oil spills). And it's effects are –

- Excess of nitrate in drinking water is dangerous for infants and human health, excess fluoride cause neuromuscular disorder and teeth deformity, hardening of bones and painful joints.
- Polluted water has less amount of Dissolved oxygen (DO) content which is important for sensitive organisms, thereby eliminates sensitive organisms.

Control measures:

- Organic farming and efficient use of animal residues as fertilizers.
- Excessive use of pesticides and fertilizers should be avoided

Soil pollution is the removal of useful substances from the soil or the addition of harmful substances to it. Garbage, cotton, clothes, newspapers, trees waste are the causes of soil pollution. Plastic, glasses and metal objects may also cause soil pollution. It's effects are – release of radioactive rays, biomagnification and pollutant gases cause health problems, it reduces soil fertility and thus crop yields; increase soil erosion and salinity. It's control measures are: afforestation, reforestation and use of organic farming, stopping the use of plastic bags etc.

Noise pollution is considered to be any unwanted or disturbing sound that affects the health and well being of humans and other organisms. Exposure to loud noise can also cause high blood pressure, heart disease, sleep disturbances and stress and these health problems can affect all age groups especially children. It can be controlled by following the limits of noise level, by staying away from noisy areas, using earplugs etc.

And at last Marine pollution, it is a combination of chemical 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. The effects of marine pollution are – skin and eye irritation and lung, liver problems from oil deposits and byproducts, reproductive system failure from exposure to poisonous industrial and agricultural chemicals. It can be controlled by reducing or recycling plastic, raising public awareness, etc.

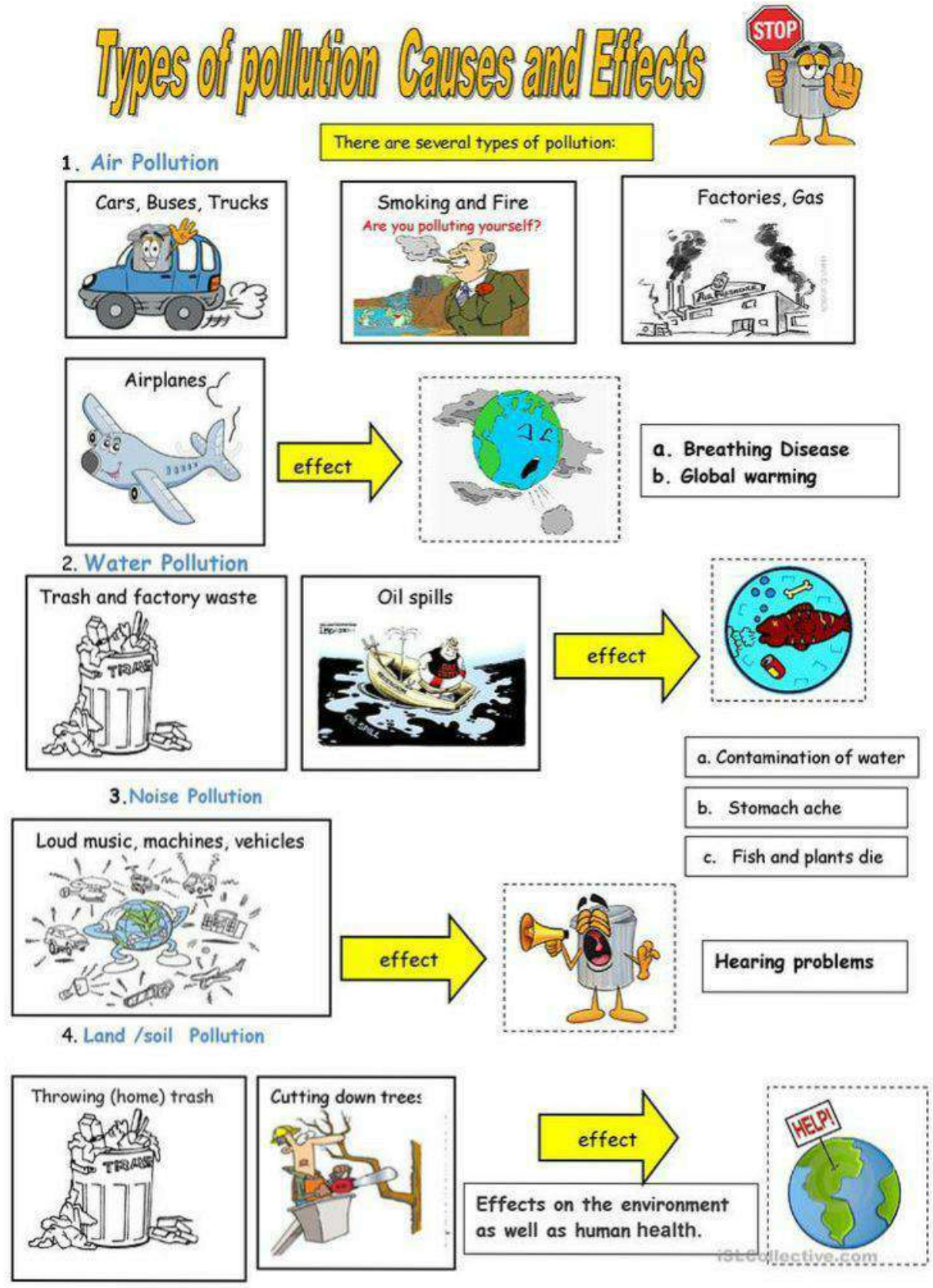

Figure : types of pollution and its causes and effects.

A hazardous waste is simply defined as a waste with properties that make it dangerous or capable of having a harmful effect on human health or the environment. It affects human health, children- especially to developing children

Whereas, Solid waste management, refers to the collecting, treating and disposing of solid material that is discarded because it has served its purpose or is no longer useful. Various methods are practised to control it, the methods are - recycling, composting, incineration, disposal, landfills etc. Hence, solid waste management reduces or controls the solid waste pollution and it’s hazardous effects.

CONCLUSION

It is the responsibility of every individual to save our planet from these environmental contamination agents. If preventive measures are not taken then our future generation will have to face major repercussions. The govt. is also taking steps to create public awareness. Every individual should be involved in helping to reduce and control pollution.

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ENVS PROJECT
CU ROLL NO: 202223-21-0025
CU REG NO: 223-1111-0086-20
COLLEGE ROLL NO: PLSA20M645

PROJECT TITLE:- Water Pollution

ACKNOWLEDGEMENT

I would like to thank our teacher Dr. Sushmita Gonsalves ma'am for the liberty in choosing topics for our project .This project helped me choose a topic of environmental concern which interests me and I really learnt a lot from this especially how I can take small steps to live a sustainable life.

What is water pollution?

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 and effects of water pollution

Water pollution can be caused in a number of ways, one of the most polluting being city sewage and industrial waste discharge. Indirect sources of water pollution include contaminants that enter the water supply from soils or groundwater systems and from the atmosphere via rain.
Soils and groundwaters contain the residue of human agricultural practices and also improperly disposed of industrial wastes.

Water Contamination Disasters

Industrial Pollution

Industrial pollution is the cause the most devastating ocean pollution events. Oil Spill is one of the most reason for the water contamination.Some of the more major spills in recent times include the Exxon Valdez oil spill in Prince William Sound, Alaska, in 1989 and the BP oil spill in the Gulf of Mexico in 2010.

Exxon Valdez Oil Spill 1989

Exxon Valdez was a VLCC (Very Large Crude Carrier) oil tanker that ran aground on Bligh Reef in Prince William Sound on March 24, 1989 at 12:04 AM. *Exxon Valdez* was carrying 1.26 million barrels of oil at the time of this collision, and, as a result of its grounding, spilled over one fifth (about 257,000 barrels) of its cargo. The total volume of the spill could fill 125 Olympic-sized swimming pools. Over four summers were spent on the cleanup effort, which cost more than $2 billion on Exxon's account, before the cleanup effort was abandoned. Some of the beaches remain oiled to this day, while the original spill covered more than 1,300 miles of shoreline.

Deepwater Horizon Oil Spill 2010

Deepwater Horizon was a semi-submersible oil drilling rig that was stationed in the Gulf of Mexico near Louisiana and operated by BP. On April 20, 2010, a blowout aboard *Deepwater Horizon* caused an explosion which killed 11 of the crew and displaced the rig

from its attachment to the well at the bottom of the ocean. As a result of this displacement, the well was left open to vent directly into the sea. The well was not capped for another 87 days because of the difficulty in sending a probe more than 5,000 feet beneath the surface. During this time more than 3.19 million barrels of oil were let into the ocean, more than twice as many as the *Exxon Valdez* spill from 20 years earlier. Over 1,000 miles of shoreline along the Gulf were impacted by this spill.

Woburn Massachusetts Water Contamination

Industrial solvent is the reason causing the water pollution of the river in Woburn Massachusetts. Since 1969 to 1979, there were 12 incidence of childhood leukemia happening in this area. Other than the leukemia, The residents show high risks of getting liver, kidney, prostate and urinary cancer. The risks of congenital abnormalities and birth defects were also pretty high during that period. The high chemical content has found in the Woburn water contamination, which are PCE and TCE. They are the major cause of the diseases above.

Drinking Water

Drinking water crises are some of the most human-affecting issues with water experienced globally. Whether it is a contamination to a drinking source or a lack of water to drink, problems with drinking water can affect the well-being of thousands of people.

Flint Water Crisis

For the past one to two years the city of Flint, Michigan has been undergoing a drinking water crisis. Since switching the water source from the Detroit River and Lake Huron to the Flint River, the drinking water in Flint has been plagued with high levels of lead and other contaminants. Lead levels up to 10 times higher than average were reported upon further investigation, with this having many health implications for those effected including: skin lesions, hair loss, high lead levels in the blood, vision loss, memory loss, depression and anxiety. This crisis is ongoing, with many national efforts to correct and prevent similar issues from occurring in the future.

Yamuna India

The river “Yamuna India”, which takes over 70% of sources of New Delhi”s water supply, is a perfect example of a polluted river. The water contamination of this Indian river is horrible. Death, disease, cancer, organ damage appears in people’s life because of

the river. Not only the pesticides cause the pollution of river, the heavy metals, such as copper, lead, zinc and nickel are also the causes. Even though the filter and filtering techniques are used by people right now, but they can not solve the water pollution radically.

Some Simple Ways to Prevent Water Pollution

1. Pick up litter and throw it away in a garbage can.
2. Blow or sweep fertilizer back onto the grass if it gets onto paved areas. Don't put fertilizer on the grass right before it rains. The chemicals will wash into storm drains and waterways.
3. Mulch or compost grass or yard waste. Or, leave it in your yard if you can't compost. Don't blow leaves into the street. This clogs and damages storm drains.
4. Wash your car or outdoor equipment where it can flow to a gravel or grassy area instead of a street.
5. Don't pour your motor oil down the storm drain. Take it to the nearest auto parts store. It's free!
6. Never clean up a spill by hosing it into a storm drain. Place kitty litter, sand, or another absorbent on the spill. Once the liquid becomes solid - sweep it up and throw it in a garbage can.

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BIODIVERSITY and CONSERVATION

In our biosphere immense diversity (or heterogeneity) exists not only at the species level but at all levels of biological organisation ranging from macromolecules within cells to biomes. Biodiversity is the term popularised by the socio-biologist Edward Wilson to describe the combined diversity at all the levels of biological organisation.

The most important of them are–

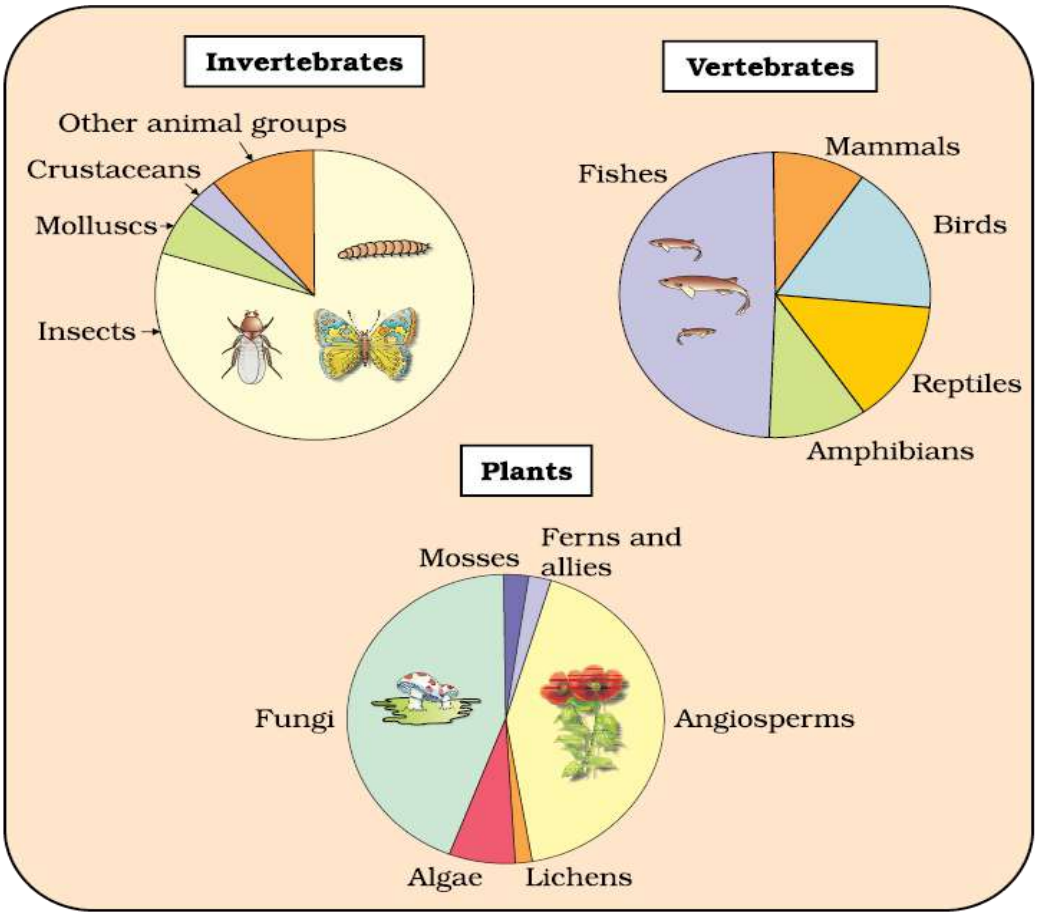
(1) **Genetic diversity**: A single species might show high diversity at the genetic level over its distributional range. The genetic variation shown by the medicinal plant Rauwolfia vomitoria growing indifferent Himalayan ranges might be in terms of the potency and concentration of the active chemical (reserpine) that the plant produces. India has more than 50,000 genetically different strains of rice, and 1,000 varieties of mango.

(2) **Species diversity**: The diversity at the species level, for example, the Western Ghats have a greater amphibian species diversity than the Eastern Ghats.

(3) **Ecological diversity**: At the ecosystem level, India, for instance, with its deserts, rain forests, mangroves, coral reefs, wetlands, estuaries, and alpine meadows has a greater ecosystem diversity than a Scandinavian country like Norway. It has taken millions of years of evolution, to accumulate this rich diversity in nature, but we could lose all that wealth in less than two centuries if the present rates of species losses continue. Biodiversity and its conservation are now vital environmental issues of international concern as more and more people around the world begin to realise the critical importance of biodiversity for our survival and well- being on this planet.

Since there are published records of all the species discovered and named, we know how many species in all have been recorded so far, but it is not easy to answer the question of how many species there are on earth. According to the International Union for Conservation of Nature and Natural Resources (IUCN) (2004), the total number of plant and animal species described so far is slightly more than 1.5 million, but we have no clear idea of how many species are yet to be discovered and described. Estimates vary widely and many of them are only educated guesses. For many taxonomic groups, species inventories are more complete intemperate than in tropical countries. Considering that an overwhelmingly large proportion of the species waiting to be discovered are in the tropics, biologists make a statistical comparison of the temperate-tropical species richness of an exhaustively studied group of insects and extrapolate this ratio to other groups of animals and plants to come up with a gross estimate of the total number of species on earth. Some extreme estimates range from 20 to 50 million, but a more conservative and scientifically sound estimate made by Robert May places the global species diversity at about 7 million. More than 70 per cent of all the species recorded are animals, while plants (including algae, fungi, bryophytes, gymnosperms and angiosperms) comprise no more than 22per cent of the total. Among animals, insects are the most species-rich taxonomic group, making up more than 70 per cent of the total. That means, out of every 10 animals on this planet, 7 are insects. The number of fungi species in the world is more than the combined total of the species of fishes, amphibians, reptiles and mammals. Biologists are not sure about how many prokaryotic species there might be. The

problem is that conventional taxonomic methods are not suitable for identifying microbial species and many species are simply not culturable under laboratory conditions. If we accept biochemical or molecular criteria for delineating species for this group, then their diversity alone might run into millions. Although India has only 2.4 per cent of the world's land area, its share of the global species diversity is an impressive 8.1 per cent. That is what makes our country one of the 12 mega diversity countries of the world. Nearly 45,000 species of plants and twice as many of animals have been recorded from India. If we accept May's global estimates, only 22 per cent of the total species have been recorded so far. Applying this proportion to India's diversity figures, we estimate that there are probably more than 1,00,000 plant species and more than 3,00,000 animal species yet to be discovered and described. Considering the immense trained manpower (taxonomists) and the time required to complete the job. The situation appears more hopeless when we realise that a large fraction of these species faces the threat of becoming extinct even before we discover them. Nature's biological library is burning even before we catalogued the titles of all the books stocked there.



REPRESENTING GLOBAL BIODIVERSITY : PROPORTIONATE NUMBER OF SPECIES OF MAJOR TAXA OF PLANTS , INVERTEBRATES AND VERTEBRATES.

Patterns of Biodiversity

(1) Latitudinal gradients: The diversity of plants and animals is not uniform throughout the world but shows a rather uneven distribution. For many groups of animals or plants, there are interesting patterns in diversity, the most well- known being the latitudinal gradient in diversity. In general, species diversity decreases as we move away from the equator towards the poles. With very few exceptions, tropics (latitudinal range of 23.5° N to23.5° S) harbour more species than temperate or polar areas. Colombia located near the equator has nearly 1,400 species of birds while New York at 41° N has 105 species and Greenland at 71° N only 56 species. India, with much of its land area in the tropical latitudes, has more than 1,200 species of birds. A forest in a tropical region like Equator has up to 10 times as many species of vascular plants as a forest of equal area in a temperate region like the Mid-west of the USA. The largely tropical Amazonian rain forest in South America has the greatest biodiversity on earth- it is home to more than 40,000 species of plants, 3,000 of fishes, 1,300 of birds, 427of mammals, 427 of amphibians, 378 of reptiles and of more than1,25,000 invertebrates. Scientists estimate that in these rain forests there might be at least two million insect species waiting to be discovered and named.

Ecologists and evolutionary biologists have proposed various hypotheses; some important ones are

(a) Speciation is generally a function of time, unlike temperate regions subjected to frequent glaciations in the past, tropical latitudes have remained relatively undisturbed for millions of years and thus, had a long evolutionary time for species diversification,

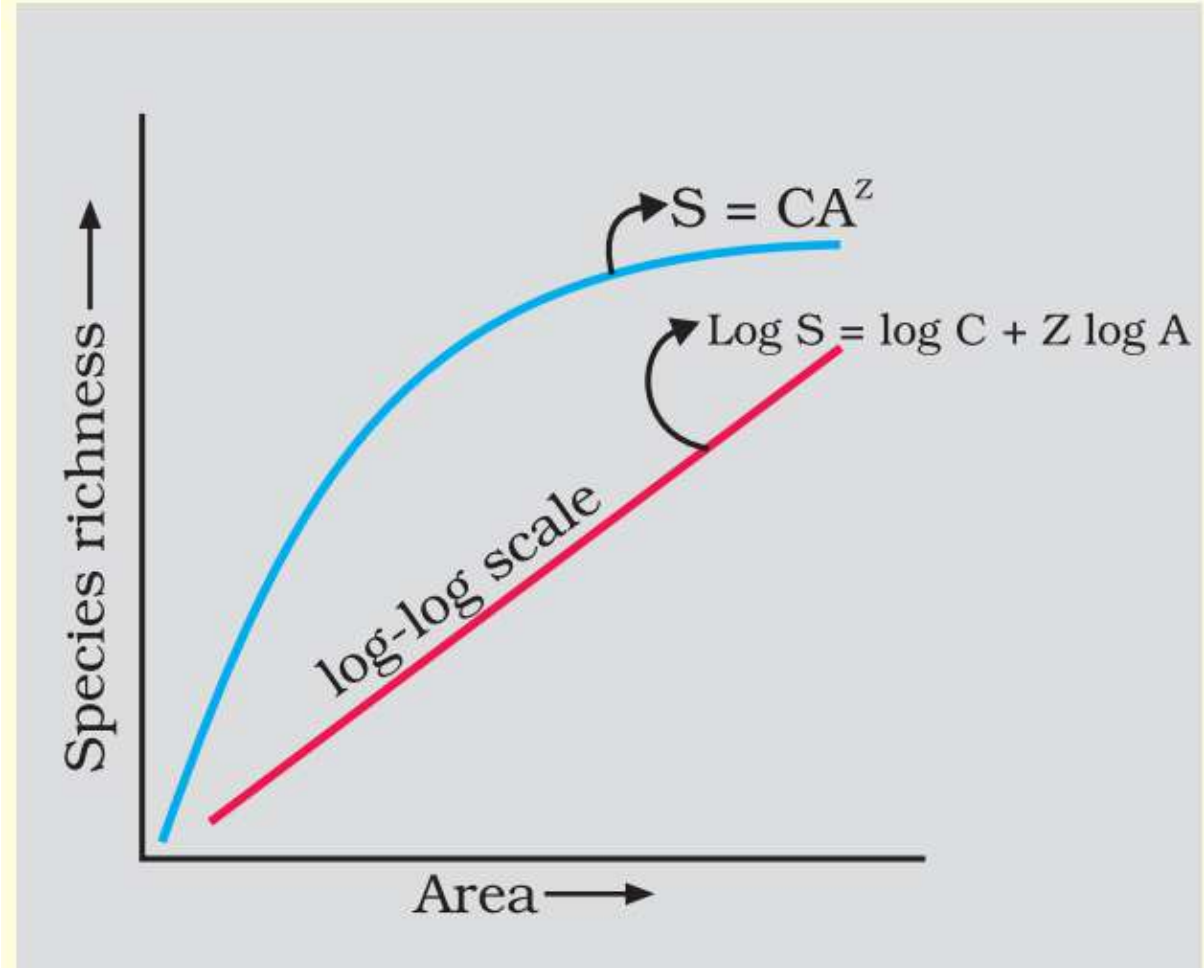
(b) Tropical environments, unlike temperate ones, are less seasonal, relatively more constant and predictable. Such constant environments promote niche specialisation and lead to a greater species diversity and

(c) There is more solar energy available in the tropics, which contributes to higher productivity; this in turn might contribute indirectly to greater diversity.

(2) Species-Area relationships: During his pioneering and extensive explorations in the wilderness of South American jungles, the great German naturalist and geographer Alexander von Humboldt observed that within a region species richness increased with increasing explored area, but only up to a limit. In fact, the relation between species richness and area for a wide variety of taxa (angiosperm plants, birds, bats, freshwater fishes) turns out to be a rectangular hyperbola

(3) On algorithmic scale, the relationship is a straight line described by the equation log S = log C + Z log A where S= Species richness A= Area Z = slope of the line (regression coefficient) C = Y-intercept Ecologists have discovered that the value of Z lies in the range of 0.1 to 0.2, regardless of the taxonomic group or the region (whether it is the plants in Britain, birds in California or molluscs in New York state, the slopes of the regression line are amazingly similar). But, if you analyse the species-area relationships among very large areas like the entire continents, you will

find that the slope of the line to be much steeper (Z values in the range of 0.6 to 1.2). For example, for frugivorous (fruit-eating) birds and mammals in the tropical forests of different continents, the slope is found to be 1.15.



SHOWING SPECIES AREA RELATIONSHIP.

The importance of Species Diversity to the Ecosystem

For many decades, ecologists thought that communities with more species, generally, tend to be steadier than those with less species. A stable community should not show too much disparity in productivity from year to year; it must be either resistant or resilient to occasional disturbances (natural or man-made), and it must also be resistant to invasions by alien species. We don't know how these attributes are linked to species richness in a community, but David Tilman's long-term ecosystem experiments using outdoor plots provide some tentative answers. Tilman found that plots with more species showed less year-to-year variation in total biomass. He also showed that in his experiments, increased diversity contributed to higher productivity. Although, we may not understand completely how species richness contributes to the well-being of an ecosystem, we know enough to realise that rich biodiversity is not only essential for ecosystem health but imperative for the very survival of the human race on this planet. We can understand the importance of survival of species by

developing a proper perspective through an analogy (the 'rivet popper hypothesis') used by Stanford ecologist Paul Ehrlich. In an airplane (ecosystem) all parts are joined together using thousands of rivets (species). If every passenger travelling in it starts popping a rivet to take home (causing a species to become extinct), it may not affect flight safety (proper functioning of the ecosystem) initially, but as more and more rivets are removed, the plane becomes dangerously weak over a period of time. Furthermore, which rivet is removed may also be critical. Loss of rivets on the wings (key species that drive major ecosystem functions) is obviously a more serious threat to flight safety than loss of a few rivets on the seats or windows inside the plane.

Loss of Biodiversity

While it is doubtful if any new species are being added (through speciation) into the earth's treasury of species, there is no doubt about their continuing losses. The biological wealth of our planet has been declining rapidly and the accusing finger is clearly pointing to human activities. The colonisation of tropical Pacific Islands by humans is said to have led to the extinction of more than 2,000 species of native birds. The IUCN Red list (2004) documents the extinction of 784 species (including 338vertebrates, 359 invertebrates and 87 plants) in the last 500 years. Some examples of recent extinctions include the dodo (Mauritius), quagga (Africa), thylacine (Australia), Steller's Sea Cow (Russia) and three subspecies (Bali, Javan, Caspian) of tiger. The last twenty years alone have witnessed the disappearance of 27 species. Careful analysis of records shows that extinctions across taxa are not random; some groups like amphibians appear to be more vulnerable to extinction. Adding to the grim scenario of extinctions is the fact that more than 15,500 species world-wide are facing the threat of extinction. Presently, 12 per cent of all bird species, 23 per cent of all mammal species, 32 per cent of all amphibian species and 31per cent of all gymnosperm species in the world face the threat of extinction. From a study of the history of life on earth through fossil records, we learn that large-scale loss of species like the one we are currently witnessing have also happened earlier, even before humans appeared on the scene. During the long period (> 3 billion years) since the origin and diversification of life on earth there were five episodes of mass extinction of species. How is the 'Sixth Extinction' presently in progress different from the previous episodes? The difference is in the rates; the current species extinction rates are estimated to be 100 to 1,000 times faster than in the pre-human times and our activities are responsible for the faster rates. Ecologists warn that if the present trends continue, nearly half of all the species on earth might be wiped out within the next100 years.

In general, loss of biodiversity in a region may lead to (a) decline in plant production, (b) lowered resistance to environmental perturbations such as drought and (c) increased variability in certain ecosystem processes such as plant productivity, water use, and pest and disease cycles. Causes of biodiversity losses: The accelerated rates of species extinctions that the world is facing now are largely due to human activities. There are four major causes ('The Evil Quartet' is the sobriquet used to describe them).

(1) Habitat loss and fragmentation: This is the most important cause driving animals and plants to extinction. The most dramatic examples of habitat loss come from tropical rain forests. Once covering more than 14 per cent of the earth's land surface, these rain forests now cover no more than 6 per cent. They are being destroyed fast. The Amazon rain forest (it is so huge that it is called the 'lungs of the planet') harbouring probably millions of specie is being cut and cleared for cultivating soya beans or for conversion to grasslands for raising beef cattle. Besides total loss, the degradation of many habitats by pollution also threatens the survival of many species. When large habitats are broken up into small fragments due to various human activities, mammals and birds requiring large territories and certain animals with migratory habits are badly affected, leading to population declines.

(2) Over-exploitation: Humans have always depended on nature for food and shelter, but when 'need' turns to 'greed', it leads over-exploitation of natural resources. Many species extinctions in the last 500 years (Steller's Sea cow, passenger pigeon) were due to overexploitation by humans. Presently many marine fish populations around the world are over harvested, endangering the continued existence of some commercially important species.

(3) Alien species invasions: When alien species are introduced unintentionally or deliberately for whatever purpose, some of them turn invasive, and cause decline or extinction of indigenous species. The Nile perch introduced into Lake Victoria in east Africa led eventually to the extinction of an ecologically unique assemblage of more than 200 species of cichlid fish in the lake. You must be familiar with the environmental damage caused and threat posed to our native species by invasive weed species like carrot grass (Parthenium), Lantana and water hyacinth (Eichhornia). The recent illegal introduction of the African catfish Clarkias Gabrielinos for aquaculture purposes is posing a threat to the indigenous catfishes in our rivers.

(4) Co-extinctions: When a species becomes extinct, the plant and animal species associated with it in an obligatory way also become extinct. When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate. Another example is the case of a coevolved plant-pollinator mutualism where extinction of one invariably leads to the extinction of the other.

BIODIVERSITY CONSERVATION

There are many reasons, some obvious and others not so obvious, but all equally important. They can be grouped into three categories: narrowly utilitarian, broadly utilitarian, and ethical.

The narrowly utilitarian arguments for conserving biodiversity are obvious; humans derive countless direct economic benefits from nature-food (cereals, pulses, fruits), firewood, fibre, construction material, industrial products (tannins, lubricants, dyes, resins, perfumes) and products of medicinal importance. More than 25 per cent of the drugs currently sold in the market worldwide are derived from plants and 25,000species of plants contribute to the traditional medicines used by native peoples around the world. Nobody knows how many

more medicinally useful plants there are in tropical rain forests waiting to be explored. With increasing resources put into 'bioprospecting' (exploring molecular, genetic and species-level diversity for products of economic importance), nations endowed with rich biodiversity can expect to reap enormous benefits.

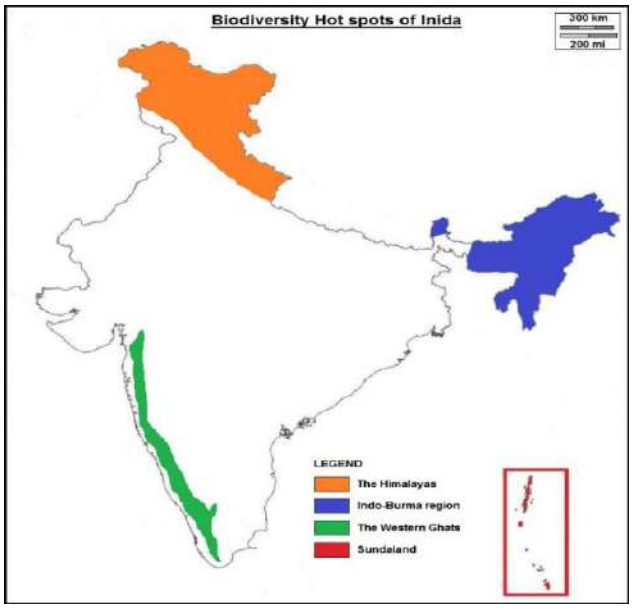
The broadly utilitarian argument says that biodiversity plays a major role in many ecosystem services that nature provides. The fast-dwindling Amazon Forest is estimated to produce, through photosynthesis, 20 per cent of the total oxygen in the earth's atmosphere.

The ethical argument for conserving biodiversity relates to what we owe to millions of plant, animal and microbe species with whom we share this planet. Philosophically or spiritually, we need to realise that every species has an intrinsic value, even if it may not be of current or any economic value to us. We have a moral duty to care for their well-being and pass on our biological legacy in good order to future generations.

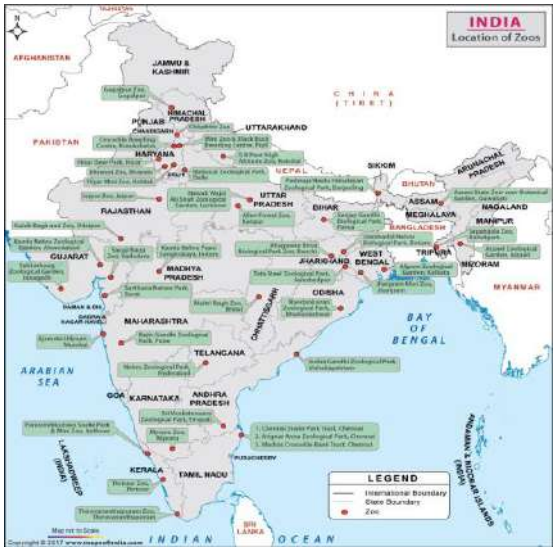
When we conserve and protect the whole ecosystem, its biodiversity at all levels is protected - we save the entire forest to save the tiger. This approach is called in situ (on site) conservation. However, when there are situations where an animal or plant is endangered or threatened (organisms facing a very high risk of extinction in the wild in the near future) and need surgent measures to save it from extinction, ex situ (off site) conservation is the desirable approach.

In situ conservation– Faced with the conflict between development and conservation, many nations find it unrealistic and economically not feasible to conserve all their biological wealth. Invariably, the number of species waiting to be saved from extinction far exceeds the conservation resources available. On a global basis, this problem has been addressed by eminent conservationists. They identified for maximum protection certain 'biodiversity hotspots' regions with very high levels of species richness and high degree of endemism (that is, species confined to that region and not found anywhere else). Initially 25 biodiversity hotspots were identified but subsequently nine more have been added to the list, bringing the total number of biodiversity hotspots in the world to 34. These hotspots are also regions of accelerated habitat loss. Four of these hotspots – Western Ghats and Sri Lanka, Indo-Burma and Himalaya , Sundarbans – cover our country's exceptionally high biodiversity regions. Although all the biodiversity hotspots put together cover less than 2 per cent of the earth's land area, the number of species they collectively harbour is extremely high and strict protection of these hotspots could reduce the ongoing mass extinctions by almost 30 percent. In India, ecologically unique and biodiversity-rich regions are legally protected as biosphere reserves, national parks and sanctuaries. India now has 14 biosphere reserves, 90 national parks and 448 wildlife sanctuaries. India has also a history of religious and cultural traditions that emphasised protection of nature. In many cultures, tracts of forest were set aside, and all the trees and wildlife within were venerated and given total protection. Such sacred groves are found in Khasi and Janita Hills in Meghalaya, Aravalli Hills of Rajasthan, Western Ghat regions of Karnataka and Maharashtra and the Sagrada, Chanda and Baster areas of Madhya Pradesh. In Meghalaya, the sacred groves are the last refuges for a large number of rare and threatened plants.

Ex situ Conservation– In this approach, threatened animals and plants are taken out from their natural habitat and placed in special setting where they can be protected and given special care. Zoological parks, botanical gardens and wildlife safari parks serve this purpose. There are many animals that have become extinct in the wild but continue to be maintained in zoological parks. In recent years ex situ conservation has advanced beyond keeping threatened species in enclosures. Now gametes of threatened species can be preserved in viable and fertile condition for long periods using cryopreservation techniques, eggs can be fertilised invitro, and plants can be propagated using tissue culture methods. Seeds of different genetic strains of commercially important plants can be kept for long periods in seed banks. Biodiversity knows no political boundaries and its conservation is therefore a collective responsibility of all nations. The historic Convention on Biological Diversity ('The Earth Summit') held in Rio de Janeiro in1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits. Ina follow-up, the World Summit on Sustainable Development held in 2002in Johannesburg, South Africa, 190 countries pledged their commitment to achieve by 2010, a significant reduction in the current rate of biodiversity loss at global, regional and local levels.



SOME HOTSPOTS OF INDIA



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Tiger Conservation in India

Be it hunting, poaching or habitat loss; the threats to our national animal- the tiger-remain. But India has become a beacon of hope in tiger conservation. According to a Government report released to mark 'World Tiger Day', 7 out of every 10 tigers in the world roam freely in India's forests (*Figure 1*). India's tiger census of 2018 entered the Guinness Book of World Records. It was the largest camera-trap wildlife survey conducted anywhere in the world. As per the survey, India is home to nearly 3000 of the world's 4000 tigers. That meant a 30% increase in the tiger population in just 4 years. The credit goes to the conservation programme- 'Project Tiger'. Its main activities include wildlife management, protection measures, and specific eco-development activities. Without it, the Indian (or Bengal) tiger (*Figure1.1*) would have joined the ranks of the extinct Balinese, Caspian, and Javanese tiger sub-species.

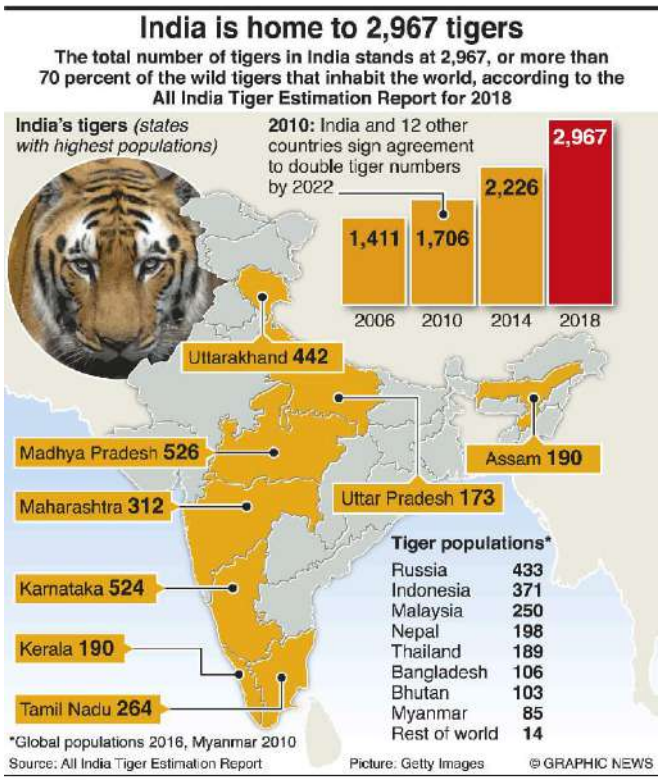

Figure 1: India's tiger surge

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Figure 1.1: The Indian or Bengal Tiger (Panthera tigris tigris)

But it was not always this way. When ‘Project Tiger’ was launched in 1973, India had around 1,800 tigers, down from the 100,000 tigers at the turn of the century. The colonial elite and Indian royals had hunted tigers to near extinction (*Figure 1.2 and 1.3).* The British Raj used ‘trophy shots’ of dead tigers to present the hunt as an embodiment of colonial masculinity and imperialism (*Figure 1.4*).

Figure 1.2 the Maharaja of Jaipur (centre) with his first kill

Figure 1.3: Post ‘shikaar’ photo-ops of Indian royals and British elites

Figure 1.4: Lord Curzon and his wife with their ‘trophy’ (1920)

The Project had stuttered in its fight against poaching. In 2006, the numbers fell to 1,400. This dramatically transformed India's approach to saving its national animal. The tiger population in India is known to have been increasing at a rate of 5.8 per cent each year since 2006. At the start of Project Tiger, India had just 9 tiger reserves. That number has now grown to 51 (*Figure 1.4).*

Figure 1.4: The 51 tiger reserves of India

A 'core-buffer' model (*Figure 1.5*) was followed. The core areas were freed from all human activities and given the status of National Parks or sanctuaries. In these parts, forest authorities were to focus exclusively on tiger habitat-conservation. The buffer areas were approached with a humane view of local communities.

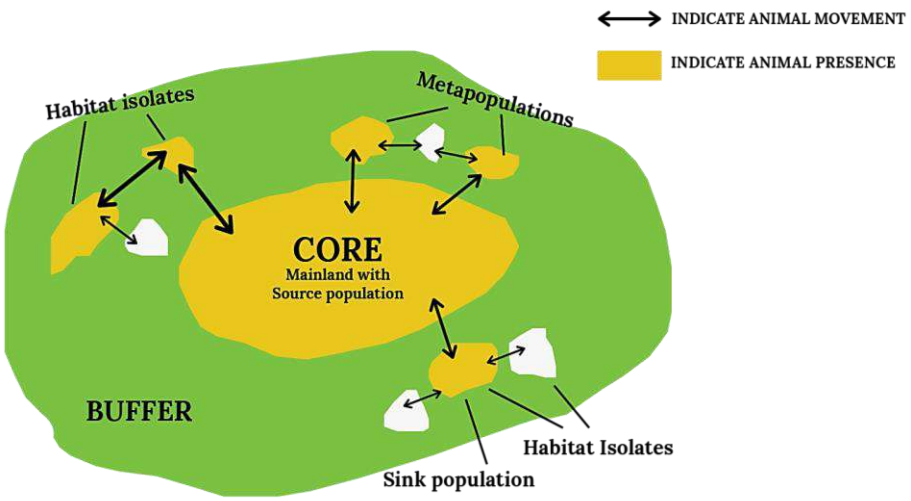

Figure 1.5: Anatomy of a tiger reserve

Still, some problems are yet to be fully countered. The demand for tiger parts and pelt (*Figures 1.6 and 1.7*) in international and domestic markets make commercial poaching (*Figure 1.8*) a low risk, high reward effort. Middlemen and traders (Figure *1.9*) earn upwards of 20 lakh per 'delivery'.

Figure 1.6: A fully harvested tiger

Figure 1.7: Tiger hides seized from poachers

Figure 1.8: A group of poachers apprehended

Figure 1.9: A group of illegal traders are arrested

To counter this, The National Tiger Conservation Authority (NTCA) – the body tasked with executing Project Tiger- has deployed the 'Special Tiger Protection Force' (STPF) (*Figure 2.0)* as an anti-poaching commando unit. It has worked closely with the Central Bureau of Investigation, Wildlife Crime Control Bureau and the regional Police Departments. In order to curb illegal trade in wildlife, four regional wildlife offices were set up at Delhi, Kolkata, Chennai and Mumbai.

Around the world, nearly 93% of the tiger's habitat have disappeared (*Figure 2.1*). India, however, is finding solutions. In 2019 alone, around $15 million were invested in tiger conservation. That includes relocating villages outside protected areas. India has built the world's largest animal underpass to let tigers safely pass beneath highway traffic.

Figure 2.0: A troop of STPF cadres

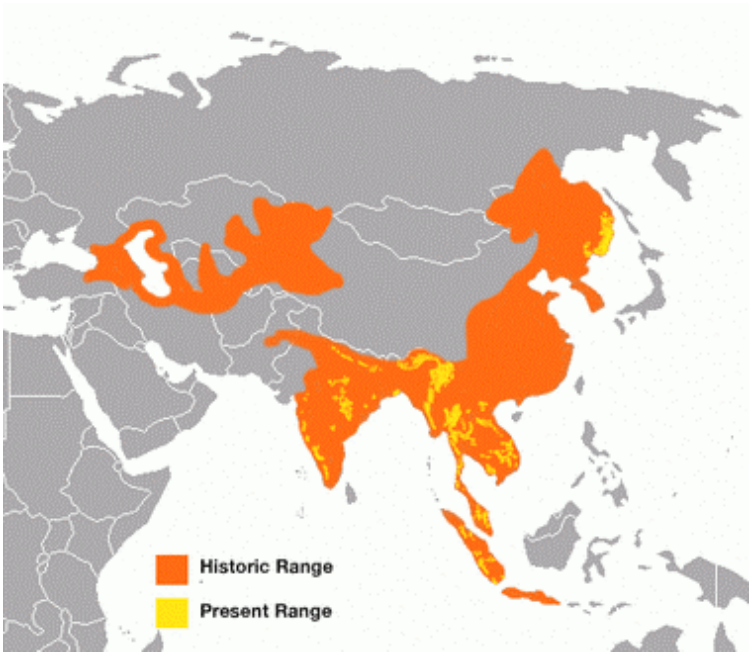

Figure 2.1: Tiger habitats disappering

India's success has become a model for the 13 other tiger-range countries i.e. where one can still find the big cat in the wild. All except India, Nepal and Bhutan are struggling to save tigers even in protected reserves. The group met in Russia and pledged to double their tiger populations by 2022. India will be able to meet its goals ahead of time. The Indian tiger population currently stands at over 3000. In 2011 the count stood at around 1,700. This shows that India's efforts are bearing fruit.

Another factor worth attributing to success of 'Project Tiger' is the cultural respect Indians display towards the animal (*Figure 2.2*). Many argue that it is the single most important factor for the continued survival of large carnivores in India. It is for this reason, we still have an almost intact assemblage of the Large Carnivore Community. While talking funds and numbers, the tolerant attitude of the masses towards the tiger cannot be ignored. There was also a national identity element- in 1972, national animal status was shifted from the Asiatic lion to the Bengal Tiger, as the latter had a larger pan-India footprint.

Figure 2.2: The Hindu Goddess Durga on her mount- the tiger

The increase in tiger numbers will add to India's global standing as a conservationist marvel that has preserved its natural habitat while simultaneously going for fast-paced economic growth. The methodology of counting tiger numbers has been contested by many in the scientific community. The challenge of rising instances of human-tiger conflict too needs addressing. In the future, India needs to develop prospects like wildlife tourism that give back to local communities. The current models favour multinationals & hoteliers. There is little incentive to locals to conserve, resulting in resentment. These sections of society need to be integrated into the larger bio-conservation effort. After all, the fate of the tiger is not entirely in the hands of biologists or conservationists, but on how society views and values the Tiger; what it is willing to pay and how it motivates the political will to conserve it.

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DEPARTMENT: POLITICAL SCIENCE

ENVIRONMENTAL

POLLUTION

ACKNOWLEGDEMENT

I Sneha Lama the student of political science department would like to express my special thanks to my mentor Sushmita Gonsalves for guiding and supporting me in preparing a project on this topic. I'm glad that this topic was given for the reason that it helped me in grabbing a lot of knowing regarding the topic.

I would also like to express my gratitude to my parents for providing me with the necessary gadgets without which the project would have been incomplete .

NOISE POLLUTION

Noise pollution is generally defined as a exposure to elevated sound levels that may lead to adverse effects in humans or other living organism. According to the World Health Organization, sound levels less than 70 DB are not damaging to living organism, regardless of how long or consistent the exposure is. Exposure for more than 8 hours to constant noise beyond 85 DB may be hazardous. If you work for more housrs daily in proximity to a busy road or highway, you are very likely exposed to traffic noise pollution around 85DB .

This type of pollution is so omnipresent in today's society that we often fail to notice it anymore:

1. Street traffic sounds from cars , buses, pedestrians ,ambulances etc.
2. Construction sounds like drilling or other heavy machinery in operation.
3. Airports with constant elevated sounds from air traffic i.e. planes taking off or landing.
4. Workplace sounds often common in open-space offices
5. Constant loud music in or near commercial venues
6. Industrial sounds like fans , generators, compressors, mills.
7. Train station traffic.
8. Household sounds, from the television set to music playing on the stereo or computer, vacuum cleaners, fans and coolers, washing machines, dishwashers, lawnmowers etc.
9. Events involving fireworks, firecrackers, loudspeakers etc.

Conflicts generate noise pollution through exploisions , gunfire etc . The dysfunctions, in this case, are likely caused by the conflict

HUMAN DISEASE CAUSED BY NOISE POLLUTION

Whether we realize we are subjected to it or not , noise pollution can be hazardous to our health in various ways:

1 HYPERTENSION: is in this case a direct result of noise pollution caused elevated blood levels for a longer period of time.

2 HEARING LOSS: can be directly caused by noise pollution, whether listening to loud music in your headphones or being exposed to loud drilling noises at work, heavy air or land traffic , or separate incidents in which noise levels reach dangerous intervals, such as intervals, 140Db for adult or 120Db for children

3 SLEEP DISTURBANCES: are usually caused by constant air or land traffic at night, and they are a serious condition in that they can affect everyday performance and lead to serious diseases.

4 CHILD DEVELOPMENT: children appear to be more sensitive to noise pollution, and a number of noise pollution related diseases and dysfunctions are known to affect children, from hearing Impairment to psychological and physical effects. Also children regularly use mobile players at a high volume are at risk of developing hearing dysfunctions.

5 DEMENTIA: isn't necessarily caused by noise pollution, but its onset can

6 PSYCHOLOGICAL DYSFUNCTIONS: and noise annoyance. Noise annoyance is, in fact, a recognized name for an emotional reaction that can have an immediate impact.

EFFECTS OF POLLUTION ON WILDLIFE AND MARINE LIFE:

Our oceans are no longer quiet. Thousands of oil drills, sonars, seismic, survey devices, coastal recreational watercraft and shipping vessels are now populating our waters, and that is a serious cause of noise pollution for marine life. Whales are among the most affected, as their hearing helps them orient themselves, feed and communicate. Noise pollution thus interferes with cetaceans feeding habits, reproductive pattern and migration routes, and can even cause haemorrhage and death.

Other than marine life, land animals are also affected by noise pollution in the form of traffic, firecrackers etc and birds are especially affected by the increased air traffic.

SOCIAL AND ECONOMIC COST OF NOISE POLLUTION

The World Health Organization estimates that one out

of three people in Europe is harmed by traffic noise. More than the purely medical effects of noise pollution on the individual, there is a significant social and economic impact. Since noise pollution leads to sleep disturbance during the day, it leads to hypertension and cardio vascular diseases and costs the health system additional time and money, and it negatively affects school performance in children.

PREVENTIONS FOR NOSIE POLLUTION

1 TURN OFF APPLIANCES AT HOME AND OFFICES:

We can turn off home and office appliances when not in use such as TV, games, computers etc. it can create unnecessary stress on ears. We can save electricity also when we turn them off.

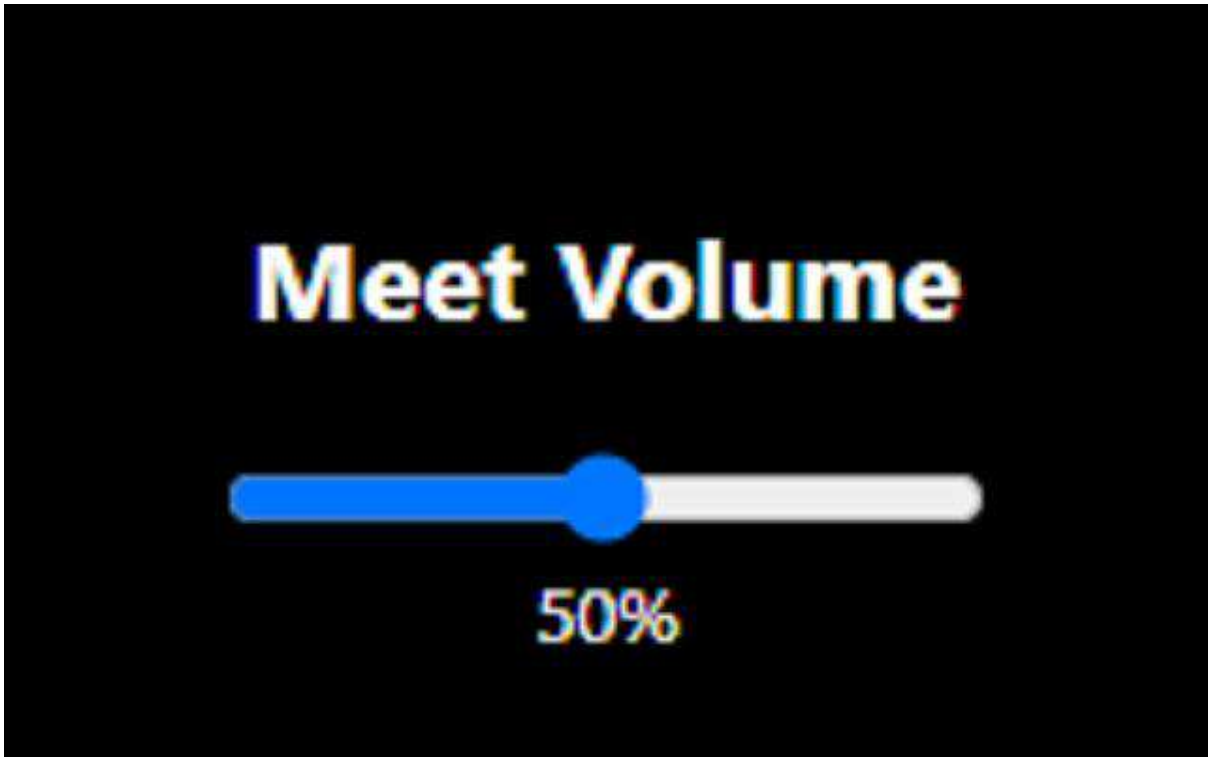
2 SHUT THE DOOR WHEN USING NOISY MACHINES:

We can shut the door after we turn on dishwashers or washing machines for rooms where it is kept or we can turn them on before leaving the house so that overlapping of exposure to loud noises can be reduced.

3 USE EARPLUGS :

Use of earplugs or earmuffs can bring down loud noises to a manageable level. Earplugs are small inserts that fit into our ear canal. And earmuffs fits over the entire outer ear to form an air seal keeping ears safe from loud noise.

4 LOWER THE VOLUME:



We can listen to songs, radios, TVs in lower volume when listening from headphones and speakers.

5 GO GREEN BY PLANTING TREES:

We can plant more trees as they are good noise absorbents. According to studies, it can reduce noise by 5 to 10 decibels around them.

6 REGULARLY CHECK NOISE LEVELS: it is necessary to control the noises created around us. It is necessary to aware people around us through various mediums. We can start from ourselves to spread awareness about noise pollution and its effects on human and the environment. Limit for noise at daytime is 55 db and at the night it is 30 db to avoid health effects.

CONCLUSION

Noise pollution is the most common problems faced by humans. Following standard measures can be helpful in the long term for both humans and the environment. The ultimate aim is to bring down the noise pollution for a better environment.

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PLASTIC POLLUTION

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- Semester :2
- Project Title : PLASTIC POLLUTION

- ***PLASTIC POLLUTION***
- ***INTRODUCTION***
- ***Plastic Pollution is the accumulation of plastic objects and particles (eg. Plastic bottles,bags and microbeads) in the Earth's environment that adversely affects wildlife,wildlife habitat and humans. Plastics are inexpensive and durable making them very adaptable for different uses; as a result levels human produce a lot of plastic.***
- ***However ,the chemical structure of most plastics renders them resistant to many natural processes of degradation and as a result they are slow to degrade. Together, these two factors allow large volumes of plastic to enter the environment as mismanaged waste and for it to persist in the eco system.***

CAUSES OF PLASTIC POLLUTION

- **While solving the problem of plastic pollution may seem as easy as just implementing recycling or cleaning up empty bottles,the truth is that the plastic causing the pollution can range in size from big to microscopic. The major contributors to this problem today include:**
- **1. Plain Old Trash**
- **Plastic is everywhere ,even on those items you may not expect it to be. Milk cartons are lined with plastic,water bottles are handed out everywhere, and some products may even contain tiny plastic beads.**

- Everytime one of these items get thrown away or washed down a sink , the toxic pollutants have more of a chance to enter the environment and do harm.
- Trash dumps and landfills are unfortunate major problems, as they allow pollutants to enter the ground and affect wildlife and groundwater for years to come.
- 2. It is overused
- As plastic is less expensive, it is one of the most widely available and overused items in the world today. Rapid urbanization and population growth increase the demand of cheap plastics. Since it is an affordable and durable material, it is utilized in every other way possible, from packaging materials to plastic bottles and containers, straws to the plastic carry bags .

- **And also because they are so cheap,we have a disposable mentality. We don’t value them to hang on to individual items. When disposed of ,it does not decompose easily and pollutes the land or air nearby when burned into open air.**

- 3. Plastics takes 400 years and even more to Decompose
- The chemical bonds that makeup plastics are strong and made to last. The decomposition rate of plastic typically ranges from 500 to 600 years,depending on the type
- 4.Fishing Nets
- Commercial fishing is an economic necessity for many parts of the world,and tons of people eat fish for their daily survival. However, this industry has helped contribute to the problems of plastic pollution in the oceans in several ways. The nets used for certain large-scale trolling operations are usually made of plastic.

- First, these spend long times submerged in water,leaking toxins at will, but they also often get broken up or lost.left to remain wherever they fall.
- Plastic waste is also washed to shores from ships and nets used for fishing. This not only kills and harms local wildlife but also pollute the water, marine animals get trapped in nets and/or swallow the toxic particles.
- 5. Disposing of Plastic and Garbage
- The disposal of plastic is often mismanaged, it ends up in landfills. This may sound a bit confusing, but beacause plastic is meant to last, it is nearly impossible to breakdown.
- Burning plastics is incredibly toxic and can lead to harmful

- atmospheric conditions and deadly illnesses. Therefore, it it is in a landfill, it will never stop releasing toxins in that area.

- Even recycling doesn’t cut down on plastic, as it essentially uses the existing plastic,albeit in a new form. The process of recycling plastic can also lead to plastic irritants being released in a number of ways.

SERIOUS EFFECTS OF PLASTIC POLLUTION

- **It seems rather obvious that this amount of a material that isn't meant to break down can destroy natural environments, leading to long term issues for plants,animals and people.**
- **It really has a negative impact on human health. We eat plastic contaminated seafood. Scientists have found microplastics in 114 marine species, and around one-third of these end up on our plates. We consume plastic via packaging. BPAs present in many plastic objects that come in direct contact with food is metabolized in the liver to form Bisphenol A, and it remains in our body through our urine.**
- **Not only this there are several causes that leads to diseases in our body.**
- **It also causes disbanded in the food chain because it comes in sizes large and small, polluting plastics even affects the world's tiniest organisms,sucha as plankton.**

- When these organisms become poisoned due to plastic ingestion, this causes problems for the larger animals that depend on them for food.
- This can cause a whole slew of problems, each step further along the food chain. Plus, it means that plastic is present in the fish that many people eat everyday.
- Despite in the imbalance of food chain it also causes several types of pollution such as air pollution, land pollution, water pollution etc. It kills animals ,despite countless TV ads over the years showing ducks,dolphins trapped in six-ring plastic can holders, these items are still used and discarded on masses each day. Whether because the mass of plastic has displaced animals or the related toxins have poisoned them, plastic pollution does a lot of damage to the world's ecosystem.

- **Cleaning plastic is very expensive. It costs millions of dollars each year to clean affected areas after exposure, not to mention the loss of life to plants, animals, and people. As land becomes more valuable, just finding a place to put garbage is becoming a problem in many parts of the world.**

EFFECTIVE SOLUTIONS TO PLASTIC POLLUTION

- **1. Shop Friendly**
- **Plastic bags were once a modern convenience but can be effectively replaced by reusable bags, many of which fold up compactly to be portable.**
- **Just think about how many bags you typically carry out of a grocery shop. That's a lot of plastic! Carry a bag and always reuse plastic bags as much as possible if you have them.**


Paper
VS
Plastic

- **2. Get rid of Bottled water**
- **People are meant to drinks lots of water each day, and plastic water bottles have become a great way to stay hydrated throughout the day.**
- **However, most of these are only recommended for single-use, and that means that everytime someone finishes a bottles, it goes into the trash. As these plastic bottles are typically made from polyethylene terephthalate (pet), it takes over 400 years to decompose naturally.**
- **Many companies now sell reusable water bottle as a substitute, reducing plastic waste and exposure to leaking bottles. The best thing you can do is carry a reusable metal bottle in your bag.**

- **3. Recycle Everything**
- **Try and select items that come in non-plastic recycled packaging, to do our best to handle items that can’t be reused properly. Check everything before you put in the trash, as more and more items are able to be recycled these days.**

- ***Conclusion***
- **Though plastic is very useful in modern civilization and provides us with a various useful articles, it serves as a serious threat to our environment. So, we should try our level best to reduce, reuse and recycle plastic whenever possible to reduce the level of environment pollution caused by plastics.**

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my teacher “Miss Sushmita Gonsalves“ who gave me the golden opportunity to do this wonderful project on the topic “POLLUTION” which helped me in doing a lot of research and I also came to know and learn about many new things.

Thankyou

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PROJECT

THE CHIPKO MOVEMENT

Department of Political Science
Semester - II
AECC 2: Environmental Studies

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ACKNOWLEDGEMENT

I would like to express my gratitude to my professor Dr Sushmita Gonsalves, who gave me this golden opportunity to do this project on the topic the Chipko Movement. From the research I did to complete this project, I gained a lot of knowledge on the Chipko Movement, its history, its causes and how this environmental movement succeeded to created a greater mass awareness and encouraged the subsequent environmental movements that occurred in India in the following years.

I would also like to thank my elder sister who helped me in finalizing this project within the limited time frame.

Archisman Bhattacharya
Semester II
Department of Political Science

THE CHIPKO MOVEMENT

Chipko Movement was a grass root level movement or campaign started by the people in a small village in Uttarakhand state to protect the trees from cutting down. The meaning of 'Chipko' is 'to hug', 'to stick' or 'to embrace'. The meaning movement was to embrace and hug the trees to protect them from the contractors who wanted to cut them.

The origin of the Chipko Movement goes back in history. The Chipko Movement was originally started by Amrita Devi in the Bishnoi community in Rajasthan who protested against the King's men who were trying to cut the trees in the 18th century. The modern Chipko movement started in the 1970s in Uttarakhand state by founder Sunderlal Bahuguna. Sunderlal Bahuguna was a renowned Gandhi Follower and he emphasized on the Gandhian non-violence protest/ Satyagraha. He along with many volunteers and women with the aim of protecting the trees by clinging to them with a non-violent protest.

The rising deforestation had affected the huge area of Garhwal, the northern Himalayan region of Uttarakhand. The people living nearby the region was fully dependent on the trees in the region. This is when the people started sensing the need for protecting and conserving the trees. The first Chipko action took place in April 1973 in the Mandal village in the upper Alaknanda valley. The movement was triggered by the government's decision to allot a plot of forest area in the Alakananda valley to a sports goods company and clear out all the trees. Many families of farmers and local residents were dependent on that forest. The felling down of these trees would have resulted in the no source of living to those farmers and residents. The rising deforestation in the area had made the region barren. The settlement between the state forest department and the sports company to clean the forest for building a factory would have devastated the lives of people living there. Hence the people, especially the women, along with other labours and activists from NGOs started a protest by holding each other's hands and forming a human circle around the trees to stop the contractors from cutting them down. On March 26, 1974, people especially the women in Reni village, Hemwalghati, in Chamoli district, Uttarakhand started a protest against the contractors ordered by the State Forest Department to fell the trees in the area. This protest inspired many people to come forward and fight for tree conservation. Soon the movement reached other areas and inspired the people to take similar actions to save the trees.

Women participation in Chipko Movement (Source: thebetterindia.com)

The primary aim, objective of the Chipko Movement was to reduce and stop the deforestation in the area and to protect the trees. The objective, the aim of the Chipko Movement also consists of maintaining the ecological balance of nature and the survival of tribal people living in that area who were fully dependent on the forest to earn their living. The objective of the Chipko Movement revolves around the Five F strategy and those Five Fs are Food, Fodder, Fuel, Fibre, and Fertilizer.

Many other Chipko Movement activists such as Chandi Prasad Bhatt who was one of the earliest Chipko activists, Dhoom Singh Negi, Bachni Devi, Ghanashyam Raturi, the Chipko poet, Indu Tikekar, a doctor of philosophy, and many others contributed to make the movement successful.

Key players in Chipko Movement (L-R): Chandi Prasad Bhatt, Gaura Devi, Sunderlal Bahuguna (Source: thebetterindia.com)

The Chipko Movement started a phenomenon of protests across the whole country of India to protect the forests, trees and wild animals. After the Chipko Andolan, the local government banned the tree falling in the region to stop the deforestation. The one of the biggest success of the Chipko Movement was that the people succeeded in protecting the trees from cutting down. It inspired the people and communities in other areas of India to protest against the cutting down of the trees and protecting and conserving trees and wild animals. The greatest outcome of the Chipko Andolan was seen in the 1980s when then prime minister of India, Mrs. Indira Gandhi, posted a 15 years ban on the tree falling in the Himalayan forests in the Uttarakhand state.

Mr Ghanasyam Raturi, the Chipko poet, whose songs echo throughout the Himalayas of Uttar Pradesh, wrote a poem describing the method of embracing the trees to save them from felling:

' Embrace the trees and
Save them from being felled;
The property of our hills,
Save them from being looted.'

The Chipko Movement was a big success against the people who wanted to cut down a huge number of trees for personal benefits. The movement succeeded in creating a trigger for other people and communities in India to come forward to protest and protect the trees. Soon the movement became a national phenomenon and became one of the most widespread and most successful ecological movements.

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2020-2021

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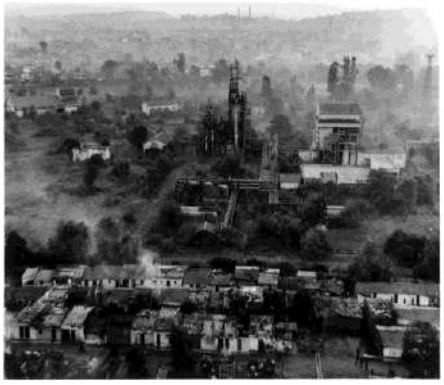
DEPARTMENT- POLITICAL SCIENCE

TOPIC- AIR POLLUTION

ACKNOWLEDGEMENT

I would like to express my gratitude to my ENVS teacher, Sushmita Gonsalves mam who gave me the opportunity to do a project on the very thoughtful project titled **Air Pollution** . I learnt about how alarming the effects are and how non-negotiable it is to take follow up with the measures that will aid with this mode of pollution. Lastly, would like to owe gratitude to my friends and family for helping me finalize my project.

AIR POLLUTION



Air pollution may appear to be the consequence of anthropogenic actions, although it has existed long before people. Dust storms are common in areas that are naturally arid and have scant vegetation. When this particle matter enters the air, it can create health problems in animals that are susceptible to dust storms. Consequently, active volcanoes spew hazardous plumes and particulate particles into the atmosphere. Wildfires also emit enormous volumes of carbon monoxide into the atmosphere, impairing plant photosynthesis. Even animals, particularly ruminants like cows, contribute to global warming by emitting enormous amounts of methane, a greenhouse gas. Nevertheless, until the industrial revolution, air pollution was not a ginormous cause for concern . Industries expanded quickly, untreated pollutants were blasted into the atmosphere, and the advent of automobiles contributed greatly to air pollution. Such acts proceeded unabated until they began to have a diverse gamut of consequences . Contaminated air can induce a massive range of ailments in humans, from asthma and bronchitis to various types of cancer. Air pollution is not limited to the outdoors; indoor air pollution is also a major concern. Contemporary research has discovered substantial evidence that room fresheners include several chemicals, some of which are classed as carcinogens. This suggests that some of the substances in the aerosol have the propensity to cause cancer Gases such as carbon monoxide and radon can also contribute to air pollution. Radon, in particular, is extremely dangerous. It is a naturally occurring odourless and colourless gas. It is present in soil as Uranium, which degrades and finally produces radon gas. When exposed to low concentrations of radon, the effects on health are minimal; nevertheless, when this gas becomes trapped indoors, the greater levels of concentration can wreak havoc or even be lethal. Radon is also reported to be released from building materials such as granite. Exposure to radon causes no immediate health effects, but long term exposure has the potential to cause lung cancer. In terms of overall range and extents of impacts, however, burning of fossil fuels (coal, gasoline, etc..) is the single largest source of air pollutants. These fuels cause smog, acid rain, soot and particulates increases, greenhouse gas emissions, and dispersal of some heavy metal contaminants. Fossil fuels are widely employed in many industries, including heating, transportation, energy generation, manufacturing, and others. As a result, they are widely used in modern culture, and it is difficult (but not impossible) to limit their use. Various methods can also be done to help make fossil fuel combustion cleaner and more efficient, but this comes at a cost. Most air pollution afflicting the planet now will continue to be a concern in the future until we find cleaner alternatives to the current fossil fuels burning processes. Air pollution affects not only the lungs but also the central nervous system. It's been connected to a variety of disorders, including schizophrenia and autism. According to one study, it can also cause short-term memory loss or impairment of memory overall. Historically, air pollution has produced numerous crises, the deadliest of which was the Bhopal disaster in 1984. The death toll was estimated at 3,800, with at least 600,000 injured. The Great Smog of 1952, which accumulated over London and killed an estimated 4,000 civilians over the course of four days, came in second. Some important measures to control air pollution are controlling pollution from domestic fire to the households use. Removal of poisonous gases by passing the fumes through water tower scrubber or spray collector , is another way. Development and employment of non-combustive sources of energy, e.g., nuclear power, geothermal power, solar power, tidal power, wind power, etc could pose as a

great paraphernalia to aid with air pollution. Though measures have been taken to reduce the effects of air pollution, a lot of irreversible damage has been done. For instance, the effects of global warming have drastically increased; this is very apparent with the rise in sea levels and melting glaciers. If the ice caps continue to melt, then we will have to face drastic repercussions. Scientists have proposed a hypothetical scenario where the greenhouse effect becomes "uncontrolled." Here, greenhouse gases build up and temperatures continue to rise steeply. Oceans will start to evaporate, adding more water vapour into the earth's atmosphere. This intensifies the effect, reaching a point where temperatures are sufficiently high for rocks start sublimating. Though this scenario is hypothetical, some speculate that this phenomenon already occurred on Venus. The supporters of this theory back this up by claiming Venus has an atmosphere composed primarily of carbon dioxide. The theory also explains why Venus has an extremely high surface temperature of 462 degrees Celcius; which is in fact, the hottest planet in the solar system. Hence, we need to reduce our impact on the planet and make a conscious effort to reduce air pollution.

End.

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AECC Environmental Studies Project

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Name of Topic **– Pollution**

DEPARTMENT **– Department of Political Department**

Semester - II

Index

Introduction

Pollution

Pollution is the introduction of contaminants into the natural environment that cause 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. Pollution is often classed as point source or nonpoint source pollution. In 2015, pollution killed 9 million people worldwide. Pollution is the process of making land, water, air or other parts of the environment dirty and not safe or suitable to use. This can be done through the introduction of a contaminant into a natural environment, but the contaminant doesn't need to be tangible. Things as simple as light, sound and temperature can be considered pollutants when introduced artificially into an environment. Toxic pollution affects more than 200 million people worldwide, according to Pure Earth, a non-profit environmental organization. In some of the world's worst polluted places, babies are born with birth defects, children have lost 30 to 40 IQ points, and life expectancy may be as low as 45 years because of cancers and other diseases. Read on to find out more about specific types of pollution.

Pollution is the largest environmental cause of disease and premature death. Pollution of air, land, and water cause more than 9 million premature deaths (16% of all deaths worldwide). That's three times more deaths than from AIDS, tuberculosis, and malaria combined and 15 times more than from all wars and other forms of violence. Global health crises, such as the current COVID-19 pandemic further highlight the need for continued action in addressing environmental pollution. Ongoing research is finding close links between air pollution and incidence of illness and death due to COVID-19.

Major forms of pollution include air pollution, light pollution, litter, noise pollution, plastic pollution, soil contamination, radioactive contamination, thermal pollution, visual pollution, and water pollution.

Pollution is the largest environmental cause of disease and pre mature death

Water pollution

Water pollution happens, pesticides and fertilizers from agricultural runoff, or metals like lead or mercury. According to the Environmental Protection Agency (EPA), 44% of assessed stream miles, 64% of lakes and 30% of bay and estuarine areas are not clean enough for fishing and swimming. The EPA also states that the United States most common contaminants are bacteria, mercury, phosphorus and nitrogen. These come from the most common sources of contaminates, that include agricultural runoff, air deposition, water diversions and channelization of streams.

Water pollution isn't just a problem for the United States. According to United Nations, 783 million people do not have access to clean water and around 2.5 billion do not have access to adequate sanitation. Adequate sanitation helps to keep sewage and other contaminants from entering the water supply.

According to National Oceanic and Atmospheric Administration (NOAA), 80% of pollution in marine environment comes from the land through sources like runoff. Water pollution can also severely affect marine life. For example, sewage causes pathogens to grow, while organic and inorganic compounds in water can change the composition of the precious resource. According to the EPA, low levels of dissolved oxygen in the water are also considered a pollutant. Dissolved is caused by the decomposition of organic materials, such as sewage introduced into the water.

Warming water can also be harmful. The artificial warming of water is called thermal pollution. It can happen when a factory or power plant that is using water to cool its operations ends up discharging hot water. This makes the water hold less oxygen, which can kill fish and wildlife. The sudden change of temperature in the body of water can also kill fish. According to the University of Georgia, it is estimated that around half of the water withdrawn from water systems in the United States each year is used for cooling electric power plants. "In nearly all cases, 90% of this water is returned to its source, where it can raise the water temperature in an area immediately surrounding the water discharge pipe. Depending on water flow, the water temperature quickly returns to ambient temperatures that do not harm fish." Donn Dears, former president of TS August, a not for profit corporation organization focused on energy issues, told Live Science.

Nutrient pollution, also called eutrophication, is another type of water pollution. It is when nutrients, such as nitrogen, are added into bodies of water. The nutrient works like fertilizer and makes algae grow at excessive rates, according to NOAA. The algae blocks light from other plants. The plants die and their decomposition leads to less oxygen in the water. Less oxygen in the water kills aquatic animals.

When chemicals or dangerous foreign substances are introduced to water, including chemicals, sewage, etc it causes water pollution.

• What causes water pollution?

Water pollution can be classified in many ways. The sources of water pollution can be considered to be Non-Point and Point. Point indicates the existence of pollutants coming from one source. For instance, in this category fall emissions coming from a factory. Non-Point indicate pollutants that come from several different sources.

Generally, industries generate a massive amount of waste, featuring pollutants and toxic chemicals that affect the quality of water sources. The waste products of power plants may contain nitrates, asbestos, Sulphur, mercury, and lead. Unfortunately, there are several industries which do not have secure waste management systems. Hence, they drain the waste directly in the fresh water which reaches lakes, rivers, canals and the sea. These toxic chemicals can change the colour, temperature and the amount of minerals in the water. Hence, this could pose a great threat to many marine species living in them and for people who consume it.

Waste materials of factories thrown in water

• Sources of water pollution

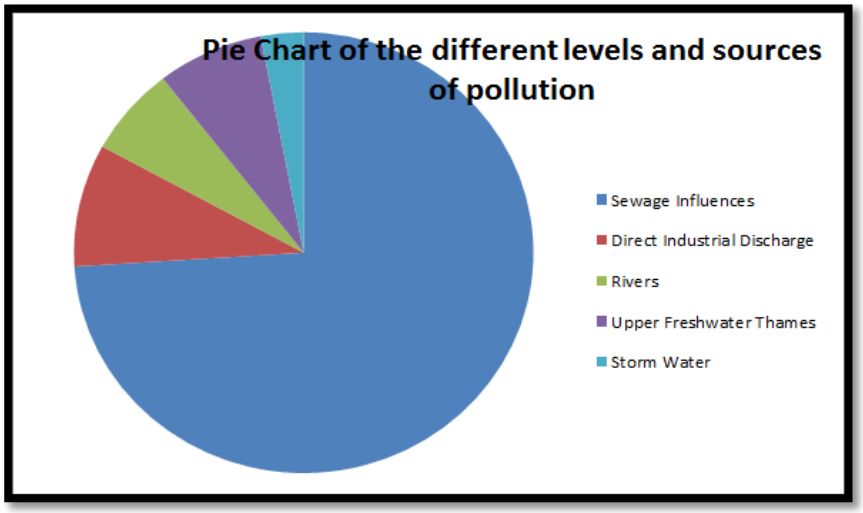
Every household produces a certain amount of wastewater which is chemically treated and then released back into the water source. The water contaminated with sewage features harmful bacteria, causing severe health problems. Furthermore, besides industrial waste

and sewage, there are also other methods and activities that cause water pollution like marine dumping, mining activities, oil leakage, pesticides, fertilizers and burning of fossil fuels.

The process of burning fossil fuels like oil and coal can trigger a massive amount of ash that float into the atmosphere. These dangerous particles that feature toxic chemicals can mix with water vapor. Hence, they become very dangerous because they turn into acid rain.

On the other hand, farmers use fertilizers and pesticides to protect their crops against bacteria and insects. Even if they prove to be very useful when it comes to plant growth, they can affect the environment. When they get mixed with water, they can cause damages to plants. Furthermore, when it rains, the rainwater that flows down the plants contains pesticides, and it slowly reaches lakes and rivers. Hence, they represent a great threat to animals and aquatic plants.

All these processes and methods disrupt many marine ecosystems and affect several sources of water that can trigger numerous health issues and diseases. Aquatic animals suffer changes, and some of the species are unable to adapt. Therefore, water pollution can lead to the extinction of some species. The environmental disruptions are extremely severe, also posing a major threat to humans too.



The above pie chart shows the different level and sources of pollution

• Summing up

The consequences of water pollution can severely affect the environment while also affecting ecosystems, animals' habitats and numerous species of plants. The waste and sewage reaching water sources can be extremely harmful, disrupting food chains and causing the outbreak of several diseases. What is more, many marine species die out or decrease in number due to chemicals that leak into the water.

AIR POLLUTION

The air we breathe has a very exact chemical composition; 99% of it is made up of nitrogen, oxygen, water vapour and inert gases. Air pollution occurs when things that aren't normally there are added to the air. A common type of air pollution happens when people release particles into the air from burning fuels. This pollution looks like soot, containing millions of tiny particles, floating in the air.

Another common type of air pollution is dangerous gases, such as sulphur dioxide, carbon monoxide, nitrogen oxides and chemical vapours. These can take part in further chemical reactions once they are in the atmosphere, creating acid rain and smog. Other sources of air pollution can come from within buildings, such as second hand smoke.

Finally, air pollution can take the form of greenhouse gases, such as carbon dioxide or sulphur dioxide, which are warming the planet through the greenhouse effect. According to the EPA, the greenhouse effect is when gases absorb the infrared radiation that is released from the Earth, preventing the heat from escaping. This is a natural process that keeps our atmosphere warm. If too many gases are introduced into the atmosphere, though, more heat is trapped and this can make the planet artificially warm, according to Columbia University.
Air pollution kills more than 2 million people each year, according to a study published in the journal of Environmental Research Letters. The effects of air pollution on human health can vary widely depending on the pollutant, according to Hugh Sealy, professor and director of the environmental and occupational health track at the Department of Public Health and Preventive Medicine, St. George's University, St. George's, Grenada. If the pollutant is highly toxic, the effects on health can be widespread and severe. For example, the release of methyl isocyanate gas at Union Carbide plant in Bhopal in 1984 killed over 2,000 people, and over 200,000 suffered respiratory problems. An irritant (e.g. particulates less than 10 micrometers) may cause respiratory illnesses, cardiovascular disease and increases in asthma. "The very young, the old and those with vulnerable immune systems are most at risk from air pollution. The air pollutant may be carcinogenic (e.g. some volatile organic compounds) or biologically active (e.g. some viruses) or radioactive (e.g. radon). Other air pollutants like carbon dioxide have an indirect impact on human health through climate change," Sealy told Live Science.

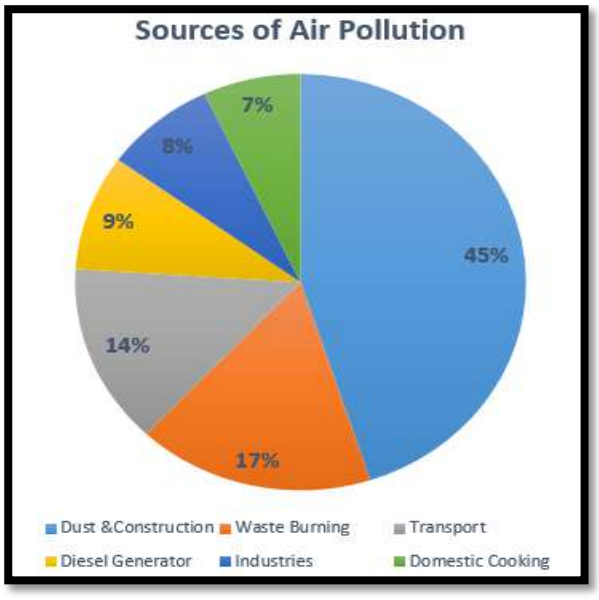
Air pollution caused by burning fossil fuels

• What causes air pollution?

Air pollution emissions come from a wide range of human activities and natural sources. Gases are emitted from fossil fuel burning. Nitrogen dioxide is an example of a harmful gas. In the UK the largest sources of nitrogen dioxide are from vehicle exhausts and household gas combustion. Chemicals come from vehicle exhausts, evaporation from petrol stations, paint and chemical plants, solid fuel burning, cleaning and personal care products. One common type of harmful chemicals are called volatile organic compounds, or VOCs. They are sometimes released naturally from plants and trees, but also come from day-to-day chemical products. These chemicals can be very long lived and transported across continents. Small particles come from vehicle exhausts, brakes and tyres, wildfires, farming practices and wood burning at homes. Particles less than 10 micrometers are called PM10, and even smaller particles are known as PM2.5. These particles are too small to see – they're less than the width of a human hair – but they can be inhaled deep into our lungs.

• How Does Weather Affect Air Pollution?

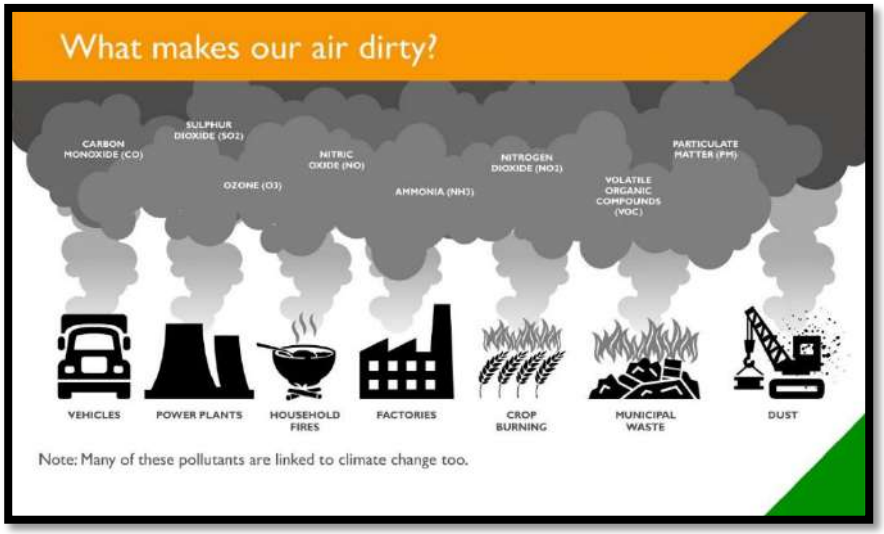
Weather plays a big part in controlling air pollution. Strong winds and rain can help disperse pollution, and the direction of the wind determines where polluted air moves away from its source. It takes around five days for air pollution to reach the UK from the USA, and about one or two days for pollution to move from the UK across to Europe. Very low wind speeds and stable weather can allow pollution to build up near the surface and lead to poor air quality. Warm sunny weather can generate additional pollution through reactions in the atmosphere that lead to 'photochemical smog'.



Sources of air pollution

• How does climate change affect Air Pollution?

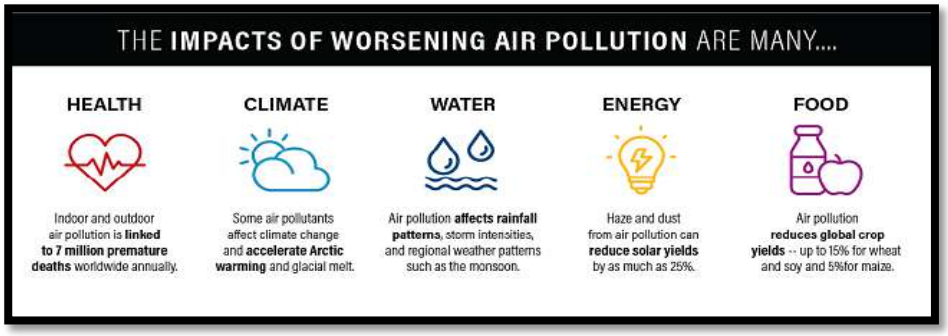
Climate Change affects the weather that we experience, and as a result, can lead to different levels of air pollution. Climate change makes experiencing extreme weather more likely. A higher frequency of strong winds and heavy rain events might potentially improve the quality of the air, as pollution gets dispersed more effectively. With climate change, longer spells of warm weather and rising average global temperatures could lead to increase in ait pollution from sunshine- induced chemical reactions and emissions from wildfires.



Things that pollute the air

• How does air pollution affect climate change?

Air pollutants such as nitrogen oxides and volatile organic compounds can lead to the formation of aerosols. Aerosols are small solid particles or liquid droplets in the air, which scatter the sun's rays and help form clouds that have a cooling effect on the climate.



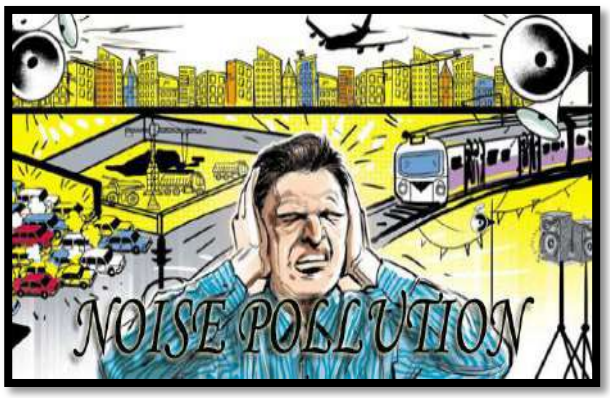
Impacts of worsening air pollution

Noise Pollution

Noise pollution, also known as environmental noise or sound pollution, is the propagation of noise with ranging impacts on the activity of human or animal life, most of them harmful to a degree. The source of outdoor noise worldwide is mainly caused by machines, transport, and propagation systems. 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, explosions, and people.

High noise levels can contribute to cardiovascular effects in humans and an increased incidence of coronary artery disease. 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. 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. In the past few years, scientists have shifted to conducting studies on invertebrates and their responses to anthropogenic sounds in the marine environment. This research is essential, especially considering that invertebrates make up 75% of marine species, and thus compose a large percentage of ocean food webs. Of the studies that have been conducted, a sizable variety in families of invertebrates have been represented in the research. A variation in the complexity of their sensory systems exists, which allows scientists to study a range of characteristics and develop a better understanding of anthropogenic noise impacts on living organisms.

Even though humans can't see or smell noise pollution, it still affects the environment. Noise pollution happens when the sound coming from planes, industry or other sources reaches harmful levels. Research has shown that there are direct links between noise and health, including stress-related illnesses, high blood pressure, speech interference, hearing loss. For example, a study bythe WHO Noise Environmental Burden on Disease working group found that noise pollution may contribute to hundreds of thousands of deaths per year by increasing the rates of coronary heart disease. Under the Clean Air Act, the EPA can regulate machine and plane noise.
Underwater noise pollution coming from ships has been shown to upset whales' navigation systems and kill other species that depend on the natural underwater world. Noise also makes wild species communicate louder, which can shorten their lifespan.



Noise pollution

• Causes and Sources of Noise Pollution

Following are the causes and sources of noise pollution:

1. **Industrialisation:** Industrialisation has led to an increase in noise pollution as the use of heavy machinery such as generators, mills, huge exhaust fans are used, resulting in the production of unwanted noise.

2. **Vehicles:** Increased number of vehicles on the roads are the second reason for noise pollution.

3. **Events:** Weddings, public gatherings involve loudspeakers to play music resulting in the production of unwanted noise in the neighbourhood.

4. **Construction sites:** Mining, construction of buildings, etc add to the noise pollution.

Causes of noise pollution

• Effects of Noise Pollution on Human Health

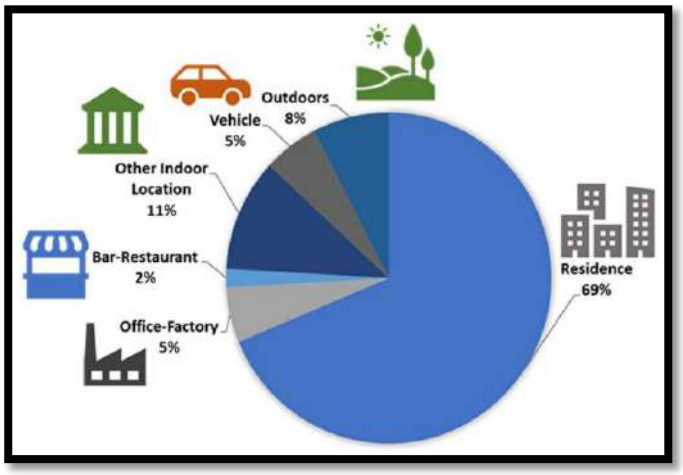
Noise pollution can be hazardous to human health in the following ways:

1. **Hypertension:** It is a direct result of noise pollution which is caused due to elevated blood levels for a longer duration.

2. **Hearing loss:** Constant exposure of human ears to loud noise that are beyond the range of sound that human ears can withstand damages the eardrums, resulting in loss of hearing.

3. **Sleeping disorders:** Lack of sleep might result in fatigue and low energy level throughout the day affecting everyday activities. Noise pollution hampers the sleep cycles leading to irritation and an uncomfortable state of mind.

4. **Cardiovascular issues:** Heart-related problems such as blood pressure level, stress and cardiovascular diseases might come up in a normal person and a person suffering from any of these diseases might feel a sudden shoot up in the level.



- ## Prevention of Noise Pollution

Some noise pollution preventive measures are provided in the points below.

1. Honking in public places like teaching institutes, hospital, etc. should be banned.

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

3. Musical instruments sound should be controlled to desirable limits.

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

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

Soil Pollution

Soil contamination or **soil pollution** as part of land degradation is caused by the presence of xenobiotics (human-made) chemicals or other alteration in the natural soil environment. It is typically caused by industrial activity, agricultural chemicals or improper disposal of waste. The most common chemicals involved are petroleum hydrocarbons, poly nuclear aromatic hydrocarbons (such as naphthalene and benzo(a)pyrene), solvents, pesticides, lead, and other heavy metals. Contamination is correlated with the degree of industrialization and intensity of chemical substance. The concern over soil contamination stems primarily from health risks, from direct contact with the contaminated soil, vapour from the contaminants, or from secondary contamination of water supplies within and underlying the soil. Mapping of contaminated soil sites and the resulting clean-ups are time-consuming,requiring extensive amounts of geology, hydrology, chemistry, computer modelling skills, and GIS in Environmental Contamination, as well as an appreciation of the history of industrial chemistry.

In North America and Western Europe the extent of contaminated land is best known, with many of countries in these areas having a legal framework to identify and deal with this environmental problem. Developing countries tend to be less tightly regulated despite some of them having undergone significant industrialization. Soil pollution is the removal of useful substances from the soil or the addition of harmful substances to it. Garbage, cotton clothes, newspapers, trees waste, are the causes of soil pollution. Plastic, glasses and metal objects may also cause soil pollution.

Soil pollution can be caused by the following:

- Micro-plastics
- Oil spills
- Mining and activities by other heavy industries

- Accidental spills may happen during activities, etc.
- Corrosion of underground storage tanks (including piping used to transmit the contents)
- Acid rain
- Intensive farming
- Agrochemicals, such as pesticides, herbicides and fertilizers
- Petrochemicals
- Industrial accidents
- Road debris
- Drainage of contaminated surface water into the soil
- Ammunitions, chemical agents, and other agents of war
- Waste disposal
  - Oil and fuel dumping
  - Nuclear wastes
  - Direct discharge of industrial wastes to the soil
  - Discharge of sewage
  - Landfill and illegal dumping
  - Coal ash
  - Electronic waste
  - Contaminated by rocks containing large amounts of toxic elements.
  - Contaminated by Pb due to vehicle exhaust, Cd, and Zn caused by tire wear.
  - Contamination by strengthening air pollutants by incineration of fossil raw materials.

- ## Effects of Soil Pollution

Soil pollution can have a number of harmful effects on ecosystems and human, plants and animal health. The harmful effects of soil pollution may come from direct contact with polluted soil or from contact with other resources, such as water or food which has been grown on or come in direct contact with the polluted soil.

Humans:

Many common soil pollutants are carcinogenic causing humans who are exposed to these pollutants to be far more likely to develop cancer than those who are not. For example, regular exposure to benzene is known to cause leukemia in both children and adults and exposure to polychlorinated biphenyls (PCBs) is linked to liver cancer. Soil pollution can also cause neuromuscular blockage as well as depression of the central nervous system, headaches, nausea, fatigue, eye irritation and skin rash. Soil does not need to be highly contaminated to be harmful to humans. Soil that is not significantly polluted may still harm humans directly though bioaccumulation, which according to Pollution Issues, occurs when plants are grown in lightly polluted soil, which continuously absorb molecules of the pollutants. Since the plants cannot get rid of these molecules, they accumulate in the plant, causing higher amounts of pollution to exist in the

plant than in the soil. Animals who eat many of these polluted plants take on all the pollution those plants have accumulated. Larger animals who eat the plant-eating animals take on all the pollution from the animals they eat. Humans who eat plants or animals that have accumulated large amounts of soil pollutants may be poisoned, even if the soil itself does not contain enough pollution to harm human health. Furthermore, the presence of heavy metals in soil in toxic amounts can cause irreversible developmental damage in children. Lead and mercury in soil may also be harmful to human health. Although lead and mercury may be found naturally in soil, high concentrations of either metal may cause damage to the developing brains of young children, which in turn may lead to neurological problems. Humans of any age may also suffer kidney or liver damage from exposure to excessive mercury in soil. In addition to endangering human health, soil pollution can also cause economic damage. For example, in some parts of China, soil that is polluted with heavy metals is nevertheless used to grow grain. The grain grown in these soils is often polluted with heavy metals. According to China Dialogue, an estimated 12 million tons of polluted grain must be disposed of each year, costing Chinese farmers up to 20 billion or about $2.57 billion U.S.

Animals:

Soil pollution can negatively affect the metabolism of microorganisms and arthropods, which can destroy some layers of the primary food chain and have a harmful effect on predator animal species. Also, small life forms may consume harmful chemicals in the soil which may then be passed up the food chain to larger animals, which may lead to increased mortality rates and even animal extinction.

Environment:

According to Pollution Issues, soil pollution naturally contributes to air pollution by releasing volatile compounds into the atmosphere - so the more toxic compounds soil contains, the greater the air pollution it creates - and can lead to water pollution if toxic chemicals leach into groundwater or if contaminated runoff or sewage, which can contain dangerous heavy metals, reaches streams, lakes, or oceans. When applied repeatedly or in large amounts, these heavy metals can accumulate in soils to the point that it is unable to support plant life. Moreover, soil pollution allows great quantities of nitrogen to escape through ammonia volatilization and denitrification and the decomposition of organic materials in soil can release sulphur dioxide and other sulphur compounds, causing acid rain. Furthermore, acidic soils created by the deposition of acidic compounds, such as sulphur dioxide brought about by the burning of fossil fuels, produce an acidic environment that harms micro-organisms, which improve the soil structure by breaking down organic material and aiding in water flow. Soil pollution may alter plant metabolism and reduce crop yields and cause trees and plants that may absorb soil contaminants to pass them up the food chain. Soils polluted by acid rain have an impact on plants by disrupting the soil chemistry and reducing the plant's ability to take up nutrients and undergo photosynthesis. Soil pollution also causes the loss of soil and natural nutrients present in it, hindering plants ability to thrive in such soil, which would further result in soil erosion and disturbing the balance of flora and fauna residing in the soil. While aluminium occurs naturally in the environment, soil pollution can mobilize inorganic forms, which are highly toxic to plants and can potentially leach into ground water, compounding their effects. Soil pollution increase the salinity of the soil making it unfit for vegetation, thus making it useless and barren. If some crops manage to grow under these conditions, they would be poisonous enough to cause serious health problems in people consuming them. The creation of toxic dust is another potential effect of soil pollution. Furthermore, contaminated soils with high

levels of nitrogen and phosphorus can leach into waterways, causing algal blooms, resulting in the death of aquatic plants due to depleted dissolved oxygen. Finally, acidic deposition into the soil can hamper its ability to buffer changes in the soil pH, causing plants to die off due to inhospitable conditions.

Conclusion

Pollution is a major problem in this modern world. In this project, only few of the pollutions are being discussed. There are many types of pollution other than air, water, soil and noise, like for example – land, light, thermal, radioactive. To stop pollution, we should prevent it from happening from the very beginning.
Pollution prevention reduces both financial costs (waste management and clean-up) and environmental costs (health problems and environmental damage). Pollution prevention protects the environment by conserving and protecting natural resources while strengthening economic growth through more efficient production in industry and less need for households, businesses and communities to handle waste.

Acknowledgement

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The ENVS project was done on the topic “Pollution” the references and pictures were gathered from www.google.com from the following websites:

- https://www.nrdc.org/stories/water-pollution-everything-you-need-know/
- https://en.wikipedia.org/wiki/Air_pollution#Sources/
- https://en.wikipedia.org/wiki/Noise_pollution//
- https://www.everythingconnects.org/soil-pollution.html/

Information was gathered from various websites thus all the websites are not mentioned above but all the information provided in the project was researched thoroughly and improvised as much as possible.

Name- Gaius Regenald Pereira.

Socialism and Its Characteristics: Pros, Cons, Examples, and Types.

Socialism is an economic system where everyone in society equally owns the factors of production. That ownership is acquired through a democratically elected government or through a cooperative or a public corporation in which everyone owns shares. The four factors of production are labor, capital goods, natural resources, and, in the modern era, entrepreneurship.

What Is Socialism?

Socialism is an economic system in which the factors of production are valued in relationship to their usefulness to people. Socialists take into account both individual needs and greater social needs. They allocate resources using central planning, as in a command economy.

Examples of greater social needs include transportation, defense, education, health care, and preservation of natural resources.Some also define the common good as caring for those who can't directly contribute to production. Examples include the elderly, children, and their caretakers.

Pros of Socialism

Under socialism, workers are no longer exploited because they own the means of production. Profits are spread equitably among all workers according to their individual contributions. But the cooperative system also provides for those who can't work. It meets their basic needs for the good of the whole society.The system eliminates poverty. It provides equal access to health care and education. No one is discriminated against.1

Everyone works at what one is best at and what one enjoys. If society needs jobs to be done that no one wants, it offers higher compensation to make it worthwhile for people to take them.

Natural resources are preserved for the good of the whole.

Cons of Socialism

The biggest disadvantage of socialism is that it relies on the cooperative nature of humans to work. It ignores those within society who are competitive and focus on personal gain. Those people tend to seek ways to overthrow and disrupt society for their own benefit. Capitalism harnesses this "Greed is good" drive. Socialism pretends it doesn't exist.

As a result, socialism doesn't reward people for being entrepreneurial. It struggles to be as innovative as a capitalistic society.

A third disadvantage is that the government has a lot of power. This works as long as it represents the wishes of the people. But government leaders can abuse this position and claim power for themselves.

Eight types of socialism
Democratic socialism.
Revolutionary socialism.
Libertarian socialism.
Market socialism.
Green socialism.
Christian socialism.
Utopian socialism.
Fabian Socialism.

Conclusion.

Socialists believe their system is the next obvious step for any capitalistic society. They see income inequality as a sign of late-stage capitalism. They argue that capitalism's flaws mean it has evolved past its usefulness to society. But capitalism's flaws are endemic to the system, regardless of the phase it is in.

America's Founding Fathers included the promotion of the general welfare in the Constitution to balance capitalism's flaws. It instructed the government to protect the rights of all to pursue their idea of happiness. It's the government's role to create a level playing field to allow that to happen. That can happen without throwing out capitalism in favor of another system.

Extra

Examples of Socialist Countries

There are no countries that are 100% socialist, according to the Socialist Party of the United Kingdom.3 Most have mixed economies that incorporate socialism with capitalism, communism, or both.

The five Nordic countries—Norway, Finland, Sweden, Denmark, Iceland—have strongly socialist systems.4 The state, on behalf of the people, owns a large percentage of the economy. It spends a large portion on education, housing, and public welfare. A large percentage of its workers are unionized, granting them greater power. Last but not least, these countries are democracies, allowing the general population input into decision making.

But these countries also incorporate many aspects of a capitalistic economy. As a result, its inhabitants are among the happiest in the world, regularly placing among the top 10 on lists of the world's happiest people.5

Communist Countries

Four countries that are self-proclaimed communist, but they have some aspects of socialism.

China 6 Cuba 7 Laos 8 Vietnam9

China, in particular, and Vietnam have strong free-market aspects to their economies, even though their governments remain under the sole control of their country's Communist Party.

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SUBJECT - *ENVS*

DEPARTMENT - *POLITICAL SCIENCE*

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Muskan Ahmed

NAME

DEFORESTATION

Deforestation is a human act in which forests are permanently destroyed in order to create settlement area and use the trees for industries like paper manufacture, wood and construction. The total coverage of forests on the Earth`s landmass is 30% and the fact that people are destroying them is worrying. Research reveals that majority of the tropical forests on Earth are being destroyed. We are almost at half the forest landmass in destruction. A lot of forests have been destroyed and the impact has been felt through climate change and extinction of animals due to destruction of the ecosystem. The impacts of deforestation are adverse and there is need to prevent and control it before it can get any worse.

Figure 1

Deforestation is mainly a human activity affected by many factors. Overpopulation contributed to deforestation because there is need to create a settlement area for the increasing number of people on earth and the need for urbanization for economic reasons. Recently, population has greatly risen in the world and people require shelter as a basic need. Forests are destroyed in order for people to find land to build a shelter and then trees are further cut to build those houses. Overpopulation is a major threat to the forest landmass and if not controlled, people will continue to occupy the forests until there is no more forest coverage on earth.

Figure 2

Another factor influencing deforestation is industrialization. Industries that use trees to manufacture their product e.g. paper and wood industries have caused major destruction of forests. The problem with industries is the large-scale need for trees which causes extensive deforestation. The use of timber in industries is a treat to forests all over the world. In as much as we need furniture, paper and homes, it is not worth the massive destruction of our forests.

Fires are also a cause of deforestation. During episodes of drought, fire spreads widely and burns down trees. The fire incidences could result from human activities like smoking or charcoal burning in the forests. Drought due to adverse weather changes in global warming is a natural disaster that claim the lives of people and living things.

Agricultural activities such as farming and livestock keeping also cause deforestation because of the land demand in those activities. Deforestation for farming purpose involves clearing all the vegetation on the required land and using it for and then burring the vegetation hence the name ‘slash and burn agriculture’. The ranches required for cattle keeping among other livestock require a large area that is clear from trees.

Figure 3

Deforestation has a great impact on the ecosystem in different ways. Climate change is influenced by deforestation because trees influence weather directly. Trees usually act to protect against strong winds and erosion but in its absence, natural disasters like floods and storms could be experienced. Also, tree are important in replenishing the air in the atmosphere. Trees have the ability to absorb carbon dioxide from the atmosphere and release oxygen. Without trees, the concentration of carbon dioxide in the atmosphere will be increased. Because carbon dioxide is a greenhouse gas, it causes global warming.

Global warming is a serious environmental issue that causes adverse climatic changes and affects life on earth. Extreme weather conditions like storms, drought and floods. These weather conditions are not conducive for humans and other living things on earth. Natural disasters as a result of global warming are very destructive both to animate and inanimate objects in the environment.

Loss of species due to deforestation has negatively affected biodiversity. Biodiversity is a highly valued aspect of life on earth and its interruption is a loss. There is a loss of habitat for species to exist in as a result of deforestation and therefore species face extinction. Extinction of some rare species is a threat we are currently facing. Animals that live and depend on forest vegetation for food will also suffer and eventually die of hunger. Survival has been forced on animals of the jungle due to deforestation and that is why human wildlife conflict is being experienced.

The water cycle on earth is negatively affected by deforestation. The existence of water vapor in the atmosphere is maintained by trees. Absence of trees cause a reduced vapor retention in the atmosphere which result in adverse climate changes. Trees and other forest vegetation are important in preventing water pollution because they prevent the contaminated runoff into water

sources like rivers, lakes and oceans. Without trees, pollution of water is more frequent and therefore the water will be unsafe for consumption by human and animals.

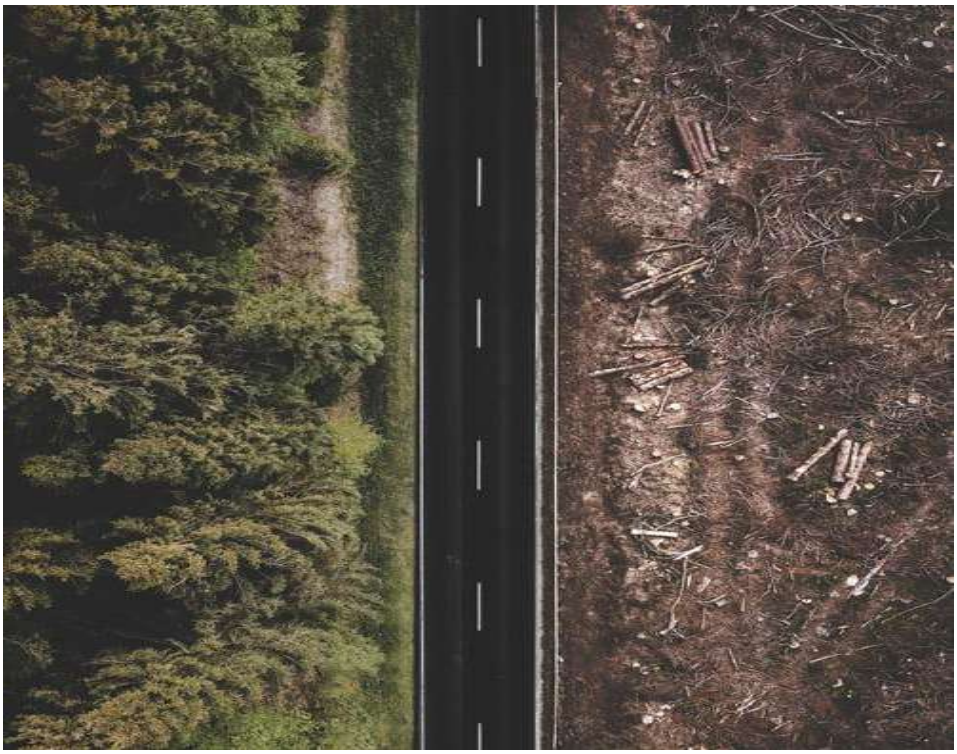

Figure 4

Based on the serious impact of deforestation, it is only safe if solutions are sought to end this problem. The ultimate solution is definitely restoration of the forest landmass on earth. The restoration can be done by encouraging the planting of trees, a process called reforestation. Although reforestation will not completely solve the impacts of deforestation, it will restore a habitat for the wild animals and slowly restore the ecosystem. Major impacts like concentration of carbon dioxide in the atmosphere require another approach. Human activities that contribute to carbon dioxide gas emission to the atmosphere have to be reduced through strict policies for industries and finding alternative energy sources that do not produce greenhouse gases.

Another solution is public awareness. People have to be made aware that deforestation has negative effects so that they can reduce the act. Through awareness, people can also be taught on ways of reducing the population e.g., family planning. On World Environment Day, people are encouraged to participate in activities like tree planting in order to conserve environment and that is how the awareness takes place.

In conclusion, deforestation is a human activity that is destructive and should be discouraged. Environmental conservation is our responsibility because we have only one earth to live in.

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Project Title - Air Pollution

Acknowledgement

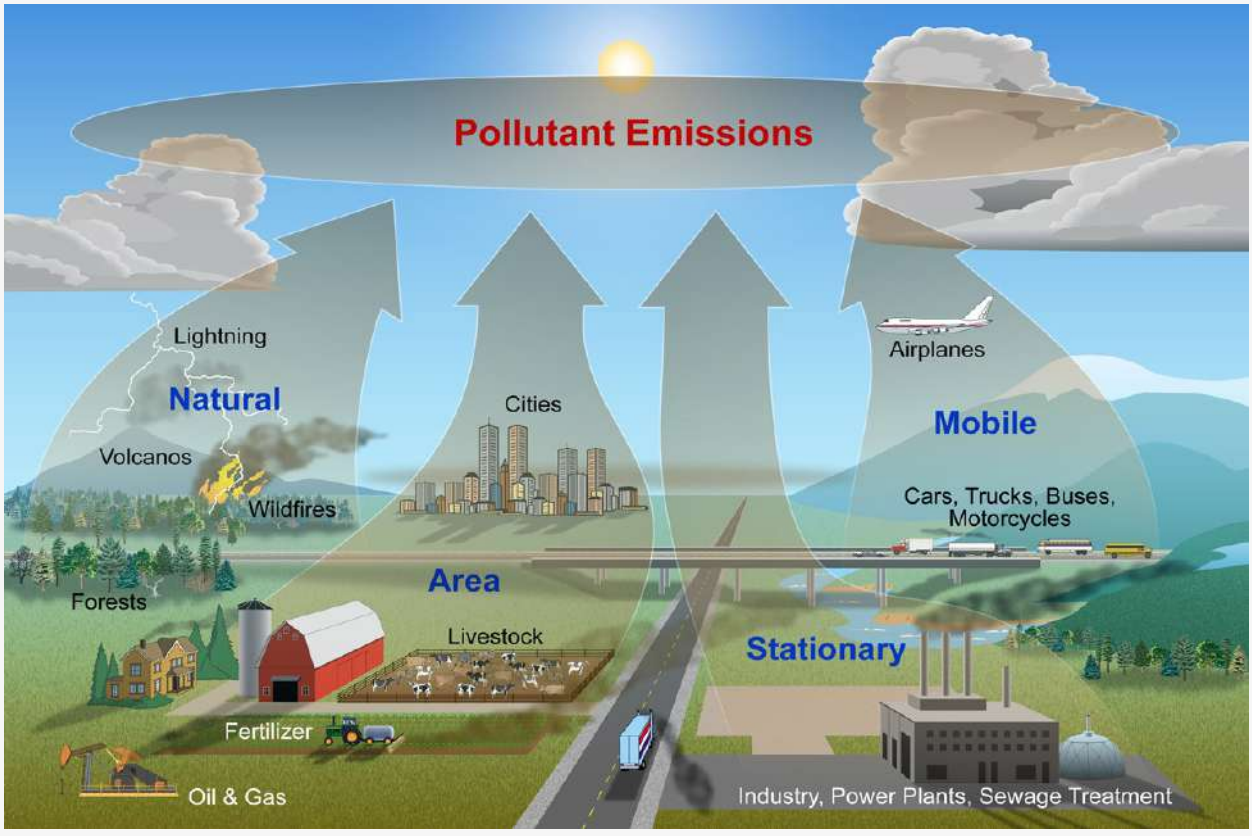
I would like to express my special thanks of gratitude to my teacher as well as our principle who gave me the golden opportunity to do this wonderful project on the topic “Air Pollution – Causes, Effects and Preventions” which helped me in doing lot of research and I came to know about so many things.

Air Pollution

Air pollution occurs due to the presence of undesirable solid or gaseous particles in the air in quantities that are harmful to human health and the environment. Air may get polluted by natural causes such as volcanoes, which release ash, dust, sulphur and other gases, or by forest fires that are occasionally naturally caused by lightning. However, unlike pollutants from human activity, naturally occurring pollutants tend to remain in the atmosphere for a short time and do not lead to permanent atmospheric change.

Anthropogenic Air Pollution sources are:

- **Combustion of fossil fuels**, like coal and oil for electricity and road transport, producing air pollutants like nitrogen and sulphur dioxide.
- **Emissions from industries and factories**, releasing large amount of carbon monoxide, hydrocarbon, chemicals and organic compounds into the air.
- **Agricultural activities**, due to the use of pesticides, insecticides, and fertilizers that emit harmful chemicals.
- **Waste production**, mostly because of methane generation in landfills.



Source: https://www.nps.gov/subjects/air/sources.htm

Effects of Air Pollution:

1. On the Environment: Air pollution has a major impact on the process of plant evolution by preventing photosynthesis in many cases, with serious consequences for the purification of the air we breathe. It also contributes to the formation of acid rain, atmospheric precipitations in the form of rain, frost, snow or fog, which are released during the combustion of fossil fuels and transformed by contact with water steam in the atmosphere.

Source: https://www.filtersamerica.com/blog/post/2016/04/27/4-Harmful-Effects-of-Air-Pollution.aspx

2. Global Warming: On top of that, air pollution is a major contributor to global warming and climate change. In fact, the abundance of carbon dioxide in the air is one of the causes of the greenhouse effect. Normally, the presence of greenhouse gases should be beneficial for the planet because they absorb the infra-red radiation produced by the surface of the earth. But the excessive concentration of these gases in the atmosphere is the cause of the recent climate change.

Source: https://climate.nasa.gov/resources/global-warming-vs-climate-change/

3. On Human Health: Our continual exposure to air pollutants is responsible for the deterioration of human health. Air pollution is indeed a significant risk factor for human health conditions, causing allergies, respiratory and cardiovascular diseases as well as lung damage.

Source: http://wiselygreen.com/indoor-air-pollution-and-its-effects-on-human-health/

Preventions:

1. Renewable fuel and clean energy production: The most basic solution for air pollution is to move away from fossil fuels, replacing them with alternative energies like solar, wind and geothermal.

Source: https://knowledge.wharton.upenn.edu/article/can-the-world-run-on-renewable-energy/

2. Energy conservation and efficiency: Producing clean energy is crucial. But equally important is to reduce our consumption of energy by adopting responsible habits and using more efficient devices.

Source: https://environmentamerica.org/feature/ame/cleanest-energy-conservation-efficiency

3. Eco-friendly transportation: Shifting to electric vehicles and hydrogen vehicles, and promoting shared mobility (i.e carpooling, and public transports) could reduce air pollution.

Source: https://www.shutterstock.com/image-vector/people-riding-eco-transportation-green-urban-1090955282

4. Green building: From planning to demolition, green building aims to create environmentally responsible and resource-efficient structures to reduce their carbon footprint.

Source: https://www.rateitgreen.com/green-building-articles/lca-life-cycle-analysis-for-buildings/94

Bhopal Disaster and Air Pollution:

Bhopal disaster, chemical leak in 1984 in the city of Bhopal, Madhya Pradesh state, India. At the time, it was called the worst industrial accident in history.

On December 3, 1984, about 45 tons of the dangerous gas methyl isocyanate escaped from an insecticide plant that was owned by the Indian subsidiary of the American firm Union Carbide Corporation. The gas drifted over the densely populated neighbourhoods around the plant, killing thousands of people immediately and creating a panic as tens of thousands of others attempted to flee Bhopal. The final death toll was estimated to be between 15,000 and 20,000.

Source: https://medium.com/kayla-anderson/the-1984-bhopal-disaster-in-india-a-message-for-industrialists-10abb3d1e8b6

Giant Air Purifier in Delhi:

The 12-feet-tall air purifier will cover an area of 1,000 square metres and deliver 2 lakh cubic metre of clean air every day. The purifier tower is capable of treating 6,00,000 cubic metres of air per day and collecting more than 75 percent of particulate matters (PM) 2.5 and 10. After cleaning polluted air, it releases clean air.

Source: https://english.newsnationtv.com/cities/delhi-and-ncr/delhi-gets-first-giant-air-purifier-at-lajpat-nagar-can-treat-6-lakh-cubic-metres-of-air-per-day-249666.html

Conclusion

The health of the public, especially those who are the most vulnerable, such as children, the elderly and the sick, is at risk from air pollution, but it is difficult to say how large the risk is. It is possible that the problem has been over-stressed in relation to other challenges in the field of public health.

As we have seen, there are considerable uncertainties in estimating both exposures and effects and their relationships. It may be, for example, that the effects of long-term exposure to lower concentrations of air pollutants could be more damaging to public health than short-term exposure to higher concentrations. For this reason alone, local authorities could take action to assess and improve local air quality. It is not sufficient to wait for an episode of severe air pollution and then try to deal with its effects. In India, there are some mega cities which are already much polluted like Delhi, Kanpur etc. We should also take the responsibilities of keeping our environment pollution free.

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ENVS PROJECT

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UNIVERSITY OF CALCUTTA REGISTRATION NO:- 223-1111-0193-20

COLLEGE ROLL NO:- PLSA20M679

DEPARTMENT OF POLITICAL SCIENCE

SEMESTER:- 2

PROJECT TOPIC :- WATER POLLUTION

ACKNOWLEGEMENT

I would like to thank my subject teachers of AECC ENVS for providing me with adequate study materials for the topic and encouraging me to do this project systematically. I would also like to thank my parents ,because without their timely help and guidance, it was impossible for me to opt and work on this project .

WATER POLLUTION

INTRODUCTION

Water is the most essential element that provides the life in the earth surface and without water it is not at all possible. We also care about it very less. Most of the times we keep our taps open, we bath with a huge amount of water. Waters can be found rivers,lakes, ponds, streams, artificial reservoirs etc. And these kinds of sources are basically called as surface waters . Waters that percolates down the ground and gets saturated in layers of sand gravel and bedrock through which ground water flows are called aquifers. These source of water is basically gets recharged by the rain waters.Water Pollution deals with the quality or composition of waters when it is changed directly or indirectly as a result of the human activities and it becomes unfit for any purposes.

Water pollution mainly occurs due to the contamination of the water .when the water gets polluted and adversely affects all lifeforms that directly depends on this source. In the near future it can be said that a huge problem related to water is coming as nearly less than 1% of fresh water is available for us currently so the future conditions are going to be beyond our imaginations. Due to pollution of water more than millions people are dying every year throughout the world due to water related health issues or by water born diseases.

TYPES OF WATER POLLUTION

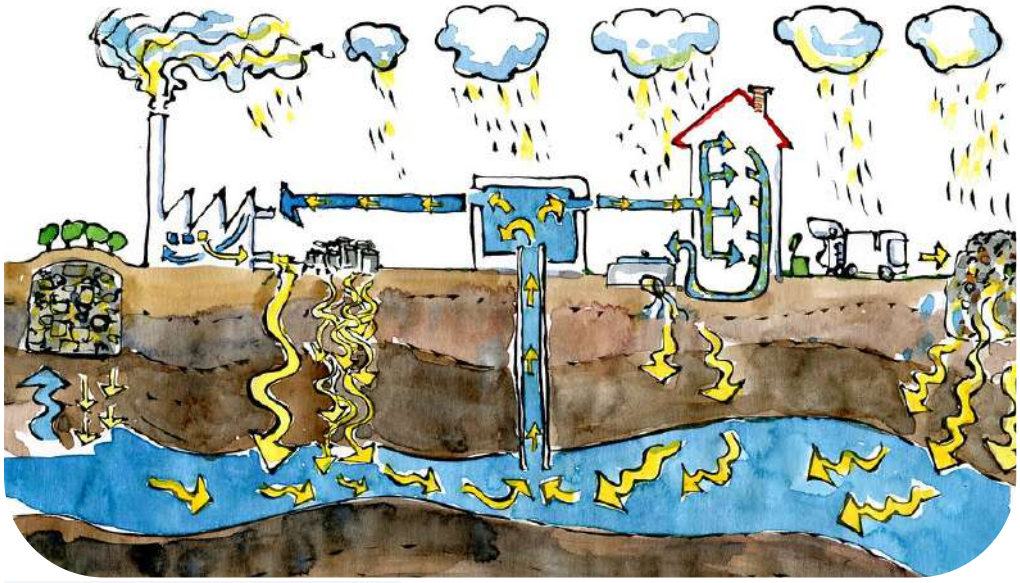
Surface water

The water bodies like river, lake, ponds , oceans are mainly recognised as the surface water and total 70% of the earth surface are covered with water bodies .
The surface water pollution is mainly caused due to human activities as we through plastic materials in the ocean and during the leakages in the ships carrying oil in it .Surface water pollution is often caused by nutrients, pathogens, plastics and chemicals such as antibiotics, heavy metals as well as pesticides etc. Several factories and industries are also there where they use to release there wastes out in nearby water bodies like river lake etc,which acidifies the water and these wastes directly affected the marine life. In several rural areas people use to bath in ponds and rivers and washes there clothes and utencils and makes the water dirty also after cremation of bodies they through the ashes in the river water flowers of temples are also thrown in the water specially in the Ganges river and the water gets hugely polluted and thus we can say that the cultural activities of human are thje mostly related factor for the pollution. Other than that the natural calamities like flood , cyclone and tsunami also extracts out a huge number of pollution from the land in the water bodies too.

The scene of the oil spill in the waters around Mauritius after Japanese bulk carrier, MV Wakashio, ran aground on 25 July 2020.

Ground water

The ground water mainly gets its resource from the rain water and some time the water gets percolated from the other water bodies like rivers and ponds. Thus the water gets stored above the bedrock region and during the time of cultivation farmers use intense pesticides and fertilizers on the crops which sweeps down making the ground water polluted.
Analysis of groundwater contamination may focus on soil characteristics and site geology, hydrology and the nature of the contaminants. Causes of ground water pollution include naturally occurring or geogenic. The underground pipings sometimes leaks resulting mixture of oil and other mineral with thye ground water.



Groundwater pollution sources

SOURCES OF WATER POLLUTION

1. Urbanization :- urbanization generally leads to higher phosphorus concentrations in urban catchments. Increasing imperviousness,increases runoff from urbanisation surface and increase loading of nutrients to urban steams.

2. Sewage and other oxygen demanding wastes :- Management of solid waste is not successful due to huge volumes organic and non biodegradable wastes generated daily ,as consequence, garbage in most parts of India is unscientifically disposed and leads to the increase in pollutant load surface and ground water courses.

3.Industrial wastes :- Many Industries situated along the banks of river such as steels and paper industries for there requirement of huge amount of water in manufacturing process an finally their wastes containing acids, alkalies and other chemicals are dumped down into rivers as effluents. All such discharges finally arrive water bodies in the form of effluents affecting human health and the organisms living there.

3. 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. Agro- chemical wastes including fertilizers , pesticides which may be insecticides widely used in crops to enhance productivity. Improper disposal a lot of pollutants to water bodies.

4. Thermal pollution:- Changes in water temperature adversely affect water quality and aquatic during the wet season. .Majority of thermal pollution in water is caused due to thee human activities . These are mainly causing because of the nuclear power and electric power plants , petroleum refineries,coal fire power plants which releases the chemicals in water bodies and the high temperatures declines the oxygen content and disturbs the aquatic life.

5.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 leads to oil pollution in water.

MEASURES TO CONTROL WATER POLLUTION

Water pollution can be controlled by several ways like if we treat the chemicals and then release in the water bodies thus the chemicals will gets intoxicated and will become harmless for the marine lif. Also to reduce the ground water pollution the farmers can use fertilizers by putting it in the root of the plants and the underground pipes should be checked regularly and less amount of chemical substances should be supplied by them.

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SEMESTER – II

DEPARTMENT – POLITICAL SCIENCE

TOPIC – ENVIRONMENTAL POLLUTION

ACKNOWLEDGMENT

Firstly, Rima Soren the student of political science department would like to express my special thanks of gratitude to my guide Sushmita ma'am, who gave me the golden opportunity to do this wonderful project on Environmental pollution, I came to know about so many things for which I am thankful.

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

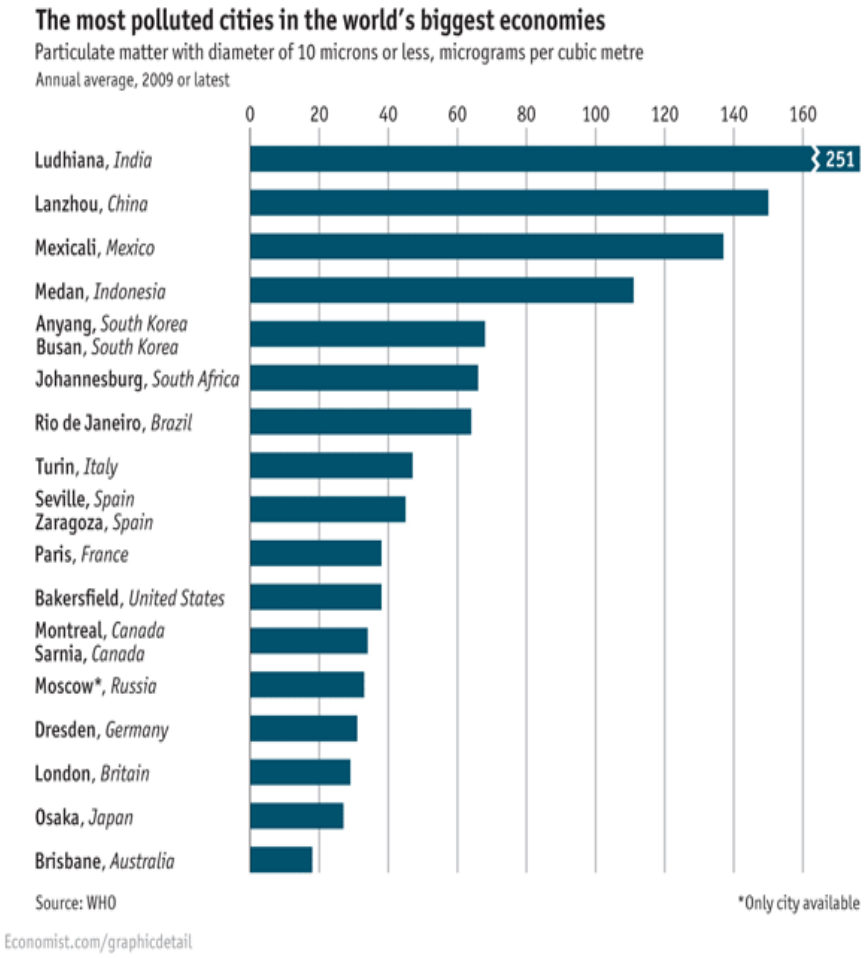
ENVIRONMENTAL POLLUTION

Pollution is the introduction of **contaminants** into the environment that cause **harm** or **discomfort** to humans or other living organisms, or that damage the environment, which can come in the form of chemical substances, or energy such as noise, heat or light. **Pollutants** can be naturally occurring substances or energies, but are considered contaminants when **in excess of natural levels.**

Environmental pollution takes place when the environment *cannot* process and neutralize harmful by-products of human activities (poisonous gas emissions) *in due course* without any structural or functional damage to its system.

Pollution occurs, on the one hand, because the natural environment does not know how to decompose the *un*naturally generated elements (i.e., anthropogenic pollutants), and, on the other, there is a lack of knowledge on the part of humans on how to decompose these pollutants artificially. It may last **many years** during which the nature will attempt to decompose the pollutants; in one of the worst cases – that of radioactive pollutants – it may take as long

as thousands of years for the decomposition of such pollutants to be completed.



Types of Pollution

- Air Pollution
- Water Pollution
- Soil Pollution
- Noise Pollution
- Nuclear hazard

Air pollution

Air pollution refers to the release of harmful contaminants (chemicals, toxic gases, particulates, biological molecules, etc.) into the earth's atmosphere. These contaminants are quite detrimental and in some cases, pose serious health issues. Some causes that contribute to air pollution are:

- Burning fossil fuels
- Mining operations
- Exhaust gases from industries and factories

The effects of air pollution vary based on the kind of pollutant. But generally, the impact of air pollution ranges from:

- Increased risk of respiratory illness and cardiovascular problems
- Increased risk of skin diseases
- May increase the risk of cancer
- Global warming
- Acid rain
- Ozone depletion
- Hazards to wildlife

Water Pollution

Water pollution is said to occur when toxic pollutants and particulate matter are introduced into water bodies such as lakes, rivers and seas. These contaminants are generally introduced by human activities like improper **sewage treatment** and oil spills. However, even natural processes such as eutrophication can cause water pollution.

Other significant causes of water pollution include:

- Dumping solid wastes in water bodies
- Disposing untreated industrial sewage into water bodies
- Human and animal wastes
- Agricultural runoff containing pesticides and fertilisers

The effects of water pollution are very pronounced in our environment. Furthermore, toxic chemicals can bioaccumulate in living beings, and these chemicals can travel their way up the food chain, ultimately reaching humans.

Soil Pollution

Soil pollution, also called **soil contamination**, refers to the degradation of land due to the presence of chemicals or other man-made substances in the soil. The xenobiotic substances alter the natural composition of soil and affect it negatively. These can drastically impact life directly or indirectly. For instance, any toxic chemicals present in the soil will get absorbed by the plants. Since plants are producers in an environment, it gets passed up through the food chain. Compared to the other types of pollution, the effects of soil pollution are a little more obscured, but their implications are very noticeable.

Some of the common causes of soil pollution are:

- Improper industrial waste disposal
- Oil Spills
- Acid rain which is caused by air pollution
- Mining activities
- Intensive farming and agrochemicals (like fertilisers and pesticides)

- Industrial accidents

The effects of soil pollution are numerous. Specific wastes, such as radioactive waste become particularly hazardous when they are not well-contained. A well-documented example is a nuclear accident in Chernobyl, which has left an area of 2,600 km^2 uninhabitable for several thousand years.

Other effects of soil pollution include:

- Loss of soil nutrients, which renders the soil unfit for agriculture
- Impacts the natural flora and fauna residing in the soil
- Degrades vegetation due to the increase of salinity of the soil
- Toxic dust (such as silica dust) can cause respiratory problems or even lung cancer

Noise Pollution

Noise pollution refers to the excessive amount of noise in the surrounding that disrupts the natural balance. Usually, it is man-made, though certain natural calamities like volcanoes can contribute to noise pollution.

In general, any sound which is over 85 decibels is considered to be detrimental. Also, the duration an individual is exposed plays an impact on their health. For perspective, a normal conversation is around 60 decibels, and a jet taking off is around 15o decibels. Consequently, noise pollution is more obvious than the other types of pollution.

Noise pollution has several contributors, which include:

- Industry-oriented noises such as heavy machines, mills, factories, etc.

- Transportation noises from vehicles, aeroplanes, etc.
- Construction noises
- Noise from social events (loudspeakers, firecrackers, etc.)
- Household noises (such as mixers, TV, washing machines, etc.)

Noise pollution has now become very common due to dense urbanisation and industrialisation. Noise pollution can bring about adverse effects such as :

- Hearing loss
- Tinnitus
- Sleeping disorders
- Hypertension (high BP)
- Communication problems

NUCLEAR HAZARDS

The radiation hazard in the environment comes from ultraviolet, visible, cosmic rays and micro wave radiation which produces genetic mutation in man.

Natural Sources – This is in space which emits cosmic rays.

Man made Sources – (Anthropogenic sources) these are nuclear power plants, X-rays, nuclear accidents, nuclear bombs, diagnostic kits.

Effects of Nuclear Hazards

❖ Exposure of the brain and central nervous system or high doses of radiation causes delirium, convulsions and death within hours or days.

- Acute radiation sickness is marked by vomiting; bleeding of gums and in severe cases mouth ulcers.
- Nausea and vomiting often begin a few hours after the gastrointestinal tract is exposed. Infection of the intestinal wall can kill weeks afterwards.
- Unborn children are vulnerable to brain damage or mental retardation, especially if irradiation occurs during formation of the central nervous system in early pregnancy.

CONCLUSION

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Every kind of pollution leaves a huge impact on our environment, human , animals etc. We, as responsible citizens, must take steps towards a better tomorrow. We must join hands to take various initiatives and fight against this problem. A lot of innocent people lives are put in danger due to Pollution everyday. If we don't do anything from now on take or take a stand to make the earth pollution-free, then the doomsday will be upon us very soon

Project Title – Environmental Pollution

Subject – ENVS, AECC

Department – Political Science

Semester – 2 Semester

College Roll No. – PLSA20M682

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Environmental Pollution

Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants. Pollutants can be natural, such as volcanic ash. They can also be created by human activity, such as trash or runoff produced by factories. Pollutants damage the quality of air, water, and land. Environmental pollution takes place when the environment cannot process and neutralize harmful by-products of human activities (poisonous gas emissions) in due course without any structural or functional damage to its system.

Many things that are useful to people produce pollution. Cars spew pollutants from their exhaust pipes. Burning coal to create electricity pollutes the air. Industries and homes generate garbage and sewage that can pollute the land and water. Pesticides—chemical poisons used to kill weeds and insects—seep into waterways and harm wildlife. Pollution is a global problem. Although urban areas are usually more polluted than the countryside, pollution can spread to remote places where no people live. For example, pesticides and other chemicals have been found in the Antarctic ice sheet. In the middle of the northern Pacific Ocean, a huge collection of microscopic plastic particles forms what is known as the Great Pacific Garbage Patch.

Air and water currents carry pollution. Ocean currents and migrating fish carry marine pollutants everywhere. Winds can pick up radioactive material accidentally released from a nuclear reactor and scatter it around the world. Smoke from a factory in one-country drifts into another country.

The three major types of pollution are air pollution, water pollution, and land pollution.

- **Air Pollution**

Earlier the air we breathe in use to be pure and fresh. However, due to increasing industrialization and concentration of poisonous gases in the environment the air is getting more and more toxic day by day. In addition, these gases are the cause of many respiratory and other diseases. Moreover, the rapidly increasing human activities like the burning of fossil fuels; deforestation is the major cause of air pollution. The fossil fuel, firewood, and other things that we burn produce oxides of carbons, which were released into the atmosphere. Earlier there happens to be a large number of trees, which can easily filter the air we breathe in. However, with the increase in demand for land, the people started cutting down of trees, which caused deforestation. That ultimately reduced the filtering capacity of the tree.

Moreover, during the last few decades, the numbers of fossil fuel burning vehicle increased rapidly which increased the number of pollutants in the air. Besides, there are some other air pollutants like industrial waste, agricultural waste, power plants, thermal nuclear plants, etc.

- **Water Pollution**

Water pollution (or aquatic pollution) is the contamination of water bodies, usually because of human activities. Water bodies include for example lakes, river, ocean and groundwater. Water pollution results

when contaminants are introduced into the natural environment. For example, releasing inadequately treated wastewater into natural water bodies can lead to degradation of aquatic ecosystems. In turn, this can lead to public health problems for people living downstream. They may use the same polluted river water for drinking or bathing or irrigation. Water pollution is the leading worldwide cause of death and disease, e.g. due to water-borne diseases.

- **Land Pollution**

Land pollution, the deposition of solid or liquid waste materials on land or underground in a manner that can contaminate the soil and groundwater, threaten public health, and cause unsightly conditions.

Trash is another form of land pollution. Around the world, paper, cans, glass jars, plastic products, and junked cars and appliances mar the landscape. Litter makes it difficult for plants and other producers in the food web to create nutrients. Animals can die if they mistakenly eat plastic.

Garbage often contains dangerous pollutants such as oils, chemicals, and ink. These pollutants can leech into the soil and harm plants, animals, and people. Inefficient garbage collection systems contribute to land pollution. Often, the garbage is picked up and brought to a dump, or landfill. Garbage is buried in landfills. Sometimes, communities produce so much garbage that their landfills are filling up. They are running out of places to dump their trash.

Reducing pollution requires environmental, political, and economic leadership. Developed nations must work to reduce and recycle their materials, while developing nations must work to strengthen their economies without destroying the environment. Developed and developing countries must work together toward the common goal of protecting the environment for future use.

PROJECT

Topic :- বায়ুদূষণ (Air Pollution)

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- Calcutta Univarsity Registation :- 223-1112-0025-20
- College Roll No :- PLSA20CM631
- Subject :- Environmental Science (ABCC-2)
- Semester :- Sem-2

Season - 2021-'22

বায়ু দূষণ (Air Pollution)

□ বায়ু দূষণের সংজ্ঞা (Defination of Air Pollution) :-

বিভিন্ন প্রাকৃতিক কারণে বা মনুষ্যসৃষ্ট কারণে উদ্ভূত কঠিন বর্জ্য পদার্থ অথবা অপ্রয়োজনীয় বস্তুর ঘনত্ব বায়ুতে যদি স্বাভাবিক অনুপাতের থেকে বেশি বা বেশি হয়ে যায়, তাহলে ওই প্রকার বায়ুকে দূষিত বায়ু এবং সেই পদ্ধতিকে বায়ু দূষণ বলে।

□ বায়ুদূষণের উৎস (Sources of Air Pollution) :-

বায়ুদূষণের বিভিন্ন উৎস আছে, যা নিচে বর্ণিত করা হল —

(1) যানবাহন ও কলকারখানার পরিত্যক্ত ধোঁয়া :-

বায়ুদূষণের একটি বিশেষ কারণ হল যানবাহনের পরিত্যক্ত ধোঁয়া। যানবাহনের পরিত্যক্ত ধোঁয়া বায়ুদূষণের জন্য 60% দায়ী। যানবাহনের পরিত্যক্ত ধোঁয়ার মধ্যে প্রচুর পরিমাণে 'কার্বন ডাইঅক্সাইড', 'কার্বন মনোক্সাইড' এবং 'নাইট্রোজেন অক্সাইড' থাকে যা পরিবেশ ও বায়ুর জন্য হানিকারক। কলকারখানায় কয়লা ও খনিজ তেল দহনের ফলে প্রচুর পরিমাণে দূষিত ধোঁয়া সৃষ্টি হয়। এই ধোঁয়াতে SO_2 থাকায় তাহাতেই বায়ু দূষিত হয়।

(২) ধোঁয়াশা :—

নানারকমের রাসায়নিক ধোঁয়া নবত্ব বাষ্পের সাহায্যে কুয়াশা কখনো – কখনো ভারী ও কালো হয়ে ভূপৃষ্ঠে নেমে আসে তখন তাকে 'ধোঁয়াশা' বলে। সুতরাং, ধোঁয়াশা হল ধোঁয়া ও কুয়াশার সংমিশ্রন। বায়ুর সংগে গাড়ির ধোঁয়া, কলকারখানার বিষাক্ত ধোঁয়া মিশলে 'ধোঁয়াশার' সৃষ্টি করে।

(৩) কুয়াশা ও মেঘ :—

কুয়াশা ও মেঘ বায়ুমন্ডলকে নানা ভাবে দূষিত করে। মেঘের সংগে মিশে থাকা বিভিন্ন ধরনের জীবাণু নানারকম রোগের সৃষ্টি করে।

(৪) তেজস্ক্রিয় পদার্থ :—

বর্তমানে বিশ্বের বিভিন্ন স্থানে আনবিক বা পারমাণবিক বোমা বিস্ফোরন ঘটানোর ফলে বায়ুমন্ডল দূষিত হচ্ছে। সেই পারমাণবিক বোমা বিস্ফোরনের ফলে বায়ুমন্ডলে তেজস্ক্রিয় পদার্থ মিশে যায়। যার ফলে বায়ুদূষন ঘটে।

☐ বায়ুদূষক -এর শ্রেণিবিভাগ :

বায়ুদূষনকে প্রধানত ২টি শ্রেণিতে ভাগ করা যায়। যা নিচে ছকের দ্বারা দেখানো হল —

A. প্রাকৃতিক উৎস থেকে সৃষ্ট বায়ুদূষক পদার্থ :—

প্রাকৃতিক উৎস	বায়ুদূষক পদার্থ
১. উদ্ভিদ (জীবিত)	ছত্রাক, স্পোর, পরাগরেণু
২. দাবানল	কার্বন ডাইঅক্সাইড, নাইট্রোজেন
৩. সামুদ্র	মিথাইল ব্রোমাইড ও আয়োডাইড
৪. মহাজাগতিক বস্তু	ধূমকেতু থেকে আগত ধূলিকণা

B. মনুষ্যসৃষ্ট বায়ু দূষক পদার্থ :—

মনুষ্যসৃষ্ট উৎস	বায়ুদূষক পদার্থ
১. তাপবিদ্যুৎ কেন্দ্র	ফ্লাই অ্যাশ, এরোসল, ধোঁয়া
২. যানবাহন	কার্বনের অক্সাইড – CO, CO_2
৩. বাতানুকূল যন্ত্র	ক্লোরোফ্লুরো কার্বন, ক্লোরিন, ব্রোমিন
৪. আবর্জনা দহন	মিথেন, কার্বন ডাইঅক্সাইড, মনোক্সাইড

☐ নিরাপদ মাত্রা :

যে নির্দিষ্ট মাত্রা অতিক্রম করলে কোনো দূষক পদার্থ উদ্ভিদ ও প্রাণী জগতের ক্ষতি সাধন করে বা বিরূপ প্রক্রিয়া সৃষ্টি করে, সেই মাত্রাকে 'নিরাপদ মাত্রা' বলে।

☐ বায়ু দূষণে বিভিন্ন গ্যাসের ভূমিকা :—

বিভিন্ন গ্যাসের মধ্যে বায়ু এবং পরিবেশ উভয়ই দূষিত হয়। নিচে কিছু গ্যাসের কথা উল্লেখ করা হল যারা হলে বায়ু দূষিত হয়।

(1.) কার্বন মনোক্সাইড :—

এটি একটি বর্ণহীন ও গন্ধহীন গ্যাস। অতিরিক্ত যানবাহন চলাচল, জীবাশ্ম জ্বালানির দহনের ফলে এই গ্যাস পরিবেশে নির্গত হয়। শিল্পাঞ্চলের বাতাসে কার্বন মনোক্সাইড-এর পরিমাণ 700 ppm-এর বেশি হলে মানুষের মৃত্যু ঘটতে পারে। সুতরাং, অনুমান করা যায়, যে এই গ্যাস কতটা মারাত্মক পরিবেশের জন্য।

উদাহরণ হিসাবে বলা যায়, কোলকাতা শহরে প্রতিদিন প্রায় 450 টন কার্বন মনোক্সাইড পরিত্যক্ত বায়ুমণ্ডলে মেশে।

(2) কার্বন ডাই-অক্সাইড :—

কার্বন ডাই-অক্সাইড বায়ুদূষক হিসাবে কাজ করে। এই গ্যাস বর্ণহীন কিন্তু এর হালকা ঝাঁঝাল গন্ধ আছে। শিল্পোন্নত বিপ্লবের পর থেকেই বায়ুমণ্ডলে CO_2 গ্যাসের পরিমাণ 25% বৃদ্ধি পেয়েছে। ছাড়া CO_2 গ্যাস 'গ্রীন হাউস' গ্যাসের গ্যাস হওয়ায়

বিশ্ব উষ্ণায়নে বিভিন্ন ভূমিকা নেয়। বিজ্ঞানীদের মতে 1958 খ্রিঃ CO_2 গ্যাসের পরিমাণ 280 ppm থেকে বেড়ে 360 ppm হয়েছে, যা দিনকে দিন বেড়েই চলেছে।

(3) নাইট্রিক অক্সাইড :—

নাইট্রোজেনের অক্সাইড গুলির মধ্যে নাইট্রিক অক্সাইড নির্গমনের পরিমাণ সবথেকে বেশি প্রায় 95% - এর কাছাকাছি। নাইট্রিক অক্সাইড বায়ুমণ্ডলের অন্যান্য যৌগের সঙ্গে বিক্রিয়া করে 'পার অক্সি অ্যাসিটাইল নাইট্রেট' বা PAN সৃষ্টি করে।

(4) ক্লোরোফ্লুরো কার্বন (CFC) :—

প্রকৃতিতে এই গ্যাস পাওয়া যায় না। বিভিন্ন শিল্পে যেমন — রেফ্রিজারেটর, A.C, ইত্যাদি থেকে CFC গ্যাস নির্গত হয়। এই গ্যাস বেশিক্ষণ বায়ুমণ্ডলে থাকলে স্ট্রাটোস্ফিয়ারে ওজোন স্তরে 100 বছর থেকে যায়। এই গ্যাসের ফলে ওজোন গহ্বর - এর সৃষ্টি হয়। যার ফলে সূর্যের অতিবেগুনি রশ্মি পৃথিবীতে চলে আসে।

□ **বায়ু দূষণ নিয়ন্ত্রণ :-**

বায়ু দূষণ নিয়ন্ত্রণের কয়েকটি পদ্ধতি হল
- (1) আধুনিক প্রযুক্তির সাহায্যে বায়ুকে শোধন বা ফিল্টার করে বায়ুমণ্ডলের অনেক ক্ষতিকারক গ্যাসকে দূর করা যায়।

(2) বসতি অঞ্চল ও শিল্পাঞ্চলের মধ্যে উপযুক্ত দূরত্ব রাখা দরকার।

(3) অনেক সময় ~~ক্ষতি~~ ক্ষতিকারক রাসায়নিক পদার্থকে অন্য কোনো রাসায়নিক পদার্থ দিয়ে শোধন করা যেতে পারে।

(4) কীটনাশক ব্যবহার কমাতে হবে এবং কীটপতঙ্গকে তাদের শত্রু দিয়ে দমন করার ব্যবস্থা করতে হবে।

□ **প্রধান কয়েকটি বায়ুদূষণ প্রতিরোধক যন্ত্র :-**

(1) **ক্যাটালাইটিক কনভার্টার :-**

এগুলি বিভিন্ন গাড়ির ইঞ্জিনের মধ্যে লাগানো হয়। এর সাহায্যে গাড়ির ধোঁয়া থেকে দূষক পদার্থগুলিকে আলাদা করে অন্যান্য পদার্থে পরিণত করা হয়।

(২) সাইক্লোন সেপারেটর :-
এই যন্ত্রের সাহায্যে দূষিত বায়ু থেকে ঘূর্ণনের সাহায্যে কঠিন দূষক পদার্থগুলিকে আলাদা করা যায়।

(৩) স্ক্রাবার :-
এই যন্ত্রের সাহায্যে বায়ু থেকে অ্যামোনিয়া, সালফার ডাইঅক্সাইড ইত্যাদি গ্যাসকে প্রবাহ করা হয়।

□ বায়ুদূষণ জনিত রোগ :-

বায়ুদূষণের ফলে সৃষ্ট রোগ :-

বায়ুদূষণের ফলে বিভিন্ন ধরনের রোগের উদ্ভব হয়। নীচে একটি ছকের মাধ্যমে বায়ুদূষণের ফলে তা দেখানো হল —

বায়ুদূষক পদার্থ	ফলাফল
1. কার্বন মনোক্সাইড গ্যাস	হিমোগ্লোবিনে O_2 -এর মাত্রা কমিয়ে দেয়, ফলে মাথা ধরা, বমি ভাব ইত্যাদি ঘটে।
2. নাইট্রোজেন অক্সাইড	ব্রঙ্কাইটিস, নিউমোনিয়া, ফুসফুসে প্রদাহ ইত্যাদি।
3. অ্যামোনিয়া গ্যাস	চোখ জ্বালা, শ্বাসনালীতে প্রদাহ।
4. ক্লোরিন	সম্পূর্ণ শ্বাসযন্ত্র আক্রান্ত হয়।

—:End:—

Title: Environmental pollution

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Table of contents

1.Introduction: In this project I am going to deal about the major causes of pollution, their effects on our environment and the various measures that can be taken to control such pollutions.

2.Definition: Environment Pollution is the addition of contaminants into the natural environment that causes detrimental effects to nature, natural resources and mankind. Any unnatural and negative changes in all the dimensions like chemical, physical and biological characteristics of any component of the ecosystem i.e. air, water or soil which can cause harmful effects on various forms of life and property is called environmental pollution.

3.Types of pollution: There are different types of pollution which I mention below.

3.1.Air pollution: Air pollution is the presence of one or more disadvantageous content in such quantity and for such duration, as it is catastrophic, or tend to be catastrophic, to human health and welfare, animal or plant life. It is the contaminants of air by the discharge of detrimental substances.

Sources: We can see the man-made sources mostly related to burning different kinds of fuel. Stationary sources" include smoke stacks from power plants, waste incinerators, as well as furnaces and other forms of fuel-fired heaters. In Mobile Sources include motor vehicles, naval boats, aircraft and sound effects, etc.

Effects: Air pollution is a major risk factor for health problems, including respiratory infections, heart disease and lung cancer, according to WHO. It also effects in environment. Air pollutants (toxic chemicals) may cause acid rain. It can also contribute to dangerous ground-level ozone. They kill trees, crops, fields, animals.

Prevention: In many countries, monitoring equipment has been built in many parts of the city. Many countries and their governments have taken action against air pollution by introducing green energy. Some governments and companies are investing in wind energy and solar energy, as well as other renewable energy, to minimize burning of fossil fuels, which cause air pollution.

3.2.Water Pollution: Addition of certain substances such as organic, inorganic, biological and radiological to the water, which degrades the water quality and makes it unhealthy for use. Water pollution is not only confined to surface water but also spread to groundwater, sea and ocean.

Sources: Industries like mining, iron and steel, pharmaceuticals, food processing, soap and detergent and paper and pulp. Agricultural sources, thermal pollution (discharge of hot water by thermal power plants cause deficiency of dissolved oxygen in water) and underground water pollution. Marine pollution like river discharge, manmade pollution and oil spills etc.

Effects: An excessive amount of mercury in water can cause Minamata disease in humans and dropsy in fishes lead in large amount can cause dyslexia, Cadmium poisoning causes diseases etc. Polluted water has less amount of Dissolved oxygen content which is important for sensitive organisms, thereby eliminates sensitive organisms.

Prevention: Usage of water should be minimized by changing the techniques involved. Recycling and treatment of water should be used to the maximum extent possible. The quantity of discharge of wastewater can be minimized.

3.3.Soil pollution: The soil which negatively affects physical, chemical and biological properties of soil and reduces its productivity is called soil pollution. The factors which disturb the biological balance of the soil and deteriorate the quality, texture and mineral content are called soil pollutants.

Sources: Industrial waste: lead, cadmium, mercury, organic substances and chemicals. Agricultural waste: fertilizers, pesticides, insecticides and manures.

Effects: It reduces soil fertility and thus crop yields; increase soil erosion and salinity. Ecological imbalance and imbalance in flora and fauna further increases. Problems in urban areas like clogging in drains, release of gases, foul smells and problems in wastewater management.

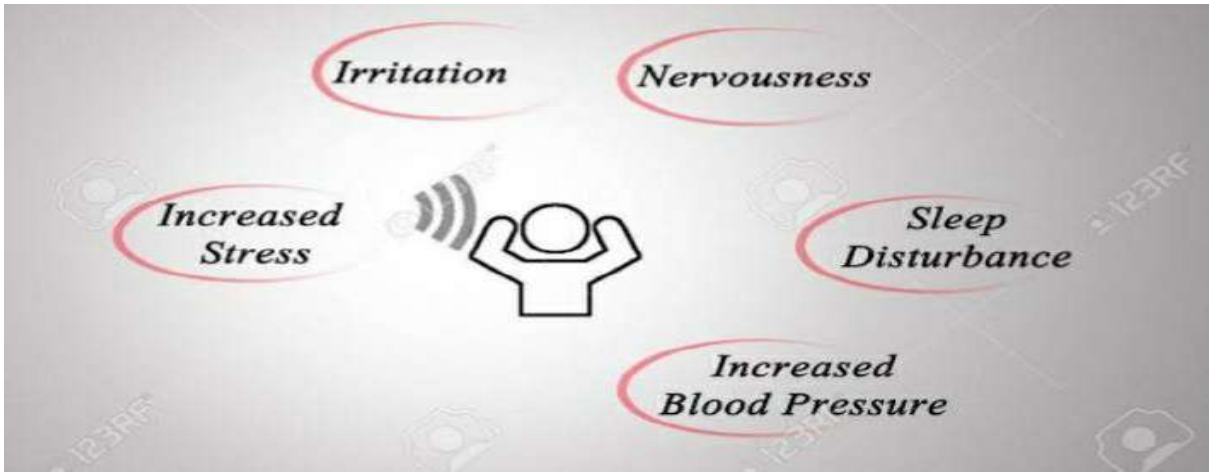
Prevention: Solid waste management and reduction of waste from the construction area. Stop the use of plastic bags and use bags of degradable materials like paper and cloth.

3.4.Noise pollution: Noise by definition is "sound without value" or "any noise that is unwanted by the recipient". Noise pollution increased blood pressure, loss of temper, decrease

in work efficiency, loss of hearing which may be first temporary but can become permanent in the noise stress continues.

Sources: Human activities contribute to noise pollution to varying extent. Indoor sources are like radio, television, generators, air conditioners, different home appliances, and family conflict. Outdoor are like industrial activities, automobiles, rail traffic, aeroplanes and activities.

Effects: Noise pollution is highly annoying and irritating. Noise disturbs sleep, causes hypertension (high blood pressure), emotional problems such as aggression, mental depression and annoyance. Noise pollution adversely affects efficiency and performance of individuals.



Prevention: Traffic noise can be reduced by proper maintenance of vehicles. Retrofitting of locomotives, continuously welded rail track, deployment of quieter rolling stock will reduce noises emanating from trains. Industrial noises can be reduced by sound proofing equipment.

3.5.Radioactive pollution: Radioactive Pollution is defined as the increase in the natural radiation levels caused by human activities. It is estimated that about 20% of radiation we are exposed to is due to human activities.

Sources: The human activities that can release radiation involve such as mining, handling and processing of radioactive materials, storage of radioactive waste and use of radioactive reactions to generate energy (nuclear power plants).

Effects: The effects of radioactive pollution is dangerous. The exposure to high amounts of radiation generates almost immediately chronic diseases, cancer or even sudden death in rare cases of extreme pollution, small amounts of radiation can cause diseases that are not so serious and develop over the course of time.

Prevention: Radiation Pollution can be controlled and prevented at various levels, including the handling and treatment of radiation waste, the control and mitigation of nuclear accidents, as well as the control and minimization of personal exposure to radiation at an individual level.

4.Conclusion: Much is being done to control, monitor and rectify damage done by pollutants. The problems are diverse and some are only being recognised 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.

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AECC ENVS PROJECT

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Water Pollution

Importance of Water:

Water links and maintains all ecosystems on the planet. The main function of water is to propel plant growth; provide a permanent dwelling for species that live within it, or provide a temporary home or breeding ground for multiple amphibians, insects and other water-birthed organisms; and to provide the nutrients and minerals necessary to sustain physical life. As nature's most important nutrient, people need water to survive.

What is Water Pollution?

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.

Types of Water Pollution:

- Organic pollution due to microorganisms - bacteria and viruses - present in the water, generated by excrement, animal and vegetable waste
- Chemical pollution generated by the nitrates and phosphates of pesticides, human and animal drugs, household products, heavy metals, acids and hydrocarbons used in industries

Sources of Water Pollution:

Groundwater is one of our least visible but most critical natural resources. With rainfall, it becomes groundwater as it seeps deep into the earth, filling up cracks, crevices, and porous spaces of an aquifer, which is an underground storehouse of water. Groundwater is then pumped to the earth's surface for drinking water.

Groundwater gets polluted when contaminants such as fertilizers, pesticides, and waste leaching from landfills and septic systems, making their way into an aquifer.

Once polluted, an aquifer becomes unsafe for humans and remains unusable for decades, or even thousands of years. Besides, groundwater can also spread contamination far from the original polluting source when it seeps into streams, lakes, and oceans.

Making groundwater free of contaminants can be difficult to impossible, as well as costly.

Eighty percent of ocean pollution or marine pollution originates on land along the coast or far inland. Streams and rivers carry contaminants such as chemicals, nutrients, and heavy metals that are carried from farms, factories, and cities into our bays and estuaries, and from there, they reach the ocean.

Marine debris, particularly plastic, is blown away by the wind or washed away in storm via drains and sewers. Our seas sometimes get polluted by big and small oil spills and leaks and are also soaking up carbon pollution from the air. The ocean absorbs a quarter of human-made carbon emissions.

A boundary line cannot contain water pollution on a map. Transboundary pollution happened when contaminated water from one country spilled into other countries' waters. It can result from a disaster like an oil spill or the slow, downriver creep of industrial, agricultural, or municipal discharge.

Various Causes of Water Pollution:

Industries produce a tremendous amount of waste, which contains toxic chemicals and pollutants, causing air pollution and damage to our environment and us. They contain harmful chemicals, including lead, mercury, sulphur, nitrates, asbestos, and many others.

Many industries, not having a proper waste management system, drain the waste in the freshwater, which goes into canals, rivers, and later into the sea.

The toxic chemicals may change the colour of water, increase the number of minerals, called eutrophication, change the temperature of the water, and pose a severe hazard to water organisms.

The sewage and wastewater that is produced in each household are treated chemically and released into the sea along with fresh water. The sewage water carries pathogens, a typical water pollutant, other harmful bacteria, and chemicals that can cause serious health problems and thereby diseases.

Microorganisms in water are known to cause some of the very deadly diseases and become the breeding grounds for creatures that act as carriers. These carriers inflict these diseases onto an individual via various forms of contact. A typical example would be Malaria.

Mining is the process of crushing the rock and extracting coal and other minerals from the underground. These elements, when extracted in the raw form, contain harmful chemicals and can increase the number of toxic elements when mixed up with water, which may result in health problems. Mining activities emit a large amount of metal waste and sulphides from the rocks, which is harmful to the water.

The garbage produced by households in the form of paper, plastic, food, aluminium, rubber, glass, is collected and dumped into the sea in some countries. These items take 2 weeks to 200 years to decompose.

When such things enter the sea, they not only cause water pollution but also harm animals in the sea.

Chemical fertilizers and pesticides are used by farmers to protect crops from insects and bacteria. They are useful for the plant's growth. However, when these chemicals are mixed up with water, they produce harmful pollutants for plants and animals.

Measures to stop Water Pollution:

The treatment of polluted water removes existing contaminants or reduce the concentration of the pollutants to make the water fit for the desired use. Some of the ways to do it are:

The raw sewage needs to be adequately treated in a water treatment plant before it is released into the environment. Water is passed through several chambers and chemical processes in the water treatment plant to reduce the amount and toxicity of waste.

When nitrates present in the water get converted into gas, it is known as denitrification. It is an ecological approach that prevents leaching of nitrates in the soil. It stops groundwater from getting contaminated.

The ozone wastewater treatment method has become very popular. In this method, an ozone generator breaks down the pollutants in water. Ozone oxidizes bacteria, organic material, moulds, and other contaminants in water.

Septic tanks treat sewage right at the place of the location where it originates instead of treating it in any far-away plant or sewage system. This system is usually put to use at the individual building

level. The sewage gets separated into solid and liquid components and treated separately.

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ENVIRONMENTAL STUDIES

DEPARTMENT OF POLITICAL SCIENCE

SEMESTER : II

COLLEGE ROLL NO. : PLSA20F656

C.U ROLL NO. : 202223-11-0067

C.U REGISTRATION NO. : 223-1211-0124-20

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"It is not possible to prepare a project without the assistance and encouragement of other people. This one is certainly no exception."

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I am ineffably indebted to my professor, **Dr. Sushmita Gonsalves** for her guidance and support to accomplish this project.

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At last but not the least my gratitude goes to all of my friends who directly or indirectly helped me to complete this project.

Any omission in this brief acknowledgement does not mean lack of gratitude.

Noise Pollution

When people talk about the bad effects of urbanization most mention bad air, the traffic and lack of green spaces but we seldom mention noise pollution. This is something that has changed over time and we are now more aware of the fact that noise pollution represents a danger equally as much as other forms of pollution.

Noise Pollution : The Challenge of the 21st Century

Noise pollution otherwise known as sound pollution or environmental noise can be simply defined as the propagation and spread of a lot of noise that have a negative effect on human activity and animal life.

The world has changed in the past centuries more then it has in the past several thousand years or actually our cities have changed and we moved from the rural surrounding of nature to a mechanized and urban surrounding that is among other things full of noise pollution. The sources of noise pollution are many and when you stop and think about it you will find that everything in the city creates noise.

The city has various forms of public transport and all of them are running during the entire day sometimes even over the night. Then there is the sound of all the people on the street speaking, walking or running. Add to the mixture, the sound of our home appliances, bars, restaurants and counter halls and you have a symphony of irritable noise pollution all around you. Noise pollution is so common in the city that most people do not even notice it is there and they do not think about it at all. Different studies have shown that there is higher noise pollution in communities that are for the racial minority and are low-income communities.

Noise Pollution by Vehicles

The problem with noise pollution is the fact that people often underestimate the effects it can have on our health. First of all, noise pollution influences our hearing ability in a negative way because it influence's the hearing apparatus in our ear that cannot be repaired. The average modern city produces enough noise pollution to do precisely that and a lot of people have trouble with their hearing that sometimes goes unidentified for several years.

The other negative effect of noise pollution is the influence it has on our blood pressure. Recent research is showing that prolonged exposure to noise pollution increases our blood pressure significantly and over time it can create cardiovascular problems. Constant exposure to noise pollution makes people irritable and it can disturb our sleep making us less capable to perform our daily activities properly.

Cities exposed to noise pollution

Lastly noise pollution influences our concentration and makes us less capable to perform logical tasks. This fact was proven in an experiment done in a school in New York City. The school was located next to a railroad and on side of the building was exposed to continuous noise pollution. After testing students from both sides of the building the researchers determined that the continuous exposure to noise pollution made students perform badly in comparison with the ones that had no such exposure. The difference was so drastic that there was no doubt that noise pollution was the main culprit behind the student's bad performance.

Noise pollution is just one more problem that the urban life has brought to humanity and as with the other sources of pollution, we can do things to help us prevent the bad influences' such pollutants have on our lives and health. There are already specific rules and regulations in place set by the government of India to tackle this problem. For instance, as per the order from the Supreme Court of India, no one in the country is allowed to make use of loudspeakers for playing music after 10 pm.

Apart from this, there are a number of solutions available in order to curb the ever-increasing levels of noise pollution in our surroundings. For instance, if we are bound to be exposed to high sound levels, we must use earplugs in order to prevent our ears from damage. More so, we should be mindful of our activities which increase the levels of sound pollution. We must not honk unnecessarily while driving.

We must also follow the set noise levels limits by the Government. In cities such as Delhi the prescribed limit of noise is 80 decibels. We must follow these limits so that others are not affected due to our faults. Moreover, we must switch off the appliances when not in use. This not only saves energy but helps in reducing the noise levels in our environment.

There is a common sight of people using earplugs to listen to music and talking over the phone. However, we must take care of the prescribed decibel levels by the health experts. Also, when using loudspeakers as well we must ensure that does become a nuisance to others. In fact, light music is always from pleasant to ears than loud thuds of music.

There is no doubt that some volume of noise is necessary for our life. But, it is also a truth that we due to our own misuse noise pollution as on date is a growing environmental concern which needs immediate remedies in place. People have been found suffering from ear ailments and the ecology as well has been affected. It is high time that we implement the preventive measures available to us in order to reduce noise pollution. Or else, tomorrow the future generations may suffer from permanent hearing related diseases and the ecology shall be affected beyond repair.

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PROJECT TITLE:

DEFORESTATION

NAME: *RUPKATHA SAHA*

DEPARTMENT: *DEPARTMENT OF POLITICAL SCIENCE*

SUBJECT: *ENVS*

SEMESTER: *II*

COLLEGE ROLL NO.: *PLSA20F657*

CU REGISTRATION NO.: *223-1211-0126-20*

CU ROLL NO.: *202223-11-0068*

DEFORESTATION

INTRODUCTION

Deforestation refers to the decrease in forest areas across the world that are lost for other uses such as agricultural croplands, urbanization, or mining activities. Greatly accelerated by human activities since 1960, deforestation has been negatively affecting natural ecosystems, biodiversity, and the climate.

Deforestation is primarily a concern for the developing countries of the tropics as it is shrinking areas of the tropical forests causing loss of biodiversity and enhancing the greenhouse effect. Thirty per cent of the earth's land area or about 3.9 billion hectares is covered by forests. It was estimated that the original forest cover was approximately six billion hectares. The Russian Federation, Brazil, Canada, the United States of America and China were the most forest rich countries accounting to 53 per cent of the total forest area of the globe.

We need trees for a variety of reasons, not least of which is that they absorb not only the carbon dioxide that we exhale, but also the heat-trapping greenhouse gases that human activities emit. As those gases enter the atmosphere, global warming increases, a trend scientists now prefer to call climate change. Tropical tree cover alone can provide 23 percent of the climate mitigation needed over the next decade to meet goals set in the Paris Agreement in 2015, according to one estimate.

CAUSES OF DEFORESTATION

- Tropical forests are a major target of infra-structure developments for oil exploitation, logging concessions or hydropower dam construction which inevitably conveys the expansion of the road network and the construction of roads in pristine areas (Kaimowitz and Angelsen, 1998).
- Mining is a lucrative activity promoting development booms which may attract population growth with consequent deforestation. The deforestation rate due to mining activities in Guyana from 2000 to 2008 increased 2.77 times according to an assessment by the World Wildlife Fund-Guianas (Staff, 2010).
- National parks and sanctuaries beyond doubt protect the forests, but uncautioned and improper opening of these areas to the public for tourism is damaging. Further, many

companies and resorts who advertise themselves as eco-tourist establishments are in fact exploiting the forests for profit.

- The relationship between development and deforestation is complex and dynamic. Profits from deforestation vary from less than a dollar to thousand dollars per hectare depending on location, technologies and land use systems.

- The FAO identified forest crime and corruption as one of the main causes of deforestation in its 2001 report. Illegal forest practices may include the approval of illegal contracts with private enterprises by forestry officers, illegal sale of harvesting permits, under-declaring volumes cut in public forest, underpricing of wood in concessions, harvesting of protected trees by commercial corporations, smuggling of forest products across borders and allowing illegal logging, processing forest raw materials without a license (Contreras-Hermosilla, 2000; 2001) .

CONSEQUENCES OF DEFORESTATION

- The trees of the rainforest that provide shelter for some species also provide the canopy that regulates the temperature. Deforestation results in a more drastic temperature variation and loss of animal and plant species due to their loss of habitat.
- Increase in the carbon dioxide (CO_2) level in the atmosphere Forests serves as a carbon sink by absorbing atmospheric carbon dioxide during photosynthesis. Since carbon dioxide is a greenhouse gas, deforestation is a direct contributor to the greenhouse effect and global warming.
- Trees and their roots provide the soil with an anchor, as well as shelter from the wind and rain. When forests are wiped out, the land becomes exposed, leaving it vulnerable to being washed or blown away by elements.

REMEDIES TO DEFORESTATION

- In order to protect the forests, there have to be strict regulations on how much forest is allowed to be cut down and how much has to be preserved. Without regulation, the deforestation process will continue until there is not much forest left.

- Farmers have to be convinced of the huge negative effects of deforestation on humanity. Since farmers have a financial incentive for turning their forests into farmland, it should also be considered to subsidize them in a way that they have a financial incentive to protect their forests.

- Reforestation can be defined as the restocking of existing forests and woodlands that have been depleted, afforestation refers to the planting of trees in areas where there has been no tree cover before. Thus, either through reforestation or afforestation, another measure to meet the deforestation problem is to plant new trees. However, it takes a quite long time until the trees have a significant size and impact on the climate. There are several foundations that relate to the problem of deforestation and try to find solutions. There is a project called the Amazon Fund which has the goal to raise money in order to monitor, combat and prevent deforestation.

- Since the industrial revolution period, it is possible for humans to have high consumption levels which have never been possible before in the history of mankind. Due to production with the support of machines, we are able to produce large quantities of goods with a low unit price. Moreover, more farming has to be done in order to meet the increasing demand. To provide all those resources, large areas of forests had been cut down. This problem is especially severe in the Amazon Rainforest where farmers often start wildfires intentionally since they want to get more land for farming purposes since it is more profitable for them. Therefore, to be able to stop the problem of deforestation, we have to change our consumption behaviour.

- Education is another crucial measure against deforestation and its implied problems for our earth. Many people in our nowadays society do not know how important our forests really are for our planet and therefore also for the living quality of their children. We have to make clear that forests are a vital part of the environment and that we have no chance to fight global warming if we continue to cut down large forest areas.

CONCLUSION

As we have already seen, there are several measures that we can take in our daily life in order to prevent deforestation and the implied adverse consequences on the environmental system.
However, our contribution is only one part of the equation. For really making an impact that matters, we have to convince our family, friends or also as many people as possible about the importance of saving our forests from deforestation. If we are able to convince many people, these people will also convince other people, and so on. In this way, we are able to make a huge impact on our society and will make a real contribution in order to mitigate the deforestation issue.

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GLOBALWARMING

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- **REGISTRATION NO: 223-1112-0143-20**

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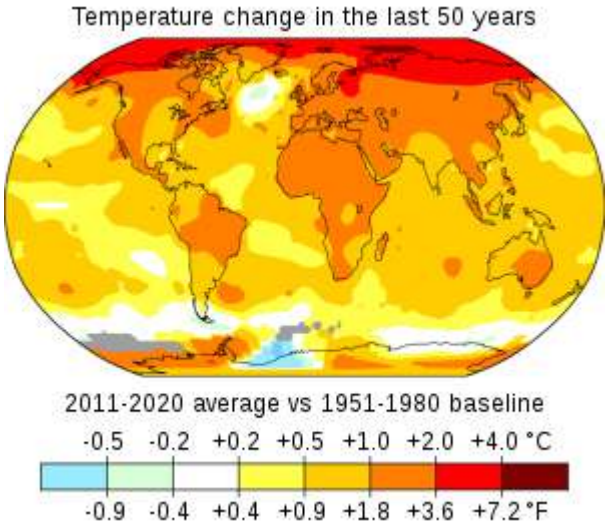
Any omission in this brief acknowledgement does not mean lack of gratitude.

GLOBALWARMING

Global Warming refers to the sustained increase in the average temperature of the earth's atmosphere. Human activity contributes to this change through the buildup of heat-trapping greenhouse gases. Over time, this increase may be sufficient to cause climatic change, including raising sea levels, altering precipitation patterns and changing water supplies and crop yields. It is also an increase in the near surface temperature of the Earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used to refer to the warming predicted to occur as a result of increased emissions of greenhouse gases. Scientists generally agree that the Earth's surface has warmed by about 1 degree Fahrenheit in the past 140 years.



The Intergovernmental Panel on Climate Change (IPCC) recently concluded that increased concentrations of greenhouse gases are causing an increase in the Earth's surface temperature and that increased concentrations of sulfate aerosols have led to relative cooling in some regions, generally over and downwind of heavily industrialized areas. Global warming has occurred in the distant past as the result of natural influences, but the term is today most often used to refer to the warming some scientists predict will occur as a result of increased anthropogenic emissions of greenhouse gases. The usual method to research about this phenomenon is to measure the surface-air

temperature over time. Some people blame the nature for the temperature increase while other points at human causes, such as our cars, industries that pollutes the air with Carbon Dioxide and farmers in the third world that pollutes the air with methane gas. Both Carbon Dioxide and Methane are Greenhouse gases. Since the late 19th century, we have experienced a rise in average global temperatures approximated between 0.6C and 0.2C. The main causes of global warming are: -

Carbon Dioxide from Power Plants: -

About 40% of carbon dioxide emissions stem from the burning of fossil fuels for the purpose of electricity generation. Coal accounts for 93% of the emissions from the electric utility industry. Coal emits around 1.7 times as much carbon per unit of energy when burned as does natural gas and 1.25 times as much as oil. Natural gas gives off 50% of the carbon dioxide, the principal greenhouse gas, released by coal and 25% less carbon dioxide than oil, for the same amount of energy produced. Coal contains about 80 percent more carbon per unit of energy than gas does, and oil contains about 40% more. For the household, a metric ton of carbon equals about 10,000 miles of driving at 25 miles per gallon of gas or about one year of home heating using a

natural gas-fired furnace or about four months of electricity from coal-fired generation.

Carbon Dioxide from Airplanes: -

Aviation causes 3.5 percent of global warming, and that the figure could rise to 15 percent by 2050.

Methane

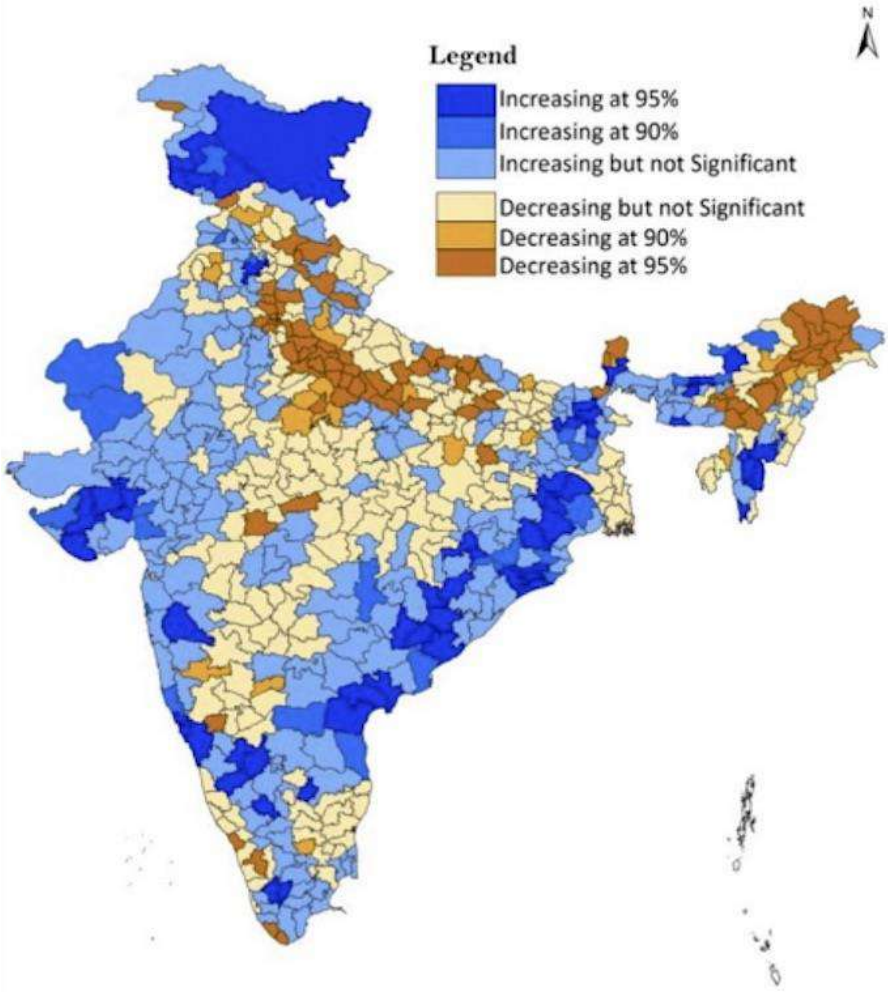
While carbon dioxide is the principal greenhouse gas, methane is second most important. Methane is more than 20 times as effective as CO_2 at trapping heat in the atmosphere. Levels of atmospheric methane have risen 145% in the last 100 years. Methane is derived from sources such as rice paddies, bovine flatulence, bacteria in bogs and fossil fuel production. Most of the world's rice is grown on flooded fields. When fields are flooded, anaerobic conditions develop and the organic matter in the soil decomposes, releasing CH_4 to the atmosphere, primarily through the rice plants.

Deforestation: -

After carbon emissions caused by humans, deforestation is the second principal cause of atmospheric carbon dioxide. Deforestation is responsible for 25% of all carbon emissions entering the atmosphere, by the burning and cutting of about 34 million acres of trees each year. We are losing millions of acres of rainforests each year, the equivalent in area to the size of Italy. The destroying of tropical forests alone is throwing hundreds of millions of tons of carbon dioxide into the atmosphere each year. We are also losing temperate forests. The temperate forests of the world account for an absorption rate of 2 billion tons of carbon annually. In the temperate forests of Siberia alone, the earth is losing 10 million acres per year.

Impacts of Global Warming: -

1. Rising Sea level: Flooding of fresh water marshlands, low-lying cities, and islands with marine water is one of the major effects of global warming.



2. Changes in rainfall patterns: In some areas, droughts and fires happen, whereas in other areas, flooding takes place. This all is due to changes in rainfall pattern.

3. Melting of the ice peaks: Due to melting of the ice peaks, there is loss of habitat near the poles. Now the polar bears are considered to be greatly endangered by the shortening of their feeding season because of declining ice packs.

4. Melting glaciers: There is a significant melting of old glaciers.

(BEFORE) (AFTER)

5. Thinning of Coral Reefs due to warming seas as well as acidification because of carbonic acid formation: Almost one-third of coral reefs are now severely damaged by warming seas.

Thus the 'Conclusion' confirms that global warming is the major challenge for our global society. There is very little doubt that global warming will change our climate in the next century. So, what are the solutions to global warming? First, there must be an international political solution. Second, funding for developing cheap and clean energy production must be increased, as all economic development is based on increasing energy usage. Third, the idea of sustainable development is needed for future development. We must not pin all our hopes on global politics and clean energy technology, so we must prepare for the worst and adapt. If implemented now, a lot of the costs and damage that could be caused by changing climate can be mitigated. The Organisation like UNFCCC (United Nations Framework Convention on Climate Change) and conventions like Kyoto Protocol and Paris climate agreement remain one of the prime examples for human beings to save planet earth from further destruction.

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ENVS PROJECT 2020-21

COLLEGE ROLL No. – PLSA20F658

C.U. ROLL No. – 202223-11-0069

C.U.REGISTRATION No.– 223-1211-0127-20

Topic :- AIR POLLUTION

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AIR POLLUTION :

Pollution is the effect of undesirable changes in our surroundings that have harmful effects on plants, animals and human beings. This occurs when only short term economic gains are made at the cost of the long term ecological benefits for humanity. During the last few years, we have contaminated our air, water and land on which life itself depends with a variety of waste products.

Air pollution is a familiar environmental health hazard. We know what we're looking at when brown haze settles over a city, exhaust billows across a busy road, or a plume rises from a smokestack. Some air pollution is not seen, but its pungent smell alerts you. It's one of the major problems these days**. *Air pollution is caused by a combination of gaseous and particulate pollutants such as carbon dioxide, methane and nitrogen dioxide*** emitted from point sources such as factories and motor vehicles that burn down fuel. Some gaseous emissions are visible to the eye and sometimes may even diffuse into the atmosphere and become invisible. Particulate pollution, on the other hand, such as soot and black carbon, is always visible.

Fig 1.0 : Toxic gases being emitted from factories and power plants.

Air is made up of 78% nitrogen, 21% oxygen, 0.9% argon. The remaining elements include carbon dioxide, water vapour, hydrogen, and other trace elements. Although gases like carbon dioxide and methane may only exist in small absolute concentrations, their outsized heat-trapping potential as *greenhouse gases* makes them the major factor in accelerating *climate change*. Air pollution occurs when there is an alteration to the composition of air, either by volume, or in the chemical, physical, or biological properties. The atmosphere is a delicate balance of elements and particles. Any imbalance, even in small proportions can be damaging for living organisms including animals and crops.

Pollutants are not only found outdoors but indoors too, from infiltrations of polluted outside air and from various chemicals used or produced inside buildings. Both pollutants of outside as well as inside are equally harmful***. Once these pollutants enter the troposphere, they are transported downward diluted by the large amount of air, transformed through either physical or chemical changes or are removed from the atmosphere by rain during which they are attached to water vapour that subsequently forms rain or snow that fall on the earth's surface.*** The atmosphere usually disperses pollutants by mixing them in the very large volume of air that covers the earth.

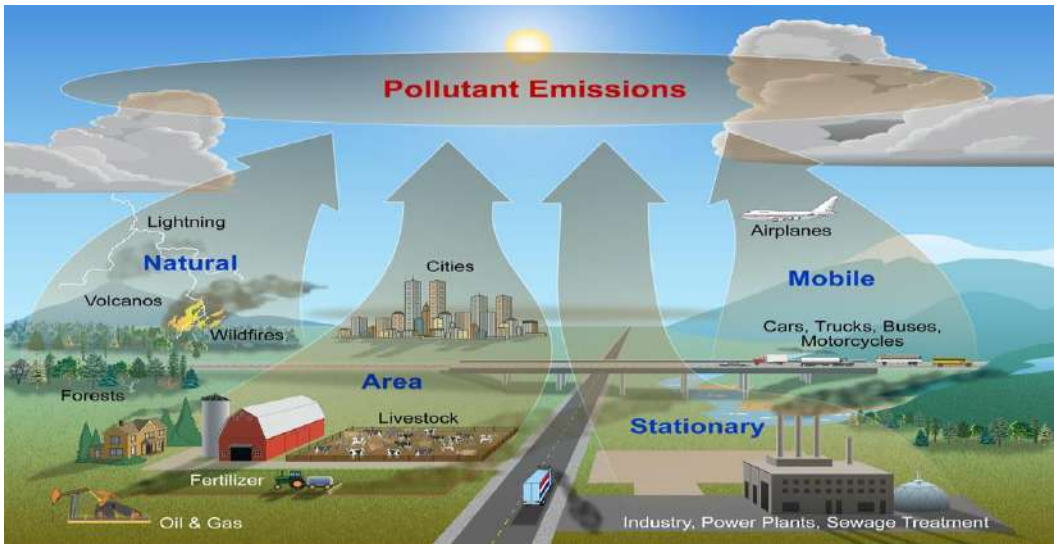

Fig 1.2 : Sources of air pollution

Air pollution is a mix of hazardous substances from both human-made and natural sources. Vehicle emissions, fuel oils and natural gas to heat homes, by-products of manufacturing and power generation, particularly coal-fueled power plants, and fumes from chemical production are the primary sources of human-made air pollution. No matter what the purpose of burning the fossil e.g. ***coal will release the harmful and suffocating chemical elements in air***. Apart from this, there is a high possibility of producing toxic gases. There is also observed some climate changes as well. As a result, there have experienced some changes in crop development. Nature releases hazardous substances into the air, ***such as smoke from wildfires, which are often caused by people; ash and gases from volcanic eruptions; and gases, like methane, which are emitted from decomposing organic matter in soils.***

Traffic-Related Air Pollution (TRAP), from motor vehicle emissions, may be the most recognizable form of air pollution. It contains most of the elements of human-made air pollution: ground-level ozone, various forms of carbon, nitrogen oxides etc. **Ozone**, an atmospheric gas, is often called smog when at ground level. It is created when pollutants emitted by cars, power plants, industrial boilers, refineries, and other sources chemically react in the presence of sunlight. **Noxious gases**, which include carbon dioxide, carbon monoxide, nitrogen oxides (NOx), and sulfur oxides (SOx), are components of motor vehicle emissions and byproducts of industrial processes. **Particulate matter** (PM) is composed of chemicals such as sulfates, nitrates, carbon, or mineral dusts. Vehicle and industrial emissions from fossil fuel combustion, cigarette smoke, and burning organic matter, such as wildfires, all contain PM. It can be inhaled deeply into lung tissue and contribute to serious health problems. ***PM 2.5 accounts for most health effects due to air pollution in the U.S.***

Fig 1.3 : Vehicle emissions contain particulate matter.

Now the question arises, how does air pollution affect us?

Air pollution can affect lung development and is implicated in the development of ***emphysema***, ***asthma***, *and other respiratory diseases, such as chronic obstructive pulmonary disease* ***(COPD).*** Particulate matter (PM) and nitrogen dioxide is linked to ***chronic bronchitis***. A large study of more than 57,000 women found living near major roadways may increase a woman's risk for ***breast cancer***.

To prevent air pollution we need to take bold steps in our daily life chores. *From rarely riding a car or a motorbike to burning the fuel less, we need to take preventive measures.*

Air quality management as a well-defined program has yet to emerge in India. At this point we need a strengthened air quality of air if we are to have a better quality of air. This would also need an integrated approach with strict air pollution control laws. Suggestions include:-

1. Putting a greater emphasis on pollution prevention rather than control,

2. Reducing the use of fossil fuels,

3. Improving the quality of vehicular fuel,

4. Increasing the use of renewable energy.

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Have mostly taken help from the textbook of environmental sciences and the following websites:-

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THANK YOU

ECOLOGY AND ECOSYSTEM

AECC 2

SEMESTER 2

COLLEGE ROLL NO: PLSA20F659

CALUTTA UNIVERSITY ROLL NO: 202223-11-0073

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DEPARTMENT: POLITICAL SCIENCE (HONS)

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CONTENTS

ECOLOGY

The word 'Ecology' was coined from the Greek word 'oikos' meaning 'house' or ' a place to live' According to the United States Council on Environmental Quality, “ecology is the science of the intricate web of relationships between living organisms and their non-living surroundings.”Ecology divides environment into terrestrial,freshwater,oceanic-marine environments.

POPULATION ECOLOGY

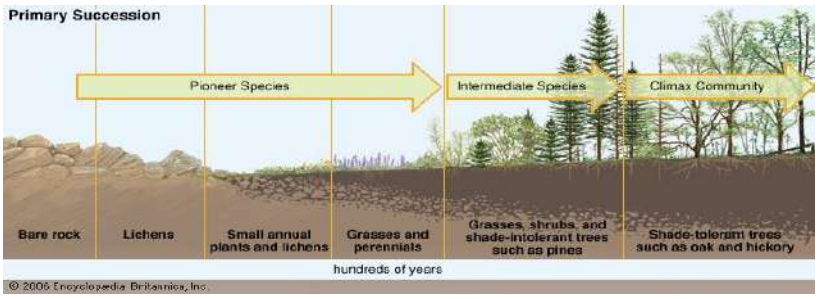
A population is the total number of individuals of a given biological species found in one place at one time.Population ecology examines how and why populations change over time.It aims to explain principles governing dynamic population patterns and integrates with mechanistic models and evolutionary interpretations of individual life-history tactics,physiology,behaviour,community theories, ecosystem dynamics and applies these principles to the management and conservation of natural populations.

COMMUNITY ECOLOGY

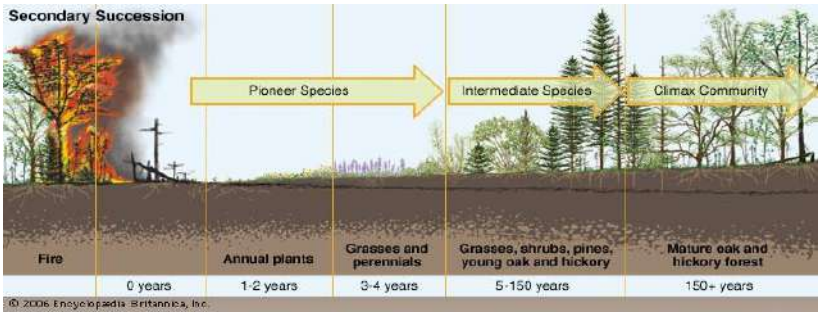
Community ecology is the study of the organization and functioning of communities of organisms.As populations of species interact with one another, they form biological communities.Community ecology also studies the relationships of the members of a community to their environment.Community ecology is usually subdivided according to habitat or biomes of species.

ECOLOGICAL SUCCESSION

“Ecological succession is a series of changes that occur in an ecological community over time.” It is the journey from seral to climax community.There are Primary succession, Secondary succession and Cyclic sucession.Primary succession begins in a barren land.Secondary succession occurs with the destruction of the primary ecosystem followed by subsequent recolonization.Cyclic succession is only a change in the structure of ecosystem on a cycle basis.



1.PRIMARY SUCCESSION



2.SECONDARY SUCESSION

ECOSYSTEM

An ecosystem consists of an assembly of mutually interacting organisms and their environment in which materials are interchanged in a largely cyclical manner.

STRUCTURE OF ECOSYSTEM

1. BIOTIC COMPONENTS

- **AUTOTROPHS**
  They are producers making food through photosynthesis.

- **HETEROTROPHS**
  They are Consumers that depend on other organisms for food and are further classified into:
  - **PRIMARY CONSUMERS**: herbivores relying on producers for food.
  - **SECONDARY CONSUMERS**: depend on primary consumers for energy and can either be carnivore, omnivore.
  - **TERTIARY CONSUMERS**: depend on secondary consumers for food.
  - **QUATERNARY CONSUMERS**: preying on tertiary consumers for energy

- **SAPROTROPHS**
  They are decomposers such as fungi and bacteria that thrive on the dead and decaying organic matter breaking them down into carbon dioxide and nitrogen to be absorbed by the soil.

2. ABIOTIC COMPONENTS

They are non-living things like habitat, gases, sola-radiation, temperature, climate, soil moisture, inorganic nutrients like carbon dioxide, water, nitrogen, calcium, phosphate all of which are involved biogeochemical cycles and organic nutrients like proteins, carbohydrates, liquids, acids, synthesized by the flora and fauna and returned to ecosystem as wastes, dead remains etc.

3.AUTOTROPHS

4.HERBIVORE HETEROTROPH

5.CARNIVORE HETEROTROPH

6. OMNIVORE HETEROTROPH

7.SAPROTROPHS

8. ABIOTIC COMPONENTS

FUNCTIONS OF ECOSYSTEM

- supports life through bio-geo chemical cycles and regulates essential ecological processes.
- Encourages genetic biodiversity by providing reproduction habitat to flora and fauna
- Maintains human health and provides scope for analysis, spiritual aesthetics, cognitive development and recreation.
- Helps to exchange energy and nutrients between biotic and abiotic components in food chain
- maintains a balance among the various trophic levels.

ENERGY FLOW

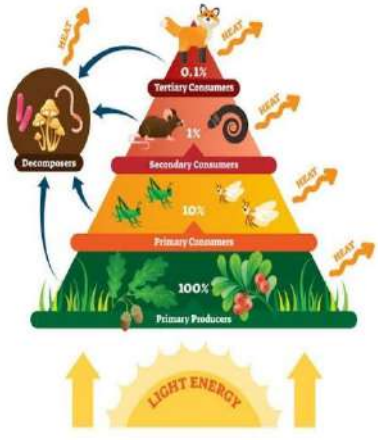
According to the First law of thermodynamics, that states that energy can neither be created nor destroyed, it can only change from one form to another. Second law of thermodynamics, states that energy is wasted in transfer from one body to another. The chemical energy of food is the main source of energy required by all living organisms. This energy is transmitted to different trophic levels along the food chain.

FOOD CHAIN

The sequence of the transfer of food energy from one organism to another in an ecological community is food chain. Producers make food through photosynthesis. They are eaten by primary consumers who are then eaten by secondary consumers. They secondary consumers are in turn captured by tertiary consumers who can be the prey of some quaternary consumers. However , once dead, the consumers of various stratum are decomposed by fungi or bacteria into carbon dioxide and nitrogen to be absorbed by the soil. Approximately 10% of the energy that is transferred from one trophic level to the next is converted to biomass of an organism.

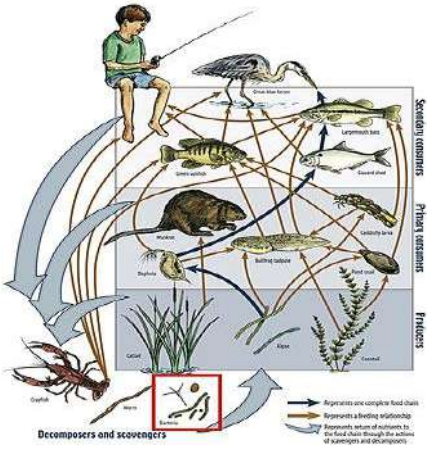
FOOD WEB

A food web depends on biomass and consists of all the food chains in a single ecosystem. Food web shows the energy flow and relation between species diversity and overall food dynamic. By analysing food webs, scientists are able to predict energy flow and help prevent the bioaccumulation and biomagnification of harmful substances.



9.ENERGY PYRAMID

10. FOOD CHAIN



11.FOOD WEB

DIVISION

a) NATURAL ECOSYSTEMS

They are existing in nature and are classified into terrestrial and aquatic.

➢ TERRESTIAL ECOSYSTEM

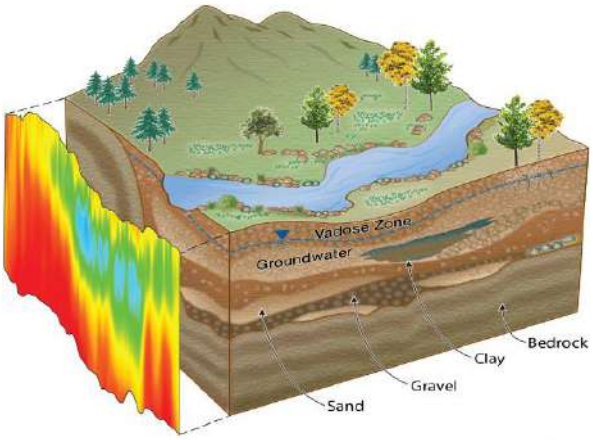
- **FOREST ECOSYSTEM**
  - Based on climate the forests ecosystem is divided into Tropical, Temperate, Boreal and Savannah forests.
  - The soil of forest ecosystems varies in terms of fertility.
  - There is a seasonal climate change
  - There are several distinct levels such as the forest floor, the lower canopy, the upper canopy and the tree tops.
  - High biological diversity
- **GRASSLAND ECOSYSTEM**
  - There are temperate, tropical, xeric, flood, tundra, montane grasslands
  - Grass dominates vegetation
  - semi-arid climate.
  - insufficient rainfall and soils nutrients
  - Present at mid-latitudes and near the interiors of continents
  - often exploited for agricultural use
  - Regular fire in the grassland ecosystem
- **DESERT ECOSYSTEM**
  - There are dry, semi-arid, coastal, cold deserts
  - Arid climate
  - Rainfall and water scarcity
  - Extreme range of temperature during day and night
  - High wind velocity
  - Dry, thin, sandy soil
  - Poor vegetation
  - Low population density
  - Wide humidity range

➢ AQUACTIC ECOSYSTEM

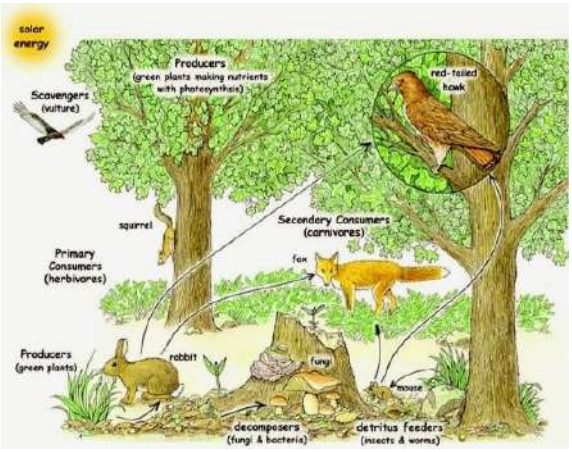
- There are freshwater (lentic, lotic, wetlands) and marine (oceanic, benthic, intertidal, neritic zones) ecosystems.
- High biological diversity
- Regulates hydrological cycle
- Limited sunlight
- Temperature is not too extreme
- Animals are either aquatic or amphibians.

b) ARTIFICIAL ECOSYSTEM

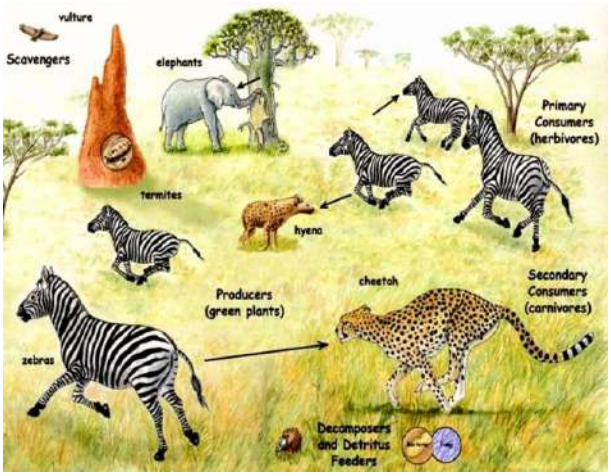
- Man-made structures like crop field, agricultural land, aquarium, hydroponics, piggeries, social forests etc.
- More productive from anthropocentric perspectives.
- Depends on natural cosmic laws.



12.TERRESTIAL ECOSYSTEM

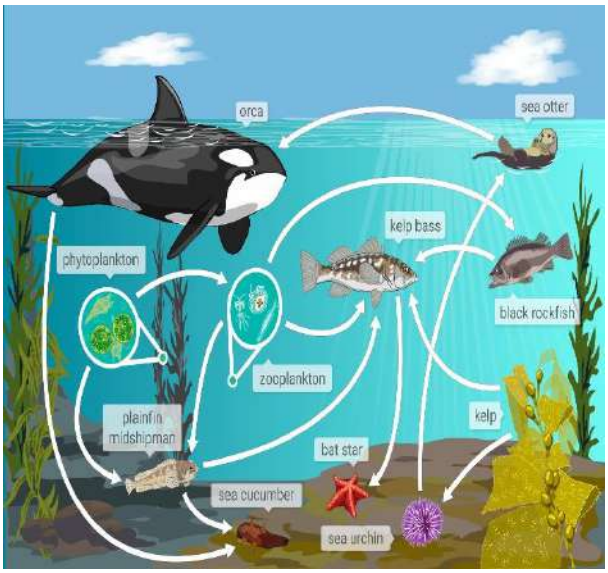


13. FOREST ECOSYSTEM



14.GRASSLAND ECOSYSTEM

15. DESERT ECOSYSTEM



16.AQUATIC ECOSYSTEM

17. ARTIFICIAL ECOSYSTEM

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ENVIRONMENTAL STUDIES PROJECT

TITLE OF THE PROJECT: - POLLUTION

CU Roll No: 202223-21-0073.

CU Registration: 223-1113-0027-20.

College Roll No: PLSA20M632.

College Name: Scottish Church College.

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ENVIRONMENTAL POLLUTION

Environmental Pollution is the result of increased production of waste products by the industries, rapid urbanization, wanting and irresponsible. Harnessing of the natural resources as well as unplanned sewage and waste disposal from industries and cities etc. Thus the presence of any environmental pollutant called Environmental Pollution. The change in the physical, chemical, or biological characteristics of our physical environment is undesirable and harms human life, other living organisms and cultural assets. The resulting impact on the environment has been so massive with far-reaching consequences that the very existence of life is threatened.

The word environment connotes the whole gamut of physical surroundings i.e. land, air and water along with biotic components which are responsible for the plant and animal kingdom to survive and proferaterate environmental segments are atmosphere, hydrosphere, lithosphere, and

biosphere. Man is the main agent for polluting the environment. Nature can cope with a certain degree of pollution because it has its own cleaning agents.

Types of Environmental Pollution

1. Air Pollution: It is an atmospheric condition in which certain substances are present in concentrations which can cause undesirable effects on man and his environment. These substances include gases, particulate matter, radioactive substances etc.

2. Water Pollution: Water is one of the most important biological components that sustain life. Its great solvent power makes the creation of absolute pure water a theoretical rather than a practical goal. Human pollution has the habit of dumping their waste into water .This has the effect of diluting the waste and getting it dispersed if it is a running water system.

3. Soil Pollution: Soil is the loose mineral material and is the most important component of the earth's surface. It is the growth medium for many microbes, plants, and animals. The formation of soil is the result of chemical, physical and biological weathering. Like air and water, soil is also subjected to pollution. Soil contains many microbes.

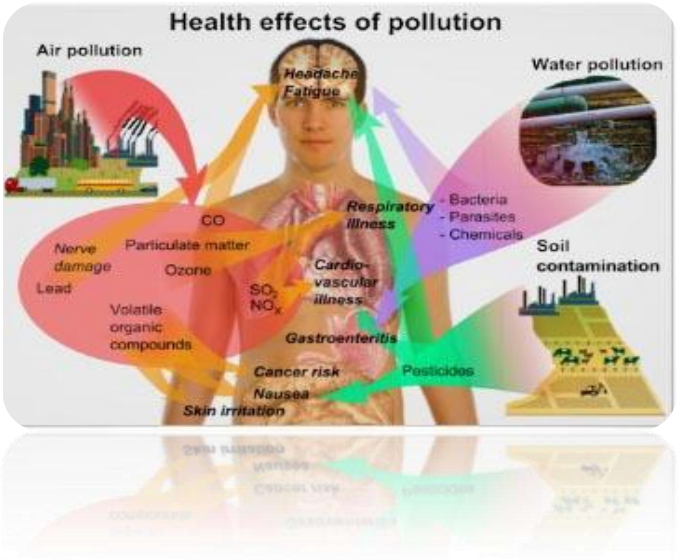
4. Noise Pollution: We hear various types of sounds every day. Sound is mechanical energy from a vibrating source. A type of sound may be pleasant to someone and at the same time unpleasant to others. The unpleasant and unwanted sound is called noise. Sound can propagate through a medium like air, liquid or solid. Sound wave is a pressure perturbation in the medium through which sound travels.

5. Radioactive Pollution: The elements such as uranium, thorium etc. having unstable nuclei emit radiation such as alpha, beta and gamma in nature to acquire stability. These elements are called radioactive elements.

Effects

The term "environment" refers to the immediate surroundings in which man lives. It comprises living and non-living constituents that support life and sustain various human activities. Pollution affects both the living as well as the non-living components of the environment. As environmental stress on the human body increases, many medical scientists fear a terminal increase in infectious disorders not only because of lower body resistance but because viruses and other disease organisms will increasingly slip through water treatment and food processing plants as the quality of water and food at the intake deteriorates.

Effect on plants, the adverse effects range from reduction in growth rate to death of the plant. The damage caused to plants by pollution includes necrosis, chlorosis, epinasty and abscission of leaves. Pollution also causes deterioration of structural materials such as marble and limestone. Pollution has changed the atmospheric conditions. The average temperature has increased due to an increase in pollution. Effects of pollution at international level are depletion of ozone layer, global warming, acid rain, rising sea level etc.



Ways to reduce pollution in the Environment

As we continue to live and breathe on this planet, we must become more energy conscious, if we are to continue to live and breathe on this planet. Use of natural resources, consumption and waste are all at peak levels, and rising .It is up to us to act individually and together to effect change that will make the planet habitable in the years to come. By conserving energy at home and growing an environment consciousness in our communities that we can turn around the dire situation that the world is now. Here then is a compendium of the things that you can do today or this week, to help reduce the impact you are having on the earth. As you implement these ideas

into your life, it is important that you inspire others. They are a practice of awareness of connecting with the environment and of hope .By embodying these qualities in our attitude we create a positive experience for ourselves and the people that we touch.

i. Bring your own bag when you go grocery shopping.
ii. Don't throw garbage anywhere.
iii. Use bicycles instead of cars because cars release dangerous smoke like CO2.
iv. Make some activities to help the environment cleaner.
v. Segregate and recycle garbage.
vi. Compost biodegradable garbage.

Conclusion

On the basis of coordinating with other related planning and analyzing the current challenges in the environment, the present environmental planning has proposed the planning vision and objectives, together with a preliminary scheme for environmental functional districts and environmental functional district management. However, since the environment is a complex, variable and extensive system, protecting the environment is a hard and enduring task. It is impossible that all the existing pollution problems in the environment can completely be resolved in the next decade. A wonderful and quality environment must be achieved by continuous planning, governmental policies, efforts of the enterprises and public participation . It is the responsibility of everyone to protect our environment. Let us fulfill our responsibilities in environmental protection, creating a quality ecological environment and sharing wonderful green living together .

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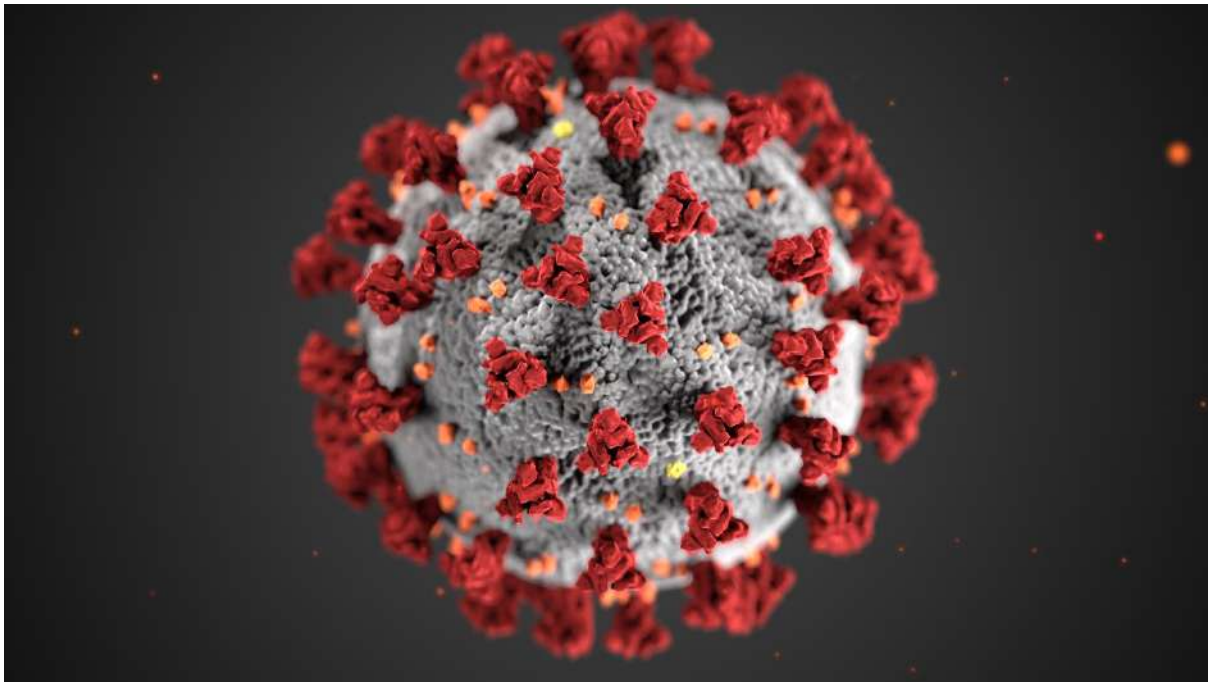
CU ROLL NUMBER = 202223-11-0075

CU REGISTRATION NUMBER = 223-1211-0138-20

COLLEGE ROLL NUMBER = PLSA20F660

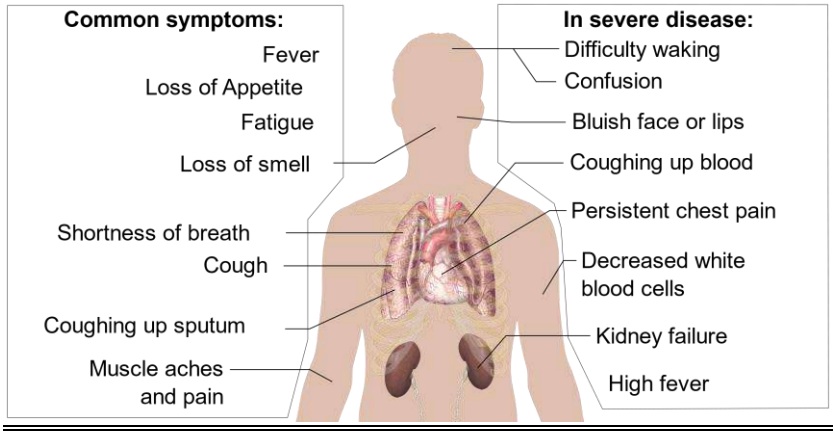
TITLE OF THE PROJECT = COVID-19 (THE PANDEMIC)



Covid-19

Coronavirus disease 2019(COVID- 19) is a contagious disease caused by severe acute respiratory syndrome coronavirus 2. The first known case was identified in Wuhan, china in December 2019. The disease has since spread worldwide, leading to an ongoing pandemic.

Signs and symptoms



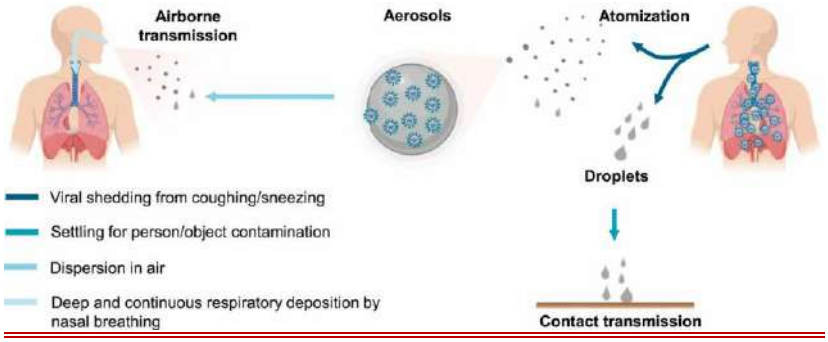
The signs and symptoms of corona virus

Symptom of covid-19 are variable, ranging from mild symptoms to severe illness. common symptoms include

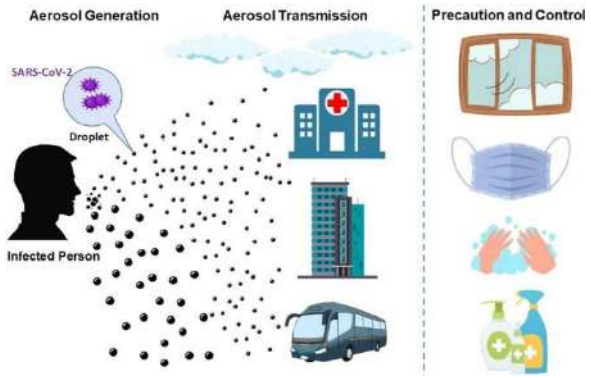
- headache
- loss of smell and taste
- nasal congestion
- runny nose
- cough
- muscle pain
- sore throat
- diarrhea
- breathing difficulties

people with the same infection may have different symptoms and their symptoms may change overtime. In people without prior ear, nose and throat disorder, loss of taste combined with loss of smell is associated with the covid -19.

Transmission



Man to man transmission of corona virus



Transmission of corona virus

This disease is mainly transmitted via the respiratory route when people inhale droplets and particles that infected people release as they breathe, talk, cough, sneeze, or sing. Infected people are more likely to transmit covid-19 the when they are physically close. However, infections can occur over distances, particularly indoors.

Infectivity begins as early as three days before symptoms appear, and people are most infectious just prior to and during the onset of symptoms. It declines after the first week, but infected people remain contagious for up to 20 days. People can spread the disease even if they are asymptomatic.

Diagnosis

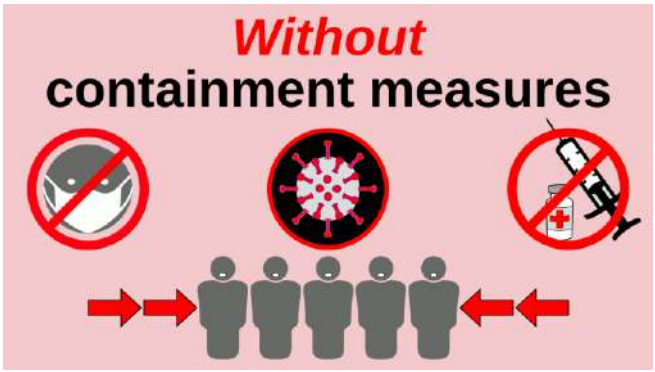
COVID-19 can provisionally be diagnosed on the basis of symptoms and confirmed using reverse transcription polymerase chain reaction (RT-PCR) or other nuclei acid testing of infected secretions. Along with laboratory testing, chest CT scan may be helpful to diagnose COVID-19 in individuals with a high clinical suspicion of infection

Viral testing

The standard method of testing for presence of SARS-CoV-2 are nuclei acid test, which detects the presence of viral RNA fragments. As these detects the presence of viral RNA but not infectious virus, its ability to determine duration of infectivity of patients is limited. The test is typically done on respiratory samples obtained.

Testing of covid-19

Prevention



Preventive measures of covid-19

Preventive measures to reduce the chances of infection include

- getting vaccinated
- staying at home
- wearing a mask in public
- avoiding crowding place
- keeping distance from others
- ventilating indoor spaces

- managing potential exposure duration
- washing hands with soap and water often at least twenty seconds
- practicing good respiratory hygiene and
- avoiding touching the eyes, nose or mouth with unwashed hands.

Those diagnosed with COVID-19 or who believe they may be infected are advised by the CDC to stay home except to get medical care, call ahead before visiting a healthcare provider, wear a face mask before entering the healthcare providers office and when in any room or vehicle with other person, cover coughs and sneeze with tissue, regularly wash hands with soap and water and avoid sharing household items.

The first COVID-19 vaccine was granted regulatory approval on 2nd December by the UK medicines regulator MHRA. It was evaluated for emergency use authorization (EUA) status by the US FDA and in several other country

Vaccine

Vaccination booth in Brussels

A COVID-19 vaccine is a vaccine intended to provide acquired immunity against severe acute respiratory syndrome coronavirus-2, the virus that causes coronavirus disease 2019. Prior to the covid-19 pandemic.

Face masks and respiratory hygiene

Face mask

The WHO recommended individuals wear non-medical face coverings in public settings where there is an increased risk of transmission and where social distancing measures are difficult to maintain. A face covering without vents 0r holes will also filter out particles containing virus from inhaled and exhaled air, reducing the chances of infection.

Hand washing and hygiene

Through hand hygiene after any cough or sneeze is required. The WHO also recommended that individuals wash hands often with soap and water for at least twenty seconds, especially after going to the toilet or when hands are visibly dirty, before eating and after blowing one's nose. When soap and water are not available it is recommended to use alcohol-based hand sanitizer with at least 60% alcohol.

Social-distancing

Social distancing (also known as physical distancing) includes infections control actions intended to slow the spread of the disease by minimizing close contact between individuals. Method include quarantine, travel restrictions, and closing of schools, work place, stadium, theatre, or shopping centers.

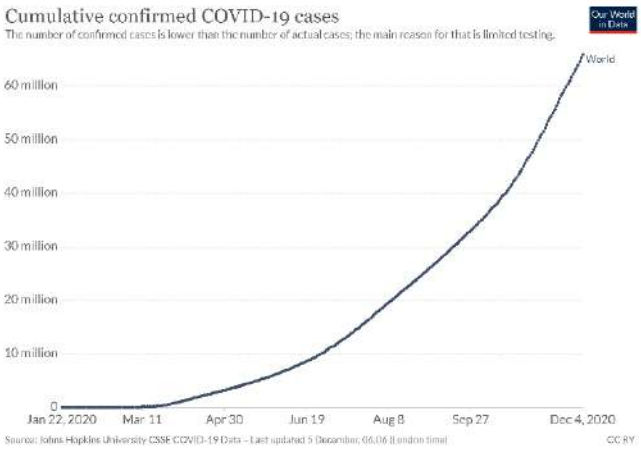
Treatment

There is no specific effective cure for coronavirus disease 2019, the disease caused by the SARC-CoV-2 virus. Thus, the cornerstone of management of covid-19 is supportive care, which include treatment to relieve symptom, fluid therapy, oxygen support prone positioning as needed and medications or devices to support other affected vital organs.

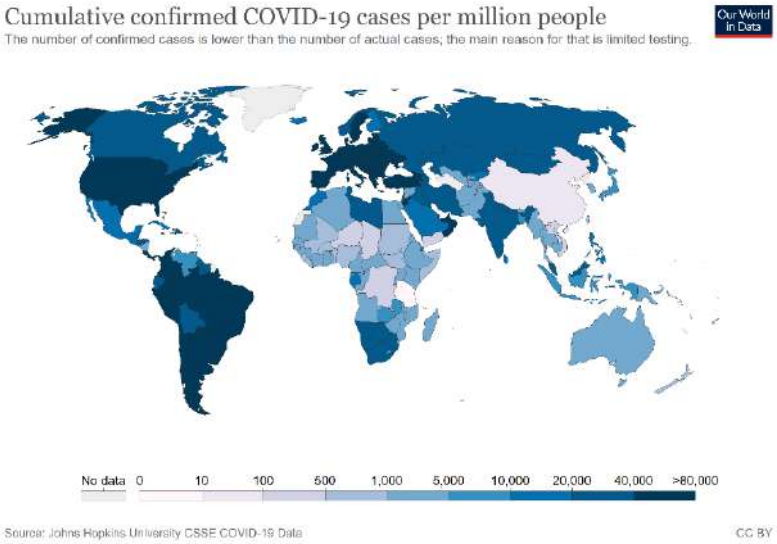
Mortality

Several measures are commonly used to quantify mortality. These numbers vary by region and over tine and are influenced by the volume of testing, healthcare system quality, treatment options, time since the initial outbreak, and the populations characteristics such as age, sex, and overall health.

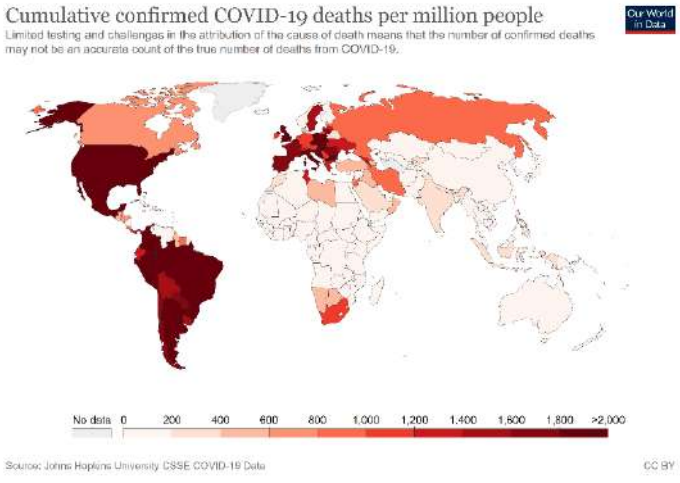
The mortality rate reflects the number of deaths within a specific demographic group divided by the population of that demographic group. Consequently, the mortality rate reflects the prevalence as well as the severity of the disease within a given population. Mortality rates are highly correlated to age with relatively low rates for young people and relatively high rates among the elderly. In fact, one relevant factor of mortality rate is the age structure of the country's population. For example, the case fatality rate for COVID-19 is lower in India than in the US since India's younger populations represents a larger percentage than in the US.



Mortality rate graph



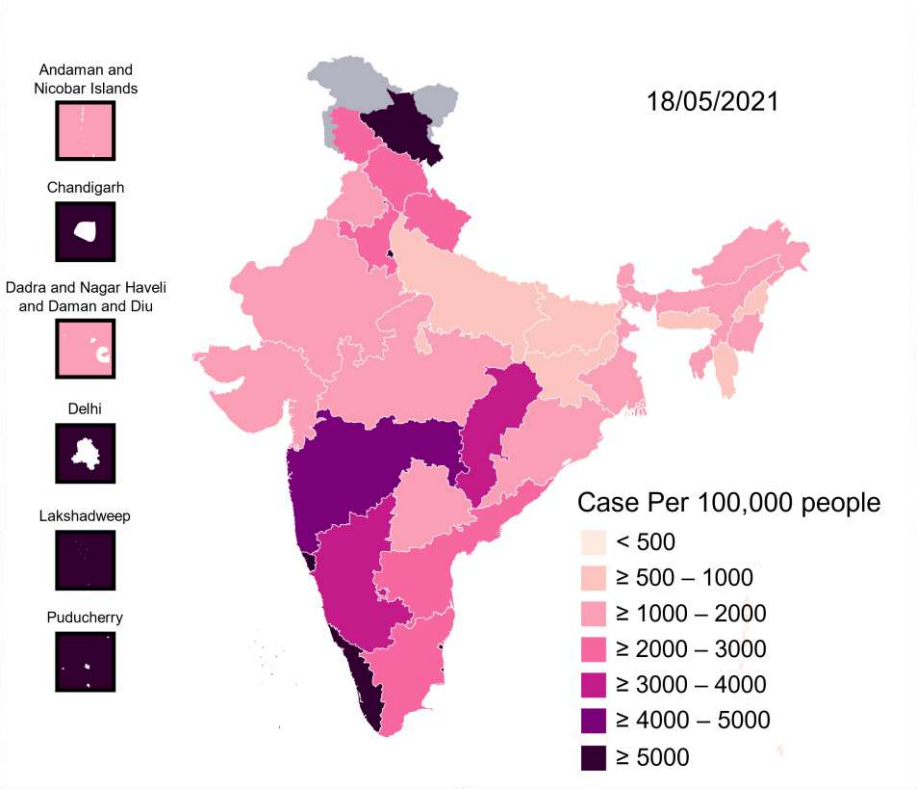
Confirmed covid-19 cases in the world per million people



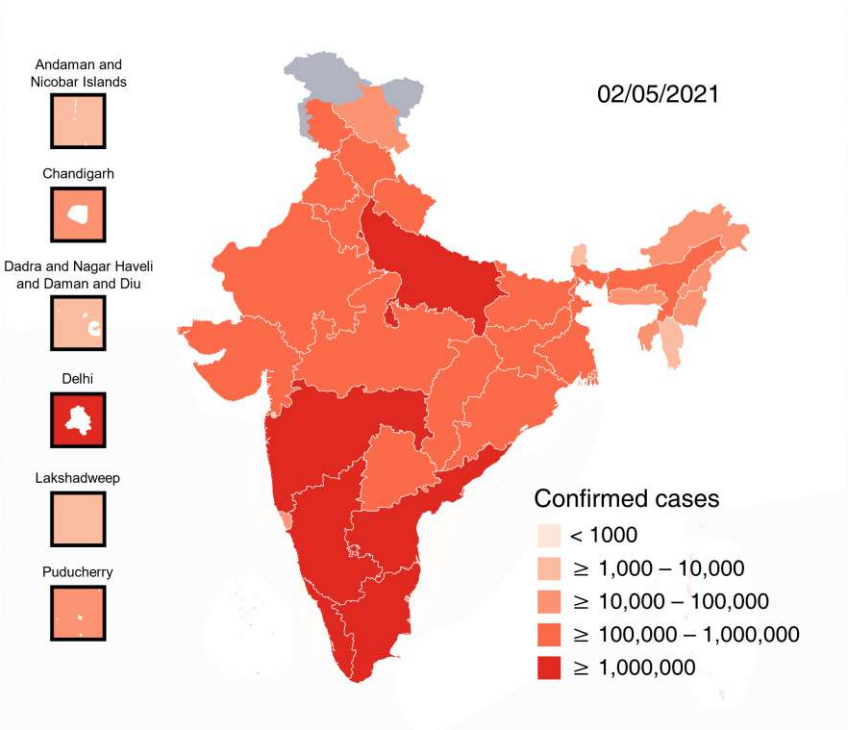
Total number of deaths due tocovid-19 per million people

COVID-19 IN INDIA (brief analysis)

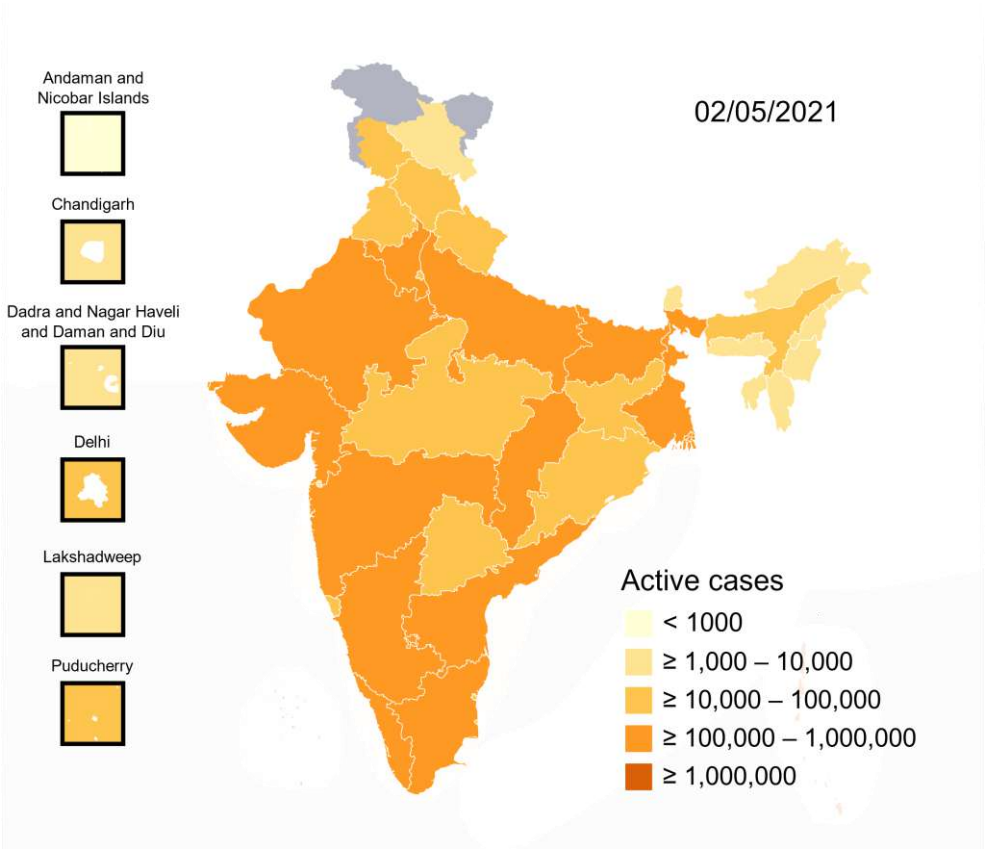
The COVID-19 pandemic in India is a part of the worldwide pandemic of coronavirus disease 2019(COVID-19) caused by severe acute respiratory syndrome coronavirus 2. **The first case of COVID-19 in India was reported on 30th January 2020. Currently India has the largest number of confirmed cases on Asia.** As of 12th June 2021, India has the second highest number of confirmed cases in the world (after the United States) with 29.3, million reported cases of COVID-19 infections and the third-highest number of COVID-19 deaths (after the United States and Brazil) at 367,081 deaths.



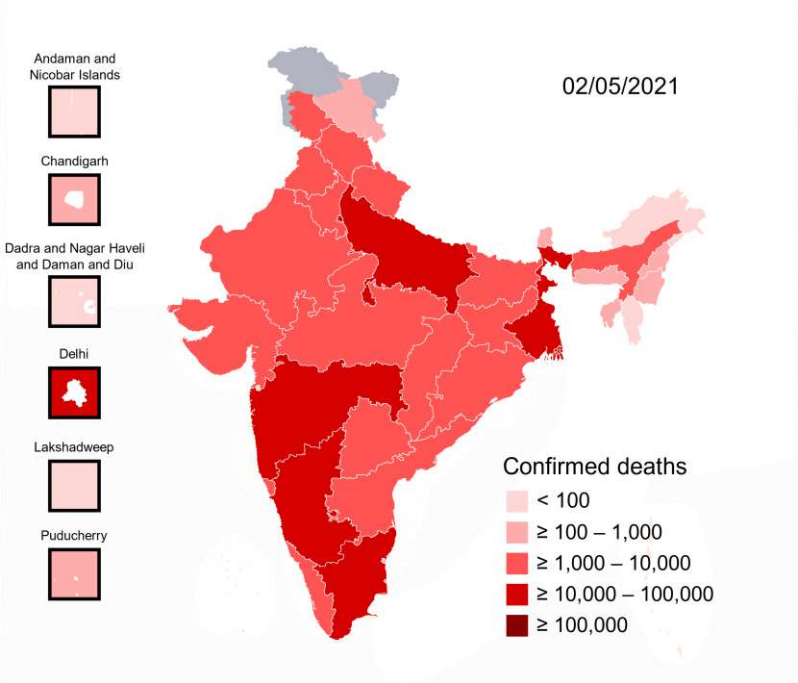
COVID-19 cases per 100,000 people by state, as of 18 May



Map of confirmed cases



Map of active cases



Map of deaths due to the pandemic

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NATURAL RESOURCES

AECC 2

SEMESTER 2

CU ROLL NUMBER – 202223-11-0076

CU REGISTRATION NUMBER- 223-1211-0139-20

COLLEGE ROLL NUMBER - PLSA20F661

DEPARTMEMT - POLITICAL SCIENCE (HONOURS)

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Secondly I would like to thank my Parents and my Friends who helped me a lot in finishing this project within a limited period of time. Thank you all who Supported, I would not have accomplished this without the support and efforts of my teachers, my classmates and my near and dear ones.

CONTENTS

1.1 DEFINATION OF NATURAL RESOURCES –

"Natural resources are natural assets (raw materials) derived from the Earth, to support life and to meet people's needs."Oil, coal, natural gas, wind, water and minerals, soil, energy are natural resources. There are two types of Natural Resources- Renewable and Non- Renewable Resources.

1.1.1 TYPES OF NATURAL RESOURCES:-

1. **RENEWABLE RESOURCES**- The energy resources that can be used continuously year after year and do not get exhausted and can be replenished rapidly through natural cycle or human activities are known as Renewable Resources. For example - Forest, Water, Sunlight etc.
2. **NON – RENEWABLE RESOURCES –**The energy resources which cannot be replenished through natural cycles and human activities and are exhausted in few years are known as Non-Renewable Resources. For example –Fossil Fuels like Coal, Petroleum, Natural Gas etc.

1.1.2 PROBLEMS ASSOCIATED WITH NATURAL RESOURCES:-

1. **Problems of Non-Renewable Resources:-**
   - The sources have been in use since a long time and have become a convention
   - Energy sources cannot be replenished
   - Sources may be exhausted in few years
   - Sources causes Environmental Pollution
2. **Problems of Renewable Resources:-**
   - The requirement of water is increasing day by day, the ground water level is going down day by day
   - Due to deforestation and human interference in the forest areas due to commercial purposes, forest resources will be exhausted soon
   - Human activities are creating lot of problem for bio diversity, some animals and plants are in the verge of extinction.

1.1.3. THREE FORMS OF NATURAL RESOURCES, discussed below are-

- LAND RESOURCES
- WATER RESOURCES & ,
- ENERGY RESOURCES

TYPES OF NATURAL RESOURCES

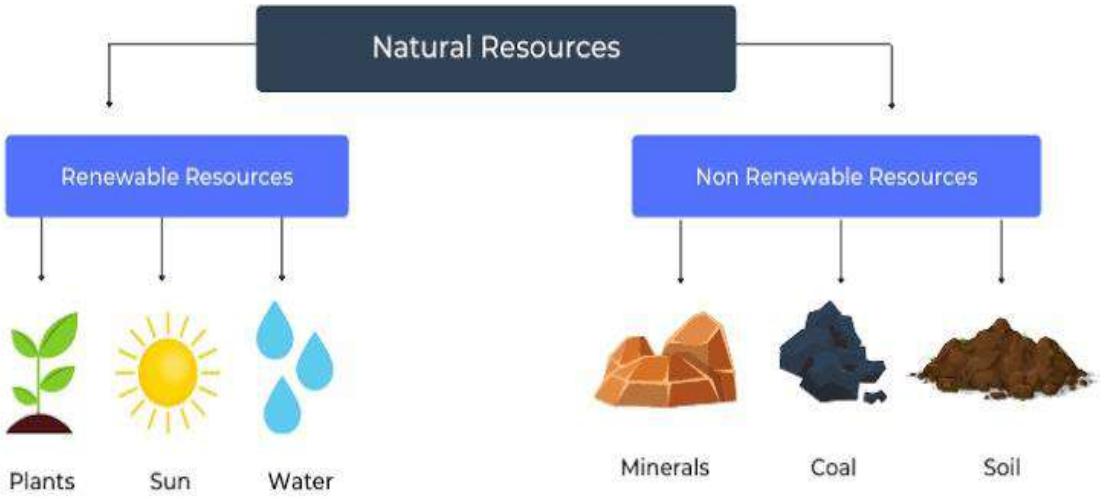

Fig 1.1.1 RENEWABLE AND NON RENEWABLE RESOURCES

1.2. LAND RESOURCES:-

"Land Resources mean the resources available from the land" It is one of the most valuable resources, it provides food, fiber, medicine to us, it is a mixture of inorganic materials and organic materials, acts as a dustbin for most of the wastes created by the modern society, some examples of land resources are the agricultural land, natural fertilizer which helps in the growth of the plants, various materials like Gold, Bauxite etc.

The **basic functions of land** are – i) Supporting and helping in survival of human and other terrestrial ecosystems in it , ii) Provision of biological habitats for plants, iii) animals and micro-organisms , iv) Production of timber , fuel, and other necessary items for human use. It is a storehouse of wealth for all.

There are **two types of Land Resources** – **Forest Lands** (Renewable); **Natural Gas and Petroleum Oil & Coal** (Non- Renewable)

If the renewable land resources are used properly there are less chances of depletion of them. But excessive **Land Use** by humans, overgrazing of cattle and cutting trees which bind the soil with their roots for constructing buildings can lead to **Soil Erosion, Land Degradation** which further leads to **Loss in Soil Fertility and Valuable Nutrients, Water Logging, Salinity, Acidity problems, Loss of ecological and social biodiversity.**

Increased amount of Deforestation (Fig 1.2.1), cutting of trees non- judiciously, which can lead to

- **Soil Erosion** (Fig 1.2.2.)**,** whereby either the top soil is removed by natural process like by the wind, water, biotic agent etc. Or, the soil is eroded due to manmade activities. Soil Erosion can be prevented **Conservational tillage, Organic farming, Crop Rotation, Contour, Strip Cropping, Terrace Farming**, **Afforestation**, **Wind break** etc.

And,

- **Desertification (**Fig 1.2.3)**,** it is a progressive destruction or degradation of arid or semi – arid areas by Overgrazing, Climate Change, Over Utilization of water, it is a type of land degradation.80% of productive land in the arid and semi arid regions are converted in to desert.

LAND RESOURCES

Fig 1.2.3. DESERTIFICATION

Fig 1.2.1. DEFORESTATION

Fig 1.2.2. SOIL EROSION DUE TO INCREASED AMOUNT OF DEFORESTATION

1.3. WATER RESOURCES:-

Water is the most important resource of our earth, it is the main component of our body it is essential component for Photosynthesis. The demand of water for modern civilization is rapidly increasing. About 30% of the total people of the earth are facing the water problem. Over Utilization of water due to faster growth in demand of water, is leading to scarcity of water, water pollution, drought, etc.

Depletion and Pollution of Ground Water can lower the ground water level or pollute it. This will further lead to unavailability of water for use in future. Water Conservation is very necessary to protect and conserve water resources for future use.

1.3.1. HOW TO CONSERVE WATER RESOURCES?

- Conserve Rain Water.
- Avoid water leakage through pipes.
- Try using water judiciously.
- Turn off the tap when not in use, to avoid wastage of water.
- Avoid polluting lakes, rivers , groundwater and other water resources.

1.3.2. CONFLICTS OVER WATER:-

Most of the Water Resources on the earth is not usable by human being, only 1% of Ground Water and Surface water is available for human use, this critical situation due to scarcity of water leads to war between many countries in Africa.

Conflict over water in India – I) Conflicts between Bangladesh and India over the distribution of Water through 'Farrakha Barrage' etc

WATER RESOURCES

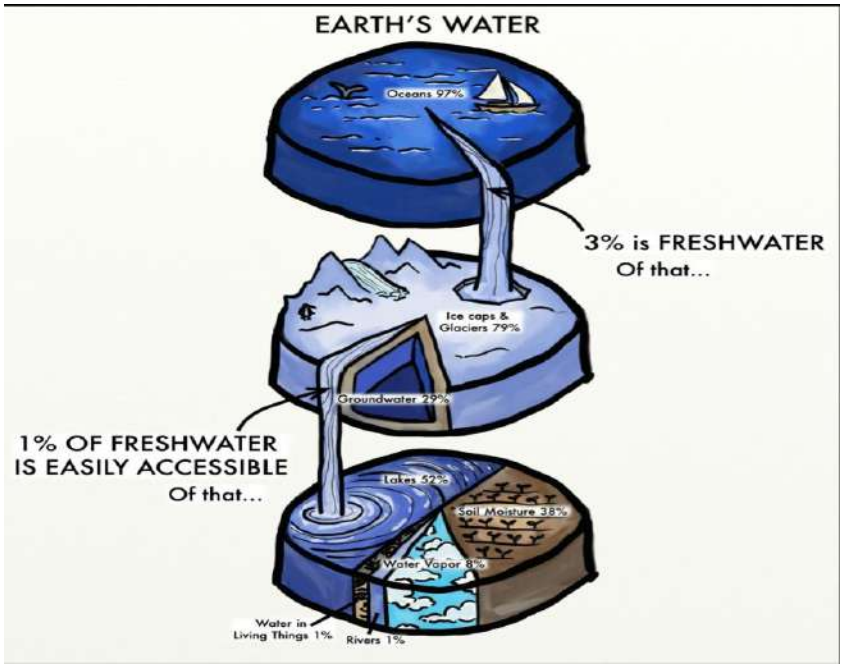

Fig .1.3. EARTH'S TOTAL WATER (1% is for human use)

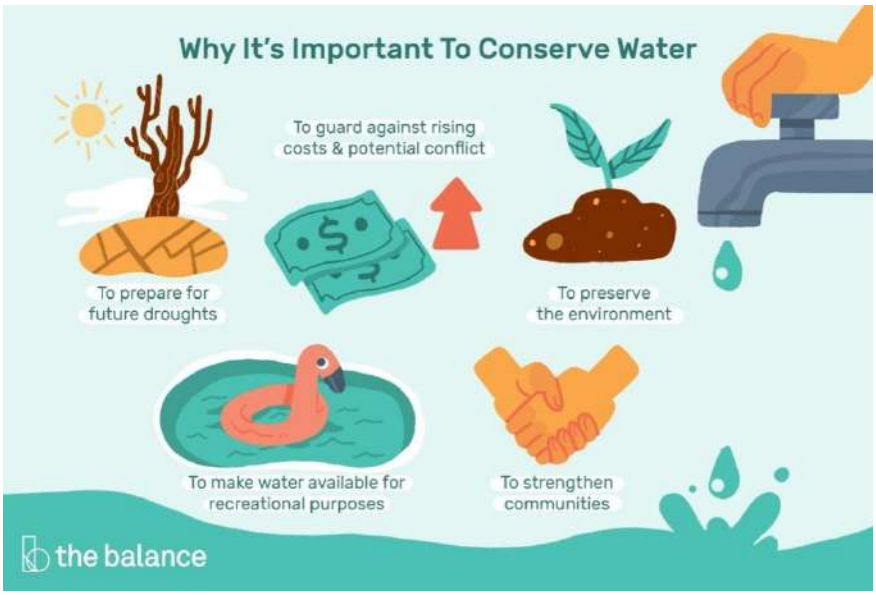

Fig 1.3.1. WHY CONSERVATION OF WATER IS IMPORTANT

1.4. ENERGY RESOURCES:-

An energy resource is something that can produce heat, power, produce electricity and move objects.

There are two types of energy resources:-

- The energy resources which are extensively used for a long time for the production of energies in our daily life are known as **Conventional Energy Resources** (Non- Renewable Resources). E.g. – Fossil Fuel like Natural Gas, Coal, Atomic energy etc.
- The energy resources that are not extensively used for energy production in our daily life and do not cause any damage to our environment are known as **Non Conventional Energy Resources**(Renewable Resources)E.g. –Solar Energy , Wind Energy, Tidal Energy, Geo thermal energy, Biomass Energy.

1.4.1. TWO EXAMPLES OF NON CONVENTIONAL ENERGY RESOURCES, in detail:-

- Solar Energy –Sun is the source of almost all kind of energy on the earth directly or indirectly, solar energy can be used in various ways by instruments like Solar thermal Route and Solar Photovoltaic Route.
- Wind Energy – The mechanical energy of wind speed can be converted into mechanical or electrical energy and can be used for grinding grains , sawing timber etc.

TYPES OF ENERGY RESOURCES

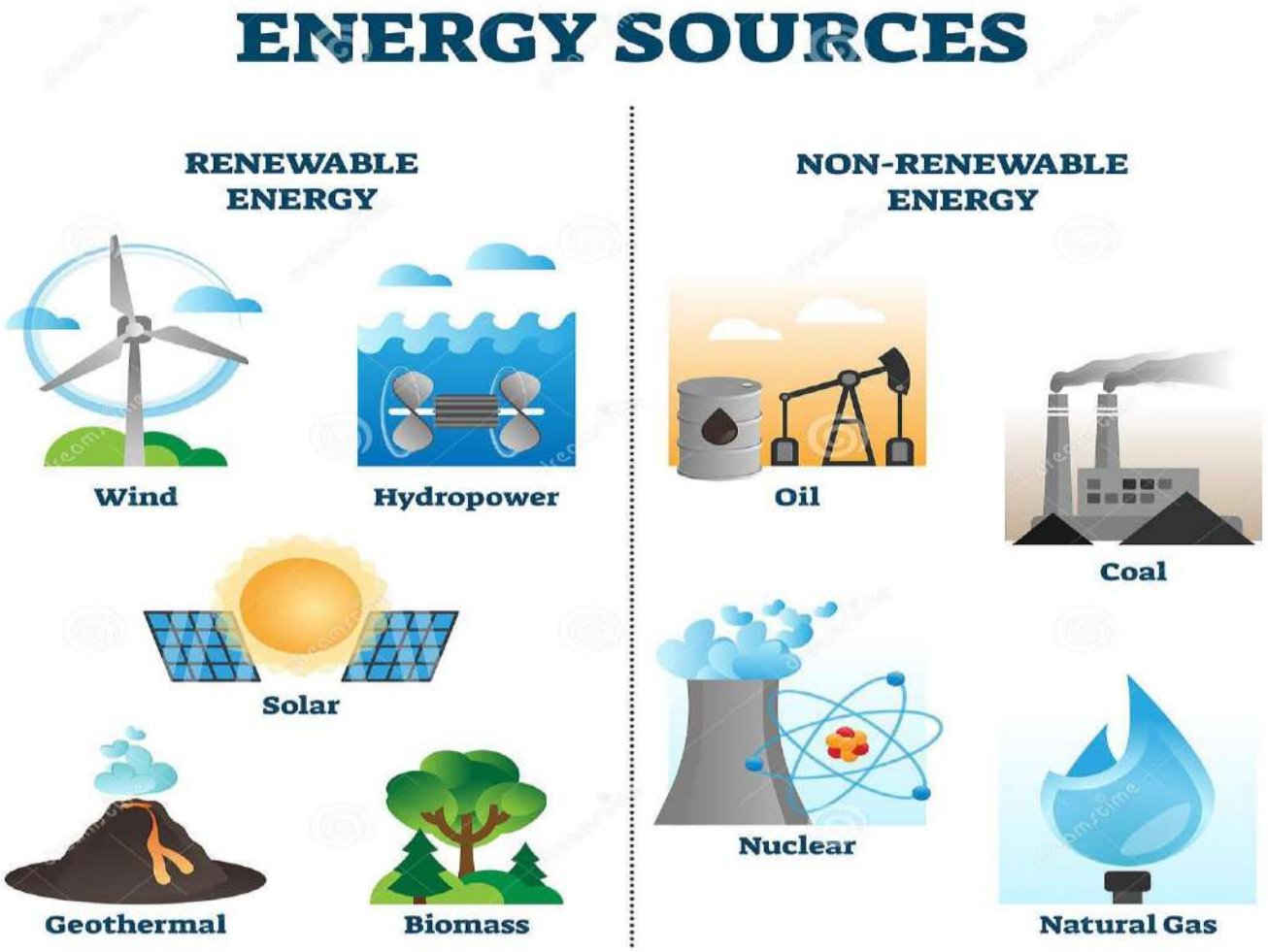

Fig 1.4. RENEWABLE AND NON- RENEWABLE ENERGY RESOURCES

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DEPARTMENT ⇒ POLITICAL SCIENCE DEPARTMENT

SUBJECT ⇒ AECC - ENVS (Water pollution).

DATE ⇒ 4th July, 2021

PAPER ⇒ AECC - ENVS

● ভূমিকা : জলের অপর নাম জীবন। এরে নির্ভর করে সমস্ত জীব পৃথিবীতে অবস্থান করে। পৃথিবীতে প্রথম প্রানের স্পন্দন জলে দেখা গিয়েছিল। জীবদেহের অর্ধেকের বেশি অংশ জল। পৃথিবীর প্রায় তিন ভাগ জল এবং এক ভাগ স্থল। সাধারন ভাবে জলের পরিমান অফুরন্ত মনে হলেও মানুষের ব্যবহার যোগ্য জলের পরিমান সীমিত। সেই জন্য জলের যথাযথ ব্যবহার ও রক্ষনাবেক্ষন জরুরী। বর্তমানে মানুষের নানান কর্মকান্ডের ফলে বিভিন্ন উৎসের জল দূষিত হচ্ছে। আর এই জল দূষিত হলে তা জীবন হানির কারন হয়ে দাঁড়ায়। তাই আমি আমার এই প্রকল্পের মাধ্যমে জল দূষনের বিভিন্ন উৎস ও এর ক্ষতিকর প্রভাব গুলি সম্বন্ধে আলোচনা করব।

● জল দূষনের সংজ্ঞা : জলের সঙ্গে কোনো অবাঞ্ছিত দ্রব্য মিশ্রিত হওয়ার ফলে যদি জলের ভৌত, রাসায়নিক ও জৈব বৈশিষ্ট্য সমূহ পরিবর্তিত হয় এবং তার ফলে জলজ প্রানী, উদ্ভিদ ও মানুষের ক্ষতির আশঙ্কা দেখা দেয়, তবে জলের এইরূপ

দূষিত অবস্থাকে জলদূষন বলে।

বিজ্ঞানী অ্যাডাপ্টাইক (1976) - এর মতে, - মানুষের ক্রিয়াকলাপের ফলে এবং প্রাকৃতিক কারণে জলের ভৌত, রাসায়নিক এবং জৈব উপাদান গুলির গুনমান নষ্ট হয়ে যাওয়াই হল জলদূষন।

আবার, মনিবাচ্যকম (1984) - এর মতে, - জলের বৈশিষ্ট্য এবং গুনগত মানের কুফলদায়ী পরিবর্তন হল জলদূষন।

জলদূষনের প্রধান উৎস:

1. <u>শিল্প ঘটিত দূষন (Industrial Pollution)</u> : - বড়ো বড়ো কারখানা বেশিরভাগ শিল্প নদীর ধারে গড়ে উঠেছে। আমাদের দেশে এইসব শিল্প, কারখানা থেকে প্রতিনিয়ত তরল বর্জ্য পদার্থ জলে মিশছে। এর ফলে জলে দ্রবীভূত অক্সিজেনের পরিমান কমে যাচ্ছে। এ ছাড়া ক্লোরিন, কস্টিক সোডা এবং কারখানার বর্জ্য পদার্থগুলি (যথা- অ্যামোনিয়া, ফেনল, সায়ানাইড প্রভৃতি) জলকে বিষাক্ত করে তোলে।

● বিভিন্ন শিল্প থেকে নির্গত জলদূষক পদার্থ :

শিল্পজাত দূষিত বর্জ্য পদার্থ	শিল্পের নাম
1. ফেনল, ট্যানিক অ্যাসিড ক্লোমিয়াম	1. চর্ম শিল্প
2. বেনজিনযুক্ত পদার্থ	2. কীটনাশক শিল্প
3. ছিবা, ফেনলযুক্ত যৌগ	3. রং শিল্প
4. ক্লোরাইড, ফসফেট	4. সার কারখানা
5. তেল, গ্রিজ, হাইড্রোকার্বন, ক্ষারকার	5. পেট্রোরসায়ন শিল্প

2. গৃহস্থালি ও নর্দমা নিষ্কাশিত পদার্থ দ্বারা দূষণ : শহর বা নগরের পয়ঃপ্রণালীর আবর্জনা সাধারণত নদী, পুকুর এমনকি সমুদ্রে নিক্ষেপ করা হয়। নানারকম আবর্জনা নদীবক্ষে জমে ওঠে। যার ফলে উদ্ভিদ-প্ল্যাংকটনের বৃদ্ধি ঘটে। উদ্ভিদ-প্ল্যাংকটন মাত্রাতিরিক্ত বৃদ্ধি পেলে জলের অক্সিজেন ক্ষয় পরিমান কমে যায়। অক্সিজেনের অভাবে জলজ জীবদের মৃত্যুর হার বেড়ে যায়, ফলে নানা ধরনের রোগজীবাণু বেড়ে গিয়ে বাস্তুতন্ত্রের অন্তর্গত সমস্ত উদ্ভিদ ও মৃত্যুর ঘটে। ভাগীরথী ও হুগলি নদীর তীরে যে শহরগুলি রয়েছে তা থেকে নির্গত বর্জ্য এসে নদীতে মেশে। কল্যানী থেকে ডায়মন্ড হারবারের মধ্যে

350টি নদমার বর্জ্য জল গঙ্গা নদীতে মিশছে।

3. কৃষি ভূমি থেকে নির্গত পদার্থ দ্বারা দূষন : ফসলের উৎপাদন বৃদ্ধির জন্য নাইট্রেট, ফসফেট, অ্যামোনিয়া জাতীয় রাসায়নিক সার ব্যবহার করা হয়। ব্যবহৃত সারের প্রায় 25% বৃষ্টির জলের সাথে ধুয়ে পুকুর ও সমুদ্রের জলে মিশ্রিত হয়। কৃষিক্ষেত্রে 200-র বেশি ছত্রাকনাশক, আগাছানাশক, কীটনাশক ব্যবহার করা হয়। শুধুমাত্র ভারতেই প্রতিবছর প্রায় 4000 টন সার জমিতে দেওয়া হয়।

4. সমুদ্র ও নদীর জলে তাপমাত্রা বৃদ্ধি জনিত দূষন :

পারমানবিক বিদ্যুৎকেন্দ্র, তাপবিদ্যুৎ কেন্দ্র প্রভৃতি কেন্দ্রে ও শিল্পে শীতলীকরণের জন্য যে জল ব্যবহার করা হয়, সেই উত্তপ্ত জল সরাসরি নদী বা সমুদ্রে নিক্ষেপ করে। ফলে জলের তাপমাত্রা বেড়ে যায় ও জলজ বাস্তুতন্ত্র ক্ষতিগ্রস্ত হয়। অক্সিজেনের পরিমান হ্রাস পায়। মাছেদের প্রজনন ক্ষমতা বিপর্যস্ত হয়।

উদাহরন স্বরূপ : কোটা পারমানবিক বিদ্যুৎকেন্দ্রের উষ্ণ জল চম্বল নদীতে ফেলার বিষয়টি উল্লেখ করা যায়।

5. ভাসমান তেল দ্বারা জলদূষণ : পেট্রোরাসায়নিক শিল্প কেন্দ্র থেকে নির্গত খনিজ তেল ও খনিজ তেলের উপাদেয় দ্রব্যগুলি সমুদ্র জলে মিশলে, জাহাজডুবি, তৈলবাহী ট্যাঙ্কার থেকে তেল জলে ছড়িয়ে পড়লে, সামুদ্রিক মহীসোপান থেকে খনিজ তেল উত্তোলনের সময় কিছু পরিমান জলে মিশে যায়। ফলে সমুদ্র থাকা প্রাণীপ্লাঙ্কটন ও উদ্ভিদ প্লাঙ্কটন ক্ষতিগ্রস্ত হয়। পাখিদের পালকে, ডানায় তেল লেগে যায়, পাখিদের ওড়ার ক্ষমতা নষ্ট হয়ে যায় জলে পড়ে থেকে শরীরের তাপমাত্রা কমে যায় এবং পাখিরা মারা যায়। এই অবস্থাকে বিজ্ঞানীরা 'হাইপোথারমিয়া' আখ্যা দেন।

- মানব স্বাস্থ্য ও পরিবেশের ওপর জলদূষনের প্রভাব :

- জলজ প্রানীদের ওপর প্রভাব : জল দূষনের ফলে জলে অক্সিজেনের পরিমান কমে যায়। ফলে বিভিন্ন প্রজাতির মাছ মারা যায়। সমুদ্রে তেলের পরিমান বেড়ে গেলে বিভিন্ন প্রজাতির উদ্ভিদ ও প্রানীর মৃত্যু ঘটে। DDT - এর মতো কীটনাশকের প্রভাবে পেলিকান, ঈগলের মৃত্যু হয়, প্রজনন ক্ষমতা নষ্ট হয়। ছোনা ব্যাঙ ও মাছরাঙার চেয়ে বেশি পরিমান DDT জমা হয়। জল দূষকের ফলে জলে ফসফরাস ও নাইট্রোজেনের পরিমান বাড়লে ক্যাওলার পরিমান বেড়ে যায়। একে ইউট্রোফিকেশন বলে। জলের বাস্তু তন্ত্র নষ্ট হয় বিভিন্ন জল বাহিত রোগ বৃদ্ধি পায়।

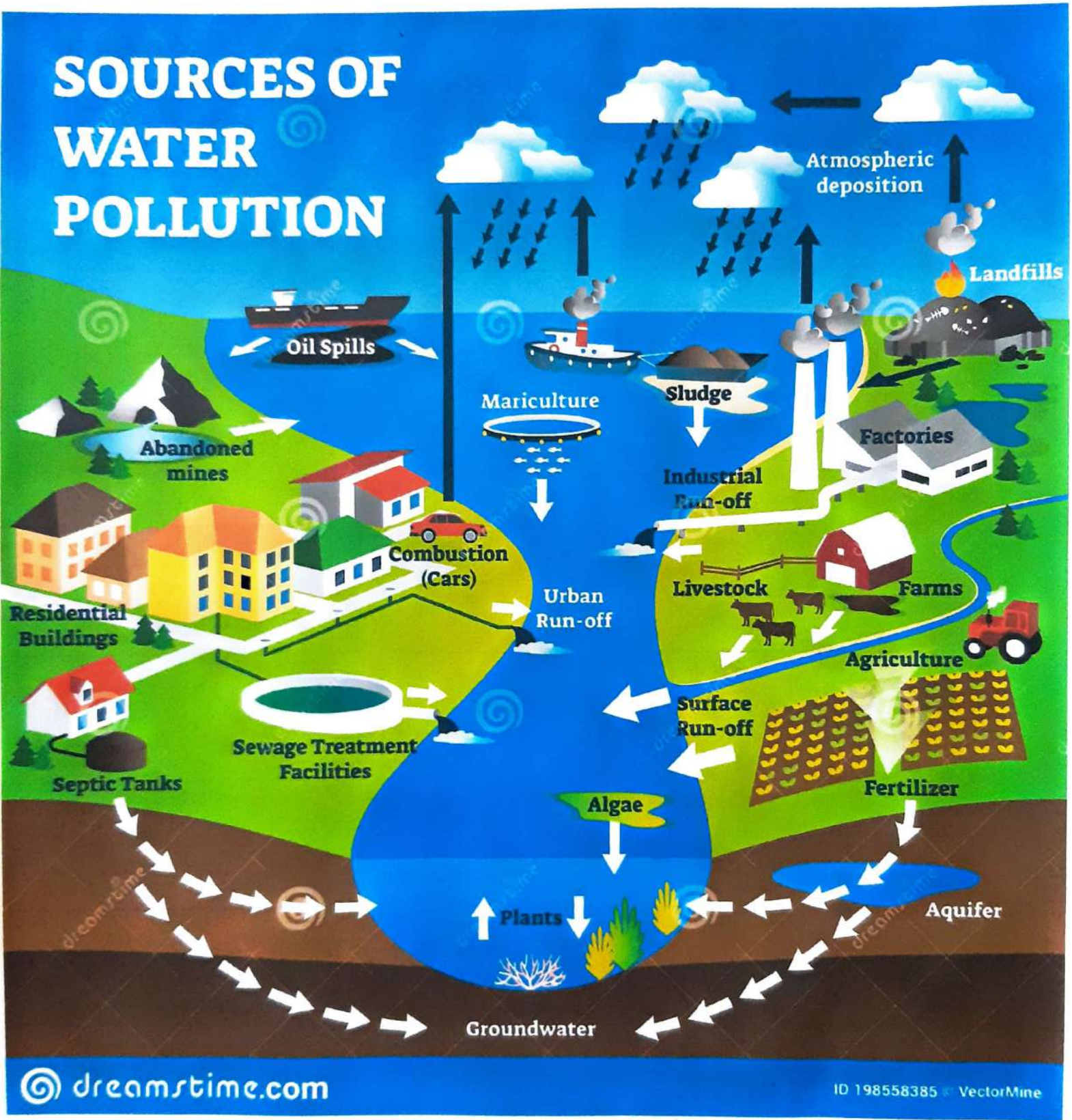
- মানব স্বাস্থ্যের ওপর প্রভাব : জলদূষকের ফলে বিভিন্ন রকম সংক্রামক রোগ সৃষ্টি হয়। অনেক সময় বিভিন্ন রোগ মহামারির আকার ধারন করে। যেগুলি হল - উদরাময়, কলেরা, আমাশয়, টাইফয়েড, আন্ত্রিক, হেপাটাইটিস, মিনমাটা, ফ্লুরোসিস, ব্ল্যাক ফুট ডিজিজ ইত্যাদি।

● জলদূষণের ফলে মানবদেহে সৃষ্ট রোগ ও ক্ষতিকর প্রভাব :

রোগের নাম	জলবাহিত দূষক	মানবদেহে দূষকের প্রভাব
1. মিনামাটা রোগ	পারদ	পেশি জনিত সমস্যা, অঙ্গপ্রত্যঙ্গের অসাড়তা, বধিরতা।
2. ইটাই-ইটাই রোগ	ক্যাডমিয়াম	রক্ত চাপ বেড়ে যায়, ফুসফুস ও বৃক্কের সমস্যা হয়।
3. ব্ল্যাকফুট ডিজিজ	আর্সেনিক	ক্রনাইটিস, ফুসফুসের সমস্যা, হাতে পায়ে কালো দাগ হয়।
4. এনডেমিক ফ্লুমিলিয়াল আর্থ্রাইটিস	কীটনাশক পদার্থ	এই ধরনের রোগে মানুষের হাড় দুর্বল হয়ে যায়, দাঁড়ানোর ক্ষমতা কমে যায়
5. আমাশয়	জলবাহী এককোশী প্রোটোজোয়া	প্রচুর পরিমানে পায়খানা হয়, শরীরে জলের পরিমান কমে যায়।
6. জন্ডিস	জলবাহী ভাইরাস	শরীর পীতবর্ণ হয়ে যায়, বিলিরুবিনের মাত্রা বেড়ে যায়।
7. টাইফয়েড	Salmonella typhi	এটি রক্ত আমাশয়ের জন্য দায়ী।

● জলদূষণের ফলে মানব দেহে সৃষ্ট রোগ ও ক্ষতিকর প্রভাব ঃ

রোগের নাম	জলবাহিত দূষক	মানব দেহে দূষকের প্রভাব
৪. আন্ত্রিক	প্রোটোজোয়া	পেট ব্যথা, মিউকাসসহ রক্ত আমাশয় হয়।
৯. কলেরা	Vibrio cholerae	ছটি বমি ও আমাশয় করায়।
১০. প্যারাটাইফয়েড	Salmonella paratyphi	জ্বর ও আমাশয় হয়।



- Sources of Water Pollution

● জল দূষণ নিয়ন্ত্রণ (Control of Water Pollution):

1. নালা-নর্দমার মুখ বন্ধ করা: প্রণালীর দূষিত জল সরাসরি নদী বা পুকুরে ফেলার পূর্বে পরিশোধন করা দরকার।

2. কলকারখানার দূষিত রাসায়নিক পদার্থগুলি যাতে নদীতে সরাসরি না ফেলা হয় সেজন্য সরকারি পর্যায়ে কঠোর আইন প্রনয়ন করা দরকার। প্রয়োজন মতো ওইসব পদার্থগুলি পরিশোধন করে তবে নদীতে ফেলা উচিত।

3. খনিজ তেল ট্যাঙ্কারের সমুদ্রে তেল যাতে সমুদ্রের জলে না পড়ে অথবা তৈলবাহী নৌকর করা জাহাজ থেকে যাতে পরিত্যক্ত তেল সমুদ্রে না মেশে সেদিকে সজাগ দৃষ্টি রাখা প্রয়োজন।

4. স্নান-বিল যাতে কচুরিপানায় ভরে না যায় সেদিকে নজর দিতে হবে।

5. পুকুর ও নদীনালাতে স্নান ও বস্ত্র ধোয়া এবং পশু স্নান নিষিদ্ধ করতে হবে এবং প্রয়োজন হলে এই বিষয়ে সাধারন মানুষকে শিক্ষিত করে

তোলার ব্যবস্থা নিতে হবে।

6. কৃষিজমিতে কীটনাশক ব্যবহার না করে জৈবিক পদ্ধতি অবলম্বন করা উচিত।

- **পানীয় জল পরিশোধন করার উপায় :** পানীয় জল পরিশোধন করার জন্য যেসব সহজ উপায়ে অবলম্বন করা দরকার সেগুলি হল -

1. জল কিছুক্ষন ফুটিয়ে ঠান্ডা করে ছেঁকে নিতে হবে।
2. ক্লোরিন, ব্লিচিং পাউডার, জিওলিন ইত্যাদি ব্যবহার করে জলকে বিশুদ্ধ রাখা যায়।
3. জল ফিল্টার করে জলকে দূষনমুক্ত রাখা যায়। অ্যাকোয়াফিলটারে আলট্রাভায়োলেট রশ্মির ব্যবহার করে জল দূষনকে মুক্ত করা যায়।

- **আইন সম্মত উপায়ে জলদূষন নিয়ন্ত্রন :**

1947 খ্রিঃ থেকে 1974 খ্রিষ্টাব্দে 'জলদূষন নিবারন ও নিয়ন্ত্রন' আইন চালু করা হয়েছে। এই আইন অনুযায়ী যেসব কার্য বাধ্যতামূলক করা হয়েছে তা হল -

1. 1974 খ্রিষ্টাব্দের আইন অনুযায়ী নদী, পুকুর, কূপ বা খালি জমিতে আবর্জনা ফেলা সম্পূর্ণ নিষিদ্ধ।

2. কোনো শিল্প-কারখানায় বর্জ্য পদার্থ নিষ্কেপের জন্য নতুন কোনো ইউনিট স্থাপন, পরিবর্তন বা প্রসারণ ঘটানো সম্পূর্ণ নিষিদ্ধ।

3. বিভিন্ন কলকারখানায়, শিল্প সংস্থায় ব্যবহৃত জলের পরিমাণ নির্ধারণের জন্য মিটার থাকা বাধ্যতামূলক।

জলদূষণের বিভিন্ন বিষয়গুলি দেখাশোনা করার দায়িত্ব 'কেন্দ্রীয় জলদূষণের নিবারণ ও নিয়ন্ত্রণ পর্ষদ' এবং 'রাজ্য দূষণ নিয়ন্ত্রণ পর্ষদ'-এর।

• জলের গুনগত মান নির্ধারন :

পানীয় জলের গুনগতমান নির্নয় করা হয় জলে দ্রবীভূত বিভিন্ন পদার্থের মাত্রা অনুযায়ী। উপাদান গুলির মাত্রা স্থির করা হয় জাতীয় ও আন্তর্জাতিক সংস্থার অনুমোদিত মাত্রাকে অনুসরন করে। আর্ন্তজাতিক স্তরে WHO, United State Public Health - এর দ্বারা নির্ধারন হয় এবং ভারতে ব্যুরো অফ ইন্ডিয়ান স্টান্ডার্ড দ্বারা এই মাত্রা নির্ধারিত হয়। পানীয় জলের pH এর মান 6.5 - 8.5, সিসা 0.1 mg/lt, ফ্লুওরাইড 0.6-1.2 mg/lt, পারদ 0.001 mg/lt, আর্সেনিক 0.05 mg/lt থাকা দরকার।

TITLE: ENVIRONMENTAL POLLUTION

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SUBJECT: ENVS

SEMESTER: 2

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Along with this , I would even like to express special thank to my brother who helped me in completing this assignment.

ENVIRONMENTAL POLLUTION

•***Environmental pollution*** is the addition of contaminants into the natural environment that causes detrimental effect to the nature natural resources and mankind.

•Any unnatural and negative changes in all the dimensions like chemical, physical and biological characteristic of any component of ecosystem i.e., air, water or soil which can cause harmful effects on various forms of life and property is called ***Environmental Pollution.***

Main types of pollution

The well-known pollution types include air and water, Marine etc. there are other type also which are relatively new but important to understand this include noise Elite clear thermal pollution etc. All these kinds of pollution have an impact on the environment.

1. Air Pollution

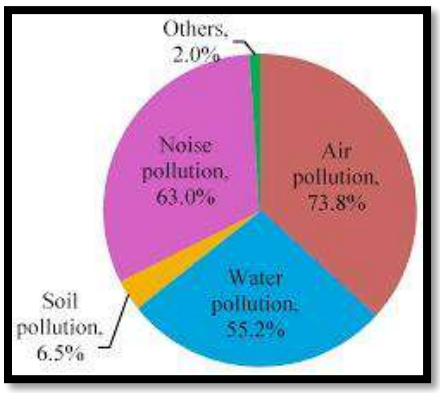
2. Water Pollution

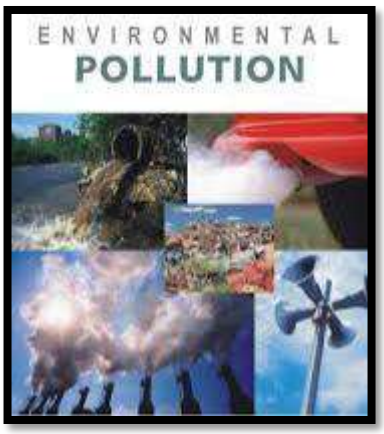
3. Soil Pollution

4. Noise Pollution

5. Radioactive/Nuclear Pollution

6. Thermal Pollution 7. Marine Pollution /Ocean Pollution





AIR POLLUTION

Air pollution occur when large number of undesirable gases and particulate matter are found in their. This results in deterioration of air quality, requires control and monitoring.

Effects Of Air Pollution

This pollutants have adverse effect on air quality and thus need to be brought to a minimum. Some of these effects/results are mentioned below:

Formation Of Photochemical Smog: main pollutants like hydrocarbons and nitrogen oxides combine in the presence of sunlight , smog is formed. It forms a yellowish brown his specially during winters and hampers visibility.

Aerosol Formation: Aerosol is formed by dispersion of liquid or solid matter in the atmosphere. Aerosols are formed by the pollutant particulate matter like carbon particles.

Causes and sources

Causes include burning of fossil fuels such as coal and petroleum in vehicles , industries and coal based electric power plants. Fossil fuels are being used in large quantities for over centuries in one or other forms. Burning of crops, waste and garbage are another equally damaging to the environment.

WATER POLLUTION

Water pollution on aquatic pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include for example lakes rivers and oceans ace fires and groundwater.

<u>What are the causes of water pollution?</u>

Water is uniquely vulnerable to pollution. Known as a "*universal solvent*", water is able to dissolve more substances than any other liquid on the earth. It's the reason we have Kool-aid and brilliant blue water falls. It's also why water is so easily polluted. Toxic substances from farms , towns, and factories ready dissolve into and mix with it , causing *Water Pollution.*

SOIL POLLUTION

Soil pollution refers to the contamination of soil with anomalous concentration of toxic substances. It is serious environmental concern since it harbours many health hazard.

<u>The root cause of soil pollution is often one of the following</u>

•Agriculture (excessive /improper use of pesticides)

•Excessive industrial activity

•Water Management or inefficient disposal of waste

Effects of soil pollution on human being

Soil contaminants can exist in all three phases (solid , liquid , and gaseous). Therefore, this contaminants can find the way into the human body via several channel such as direct contact with the skin or through the inhalation of contaminated soil dust .

The short term effect of human include:

•Headache Common Nausea , And Vomiting.

•Irritation Of The Skin And The Eyes.

A variety of long-term elements have been linked to soil pollution. Some such diseases are listed below.

•Depression of the CNS (Central Nervous System).

•High Risk Of Developing Cancer.

Effects on plants and animals

Soil pollution is often accompanied by a decrease in the availability of nutrients, plant lychees to thrive in such soils. *Soils contaminated* with inorganic aluminium can prove toxic to plants. Also this type of pollution of an increases the salinity of the soil making it inhospitable for the growth of the plant life.

MARINE POLLUTION

Marine pollution is a combination of chemicals and trash, most of which comes from the land sources and is washed or blown into the ocean.

<u>Cause of Marine pollution</u>

Here are some major causes of *Marine Pollution.*

NONPOINT SOURCE POLLUTION (RUNOFF)

Nonpoint source pollution comes from the variety of different locations and sources. The result of this is run off, which occurs when rain or snow moves pollutant from the ground into the ocean. For instance, after a heavy Prince Tom, water flows of roads into the ocean taking oil left on the street from cars with it.

OIL SPILL

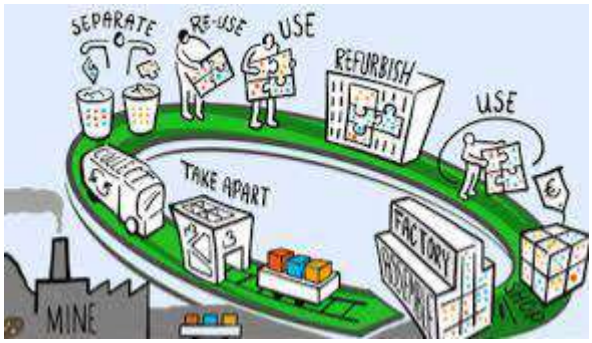
Ships are major contributors to the Ocean pollution commerce specially when crude oil spills occur. Crude oil last for years in the ocean and mining causes pollutions and destruction at the lowest level of the ocean. Drilling for substances such as cobalt zinc silver gold and copper creates harmful sulphide deposits deep in the ocean.

Effects Of Ocean Pollution

Ocean pollution has many consequences that directly and indirectly affect marine life as well as humans. Here are some of the most common effects of *Ocean pollution.*

Solid Waste Management

Solid Waste Management *i*s a term that is used to refer to the process of collecting and treating solid waste. *Waste Management* is all about how solid waste can be changed and used as valuable resources.



The four major categories of waste management is *1. Municipal solid waste 2. Industrial waste 3. Agriculture waste and 4. Hazardous waste.*

<u>Thoughts of solid waste disposal and Management</u>

Here are the methods of solid waste disposal and Management

•Composting Process

Composting Process is similar to sanitary landfill in and it is popular in developing countries. Decomposable organic matter is separated and composted in this procedure. They can be used as a base for fertilizers.

Two methods have been used in this process.

A) Open Window Composting

B) Mechanical Composting

•Disposal By Ploughing Into The Fields

Disposal by ploughing into the field are not commonly used. These *disposals* are not environment friendly and general.

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- ***https://www.britannica.com/technology/solid-waste-management***

COLLEGE ROLL NO.-PLSA20M662

CU ROLL NUMBER- 202223-21-0081

CU REGISTRATION NUMBER- 223-1111-0602-20

ENVS PROJECT ON RARE ANIMALS AND THEIR CONSERVATION

Acknowledgement-

I would like to thank my teachers for giving me this opportunity to do this project on 'Rare animals and their conservation'.

This opportunity has not only allowed me to showcase my skills, but also learn a lot of new things.

Thank you.

Index-

Introduction-

Some animals are common and some are rare. Some can be so common that they are coined as pests or vermin-such as rabbits, rats, mice starlings, etc. On the other hand, some animals are so rare that they might disappear and become extinct. These animals include Tigers, Cheetahs, Rhinos, Tortoises, etc. They are considered to be *endangered* with extinction. Throughout the course of this essay, I will be answering a series of simple questions with not so simple answers.

Mammals-

1. Why are dolphins killed?

The rare Dusky Dolphin.

The endangered Porpoise.

The Dolphins which live in the sea are hunted for their meat and oil. But even larger number of Dolphins and Porpoises are killed by Tuna fishermen. Tuna Fish and dolphins often swim and hunt together, and when they spot dolphins, they anticipate that the Tuna might be near. And thus, they spread their nets around dolphins to lure in the Tuna. Unfortunately, they cannot escape and often drown. Between 2013-2014, nearly 15,000 dolphins were killed.

2. Which members of the cat family are endangered?

The endangered South China Tiger.

The Lion.

The extremely rare Black Panther.

The Lynx is also used to make coats.

The cat family includes many animals which are rare and several which are terminally extinct. The Largest cats are the Lions and Tigers. Both these animals were once very wide-spread indeed but they have now mostly disappeared from their natural habitat. Neither the lion or the tiger could become functionally extinct as they are both bred quite successfully in captivity. In the wild they are now mostly found in the national parks and sanctuaries. This is not unforeseeable as they are both carnivores, they pose a severe threat to humans and their livestock. But this case can be reversed too, man can possess a great threat to these cats.

In the days of Greece, some 3000 years ago, Lions were found over most of Africa, western Asia, and even Europe. Now they have disappeared from the latter and only found in Africa and places in Asia like the 'Gir' Forest in India.

The Tiger was once as widespread from Turkey to China, and from Siberia to Indonesia. In India there were as many as 20,000 Tigers in the turn of the century. But by 1972 the numbers declined to 2,000. As of today, there remain as many as 3,900 tigers in the wild.

3. Which animals are used to make coats?

The cat family includes many species which have very attractive spotted patterns. These include Jaguars, Leopards, Cheetah, Clouded Leopard, Lynx and Ocelot. Leopards have been hunted by man since prehistoric times. In modern times they have been seen in the suburbs of African cities. Leopard skin coats are extremely fashionable and highly in demand. So many have been killed and this is the reason they are becoming extinct.

Fortunately many spotted cats are protected in the countries hey are found in. But still, they are killed illegally and their skin smuggled abroad. It is only when countries stop importing the skins will the animal be truly protected.

4. Why are Rhinos Killed?

The last two Northern white Rhinos in the world, known as Najin and Fatu (Both Females)

There are five species of Rhinoceroses in the world. Two occur in Africa. The Asian species are the Indian, Javan and Sumatran Rhinos. The African species are the Black Rhino and White Rhino (contrary to the name, it originates from the Afrikaans name meaning 'wide lipped')

All rhinos are large and comparatively easy to kill. Unfortunately their horns are very expensive in the east and are powdered to create a drug. They are hunted just for their horns.

Birds-

5. What factors have caused parrots to become rare?

The rarest Spix macaw.

Spricco Parrot

Several species of parrot have already become extinct in the last few hundred years. Among the rarest are the Amazon parrots of the West Indies. There are at least 28 different species of Amazon parrots and half of them live in the West Indies. One of the rarest live on the island of Puerto Rico. Towards the beginning of the 20th century they were widespread, but in the 1930s it was only found in a few mangroves. Now it is only found in the Luquillo National Forest. The cause of their extinction is that they mostly nest in holes in a tree and several externally introduced predators like Margays eat their young and eggs. The of Dominica, St Lucia and St. Vincent are also rare

In Australia there are a variety of parrots ranging from the Giant Cockatoo to the sparrow-sized grass parakeet and the Budgerigar. There are also Night Parrots which may be completely extinct. A close relative is the Ground Parrot which as the name suggest nest on the ground and thus their young are prey to rats, and other predators native to Australia.

Parrots are likely to become rare as most of them live in the forest and usually they lose their habitat because of deforestation. They are also tameable birds and large number of chicks are taken away. Some species are killed for their bright colour feathers.

Reptiles-

6. Why are crocodiles valuable?

The Nile Crocodile.

Crocodile Skin Products.

Crocodiles are not popular animals. They are flesh eaters and because of their size, they are dangerous to man. Some species can grow over 6 metres long.

However, there are other reasons why man has hunted crocodiles and their close relatives, the alligators. The skin of these reptiles make a leather which has become fashionable for making handbags, suitcases, wallets, and similar goods. Because of this, crocodiles have reached near extinction.

The Nile Crocodile was once found all over the Nile river into Egypt, and further into North Palestine. The Ancient Egyptians protected and worshipped the crocodile. But since those days crocodiles have been hunted, persecuted and almost removed from Egypt.

In India there is a kind of crocodile named Gharial. It has a long thin snout with small teeth, which it uses to catch fish. Until fairly recently, the Gharial was wide spread but it is declining in numbers and is one of the rarest crocodiles in Asia. In South America, Caimans, which are a sort of crocodile have been killed in thousands.

Conservation-

7. What can we do?

Everyone in the world can help save wild animals for the future. Family planning is extremely important, by having smaller families we could use less natural resources. This is particularly true in developed countries such as Europe, North America and Japan. In order to have nice furniture, the forests of New Guinea and Brazil are cut off. In order to have meat at the table, land is cleared to raise cattle. In order to use wi-fi and television, mines for copper and other resources destroy the land

As of now we can help by joining many organisations which are devoted to saving rare animals. These organisations publish newsletters and articles making people more aware of these animals. The more people who understand and care about rare animals, the more the future generations will see Tigers, Lions, Oryx and other rare animals.

Although the construct of zoos are inhumane, they can help save rare animals. These animals include Père David's Deer, which had become extinct in China in the 1900's and existed in the wild for 2,000 years. The Arabian Oryx and European Bison have also become extinct in the wild.

A national Park is an area of land which is set aside and protected to preserve the plants and animals that live there from man. Until recently there was enough room for both but with the growing human population, animals find it difficult to live in protected national parks.

Conclusion-

Throughout the millions of years that there has been life on the planet Earth, new species of animals and plants have evolved. At the same time, to preserve the balance other species have become rare or extinct. However, during the last few thousand years more and more animals have also become extinct, and even more endangered. And the reason for their extinction is quite simple, *man.*

THE END.

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SUBJECT: ENVIRONMENTAL STUDIES (AECC2)

TOPIC: MARINE POLLUTION

ACKNOWLEDGEMENT

I would like to give my special thanks to my Environmental Studies teacher for giving me the opportunity to do this project on the topic on Marine Pollution and also guiding me in doing this project, it has been a great learning experience for me to understand the Marine Pollution. Lastly, I would also like thank my parents for support and guidance.

Thank You,

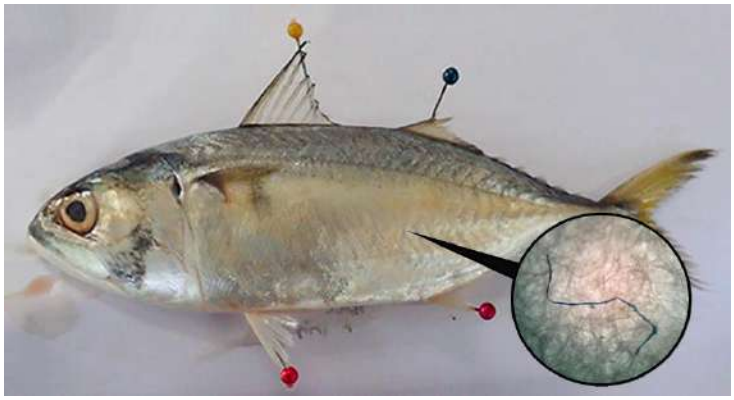
Anuj Prahan Kerketta

INTRODUCTION

There are many types of pollution like air pollution, noise pollution Land pollution and marine pollution but here we'll mainly focus on marine pollution. Ocean water covers more than 70 percent of the Earth, and only in recent decades have we begun to understand how humans impact this watery habitat. Marine pollution, as distinct from overall water pollution, focuses on human-created products that enter the ocean.

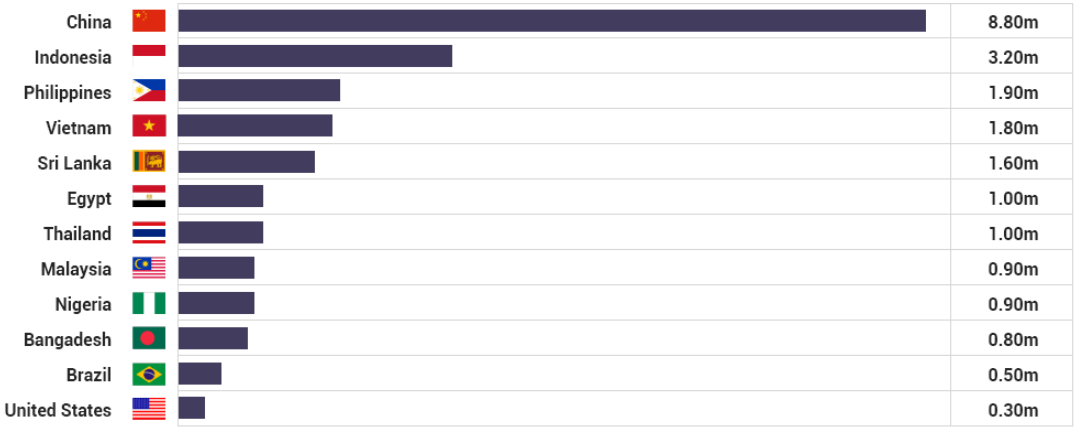
Before 1972, humans around the word spewed trash, sewage sludge, and chemical, industrial, and radioactive wastes into the ocean with impunity. Millions of tons of heavy metals and chemical contaminants, along with thousands of containers of radioactive waste, were purposely thrown into the ocean.

Many of these pollutants sink to the ocean's depths or float far distances from their original source, where they are consumed by small marine organisms and introduced into the global food chain. Plastic microfibers found in the stomach of a fish not only effects our marine ecosystem but also pose a threat to us human beings as it also enters in our food chain from the fishes we eat.



Top Countries Polluting The Oceans

Annual metric tons of mismanaged plastic waste entering the sea



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CAUSES OF MARINE POLLUTION

Chemical pollution

Chemical pollution is the introduction of harmful contaminants. Common man-made pollutants that reach the ocean include pesticides, herbicides, fertilizers, detergents, oil, industrial chemicals, and sewage.

Many ocean pollutants are released into the environment far upstream from coastlines. Nutrient-packed fertilizers applied to farmland, for example, often end up in local streams and are eventually deposited into estuaries and bays known as nutrients pollution. These excess nutrients trigger massive blooms of algae that rob the water of oxygen, leaving dead zones where few marine organisms can live.

Plastic pollution

Plastic pollution seeps into the ocean through run-off and even purposeful dumping. The amount of plastic in the Atlantic Ocean has tripled since the 1960s. The garbage patch floating in the Pacific Ocean, almost 620,000 square miles.

A huge culprit is single-use plastics, used once before tossed into the trash or directly into the ocean. These single-use items are accidentally consumed by many marine mammals. Plastic bags resemble jellyfish, a common food for sea turtles, while some seabirds eat plastic because it releases a chemical that makes it smell like its natural food.

Bits of plastic swirl throughout the water column, even sinking to the deepest depths of the ocean. Dying marine mammals, washing up on shore, also contain plastic inside their stomachs.

EFFECTS OF MARINE POLLUTION

- When excess nutrients like nitrates or phosphates get dissolved with the water it causes the eutrophication of surface waters, as it stimulates the growth of algae due to excess nutrients.
- Most of Benthic animals and plankton are either filter feeders or deposit feeders take up the tiny particles that adhere to potentially toxic chemicals.
- In the ocean food chains, such toxins get concentrated upward. This makes estuaries anoxic as many particles combine chemically depletive of oxygen.
- When the marine ecosystem absorbs the pesticides, they are incorporated into the food webs of the marine ecosystem. After getting dissolved in the marine food webs, these harmful pesticides cause mutations, and also results in diseases, which can damage the entire food web and cause harm to the humans.
- When toxic metals are dumped or flown into the oceans through drains, it engulfs within the marine food webs which result in change of tissue matter, biochemistry, behavior, reproduction, and suppress and alter the marine life's growth.

CONTROL MEASURES OF MARINE POLLUTION

Solutions for marine pollution include prevention and cleanup. Is there a "fix" to marine pollution? yes, many national laws, as well as international agreements, now forbid dumping of harmful materials into the ocean, although enforcing these regulations remains a challenge. Importing countries have found the surge of waste difficult to manage and this has led to new controls in some countries. For example, countries like Malaysia have revoked import permits and has been clamping down on illegal processing plants and Ministry of Environment, Forest and Climate Change of India expanded its ban on solid plastic waste imports

Other preventions include to sustain marine pollution are as follows:

• Adopting appropriate methods to remove heavy metals from the marine water and Creating awareness on marine pollution.

• Radioactive wastes can be removed or reduced by the ion-exchange techniques, precipitation of radio-nuclides.

• The impacts of deep-sea mining can be minimized or reduced by using proper mining techniques.

• Industrial units should be equipped with pollution control instruments.

CONCLUSION

• Marine ecosystem plays an important role in the chemical and biological balance of the life on the earth. Oceans are rich with marine resources like minerals, oil and marine life and the sea food supplies meet a substantial food requirement of the world's population.

• If the marine life affected by the pollution and if they carry pollutants in its biomass, the human population may get the impact while consuming such resources.

• Hence it is necessary to aware about the marine pollution, and to protect the marine water from the pollutants. Let us save our oceans and the huge marine ecosystem.

Nonetheless, many countries are taking action. The London Convention, ratified in 1975 by the United States, was the first international agreement to spell out better protection for the marine environment. The agreement implemented regulatory programs and prohibited the disposal of hazardous materials at sea. An updated agreement, the London Protocol, went into effect in 2006, more specifically banning all wastes and materials except for a short list of items, like leftover materials from dredging. 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.

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SCOTTISH CHURCH COLLEGE

TITLE OF THE PROJECT: WASTE MANAGEMENT CASE STUDY AT YOUR HOME/NEIGHBOURHOOD

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COLLEGE ROLL NUMBER: PLSA20M669
CALCUTTA UNIVERSITY ROLL NUMBER: 2022223-21-0083
CALCUTTA UNIVERSITY REGISTRATION NUMBER: 223-1111-0605-20

ACKNOWLEDGMENT

I would like to express my gratitude towards all of my ENVS professors for giving us such an interesting topic to do a tutorial on and also thank you for guiding me throughout the project.

Thank you.

INTRODUCTION

Waste management is the activities and actions required to manage waste from its inception to its disposal. This includes the collection, transport, treatment and disposal of waste, together with monitoring and regulation of the waste management process.

Waste management in Europe aims at promoting waste treatment options in line with the waste hierarchy, notably favouring preparation for re-use and recycling over disposal operations such as landfilling. For Germans, waste collection and disposal are self-evident. However, this is the result of a long development in the field of waste management, waste technology and waste regulations. Germany's first uniform national waste disposal law, the 1972 Waste Disposal Act (Abfallbeseitigungsgesetz), has been amended and adjusted from time to time, and is now our current Waste Management Act

(Kreislaufwirtschaftsgesetz – KrWG). Switzerland is one of the countries with the highest per capita waste production in the world. However, thanks to the waste management policies adopted, it is also one of the countries with the highest recycling rates. The waste management in Switzerland is based on the polluter pays principle.[1] Bin bags are taxed with pay-per-bag fees in three quarters of the communes. The recycling rate doubled in 20 years due to this strategy. [1] The recycling rate for municipal solid waste exceeds 50 percent

Although the United States represents just four percent of the global population, it accounts for 12 percent of global municipal solid waste generation. Modern lifestyles have resulted in a huge increase in waste production in the U.S. since the 1960's. Waste Management of Texas, Inc. is located in Houston, TX, United States and is part of the Solid Waste Services & Recycling Industry. Streamlined universal waste regulations promote environmentally sound collection practices and increase the proper recycling or treatment of such wastes. Universal waste in Texas includes: batteries, some pesticides, mercury-containing thermostats, paint and paint-related waste, and lamps (bulbs). In Canada the responsibility for managing and reducing waste is shared among the federal, provincial, territorial and municipal governments. Municipal governments are responsible for collecting and managing waste from households for recycling, composting, and disposal, while provincial and territorial authorities are responsible for approving, licensing and monitoring waste management operations.

Waste management market comprises of four segments - Municipal Waste, Industrial Waste, Bio- Medical Waste and Electronic Waste Market. All these four types of waste are governed by different laws and policies as is the nature of the waste. In India waste management practice depend upon actual waste generation, primary storage, primary collection, secondary collection and transportation, recycling activity, Treatment and disposal. Municipal Corporation is responsible for the management of the MSW generated in the city, among its other duties. The public health department is responsible for sanitation, street cleansing, epidemic control and food adulteration. Currently waste management in India mostly means a picking up waste from residential and industrial areas and dumping it at landfill sites. The authorities, usually municipal, are obligated to handle solid waste generated within their respective boundaries; the usual practice followed is of lifting solid waste from the point of generation and hauling to distant places known as dumping grounds and/or landfill sites for discarding. The treatment given to waste once thus emptied is restricted to spreading the heap over larger space so as to take away the waste from the public gaze.

CASE STUDY

The area where I live is Bidhannagar, Group Housing, Durgapur. This place is towards the East of the city. It is mainly a residential area, thus has no waste generated beyond the normal household, educational, small business and hotel waste. The Durgapur Municipal corporation is in charge of the waste management here and has done a great work in terms of waste management.

Regular clearance of waste is done daily, around 6 A.M. to 7 A.M. in the morning. The waste is collected in DMC waste bins and then further dumped by DMC in the dumping ground in Bidhan Nagar itself. The waste is collected in DMC waste bins and then further dumped by DMC in the dumping ground in Bidhan Nagar itself. The mayor of Durgapur tried to make provisions for the separation of organic and non-biodegradable waste, but this scheme did not materialise. Waste generated by the locality is also collected and transported to the DMC dust bins by the cleaning staff every single day.

TYPES OF WASTE GENERATED

1. Waste generated from the Residential area- The waste generated from residential areas varies a lot based on the socio-economic and cultural situations. Our locality mainly consists of upper middle-class to lower middle-class families and hence gas or electricity is mainly used for cooking. Thus, the waste generated in our locality is less compared to the houses using wood and charcoal as fuel. The amount of waste generated from paper, cardboard, tin and bottles is high in our locality.

2. Waste generated from shops and fruit and vegetable markets- The waste consists of the vegetable matter like skin of fruits and vegetables, bread, unused cooked cereals and plastic waste like poly bags.
3. Waste from Hotels, Restaurants and Eating stalls- Hotels and Restaurants generate both degradable and non-degradable waste. The domestic type of waste generated from here will obviously be high, hence it has to be removed daily. They can be provided with separate bins for waste collection.
4. Waste collected from Slaughter houses and Fish markets- Slaughter houses and fish markets generate highly putrescible matter. They decay very fast and are the main reason for the malodour near these premises. No proper collection or removal is practiced and hence the waste rots in the premises itself.
5. Waste generated by street hawkers- Street food vendors and hawkers generate large quantities of waste, particularly food waste and plastic paper plates.

PROCESSING OF THE WASTE- The ULBs will deposit the MSW collected by them to their designated processing plants. These plants are equipped with technology to segregate waste into dry and wet, as well as bio-degradable and non-bio degradable. The plants would produce compost, fuel blocks, plastic pellets, sand/bricks, which it would market.

STEPS TO BE TAKEN TO MINIMIZE THE WASTE GENERATION

1. **Use a reusable bottle/cup for beverages on-the-go-** We should always use a reusable bottle to save money, and reduce waste. By taking your own water with you, you'll also reduce your chances of purchasing more expensive beverages on-the-go. This will eliminate the one-time use containers they come in. While most cans and bottles can be recycled, they require a lot of energy to be produced, shipped to the bottling facility and then to the store for purchase.

2. **Use reusable grocery bags, and not just for groceries**- Just like a reusable water bottle, we should always have and use a reusable grocery bag, though it's often forgotten. Many grocery stores will provide a 5 cent per bag refund so you'll save a few cents while reducing your usage of one-time-use plastic bags.
3. **Avoid single-use food and drink containers and utensils**- Whenever possible, try to avoid single-use coffee cups, disposable utensils, straws and napkins. Some businesses will even give you a discount on your coffee for bringing your own mug. Keep a set of silverware at work along with a plate, bowl and cup that you can wash and reuse. Skip the plastic straw altogether or buy reusable metal ones instead. Remember, a lot of these items are made from plastic, had to be delivered by a truck, and will end up in a landfill once we have used them one time. Anything we can do to reduce our use of these products adds up to make a big impact.
4. **Buy second-hand items and donate used goods**- Before you go buy something new, consider buying it used which can also save you lots of money. That can mean buying second-hand clothes, used furniture and repurposed construction materials. By purchasing second-hand items you'll be supporting local charities in addition to saving items from ending up in the dump.
5. **Curb your use of paper: mail, receipts, magazines**-In today's digital world, most companies offer bills by email, and some even offer incentives to do so. More stores are offering e-receipts, too, which are great because they're harder to lose if you need to make a return. Consider digital subscriptions for your favourite magazines that you can read on your tablet or computer. Digital subscriptions are often a little cheaper than the hard-copy version, as well.

6. **Purchase wisely and recycle-** You can reduce the amount of waste you produce by purchasing products that come with less packaging and/or come in packaging that can be recycled.

Recycle and Reuse of the waste- Since it is a town where a lot uneducated and unaware people exist the people in my locality have not been able to recycle their waste in an efficient manner. However, if recycling and reuse can be done in an efficient way, it can have a lot of benefits. Recycling reduces the need of natural resource exploitation for raw materials, but it also allows waste materials to be recovered and utilized as valuable resource materials. Recycling of wastes directly conserves natural resources, reduces energy consumption and emissions generated by extraction of virgin materials and their subsequent manufacture into finished products, reduces overall energy consumption and greenhouse gas emissions that contribute to the global climate change, and reduces the incineration or landfilling of the materials that have been recycled .In some cases, the recycled materials can be used as input materials as they can be heavily processed into end products.

Apart from Recycling and reuse, some other steps can also be implemented to improve the waste management process in our area. These methods can also reduce the amount of waste generated every day. These steps include: -

i. Awareness campaigns can bring about considerable changes in the attitude and perception of the people towards waste management.
ii. Decentralized segregation and collection systems can be introduced in the locality with the participation of the Residents Association.
iii. Waste management activities can only be a success through the integrated and active participation of all the stakeholders.
iv. Involvement of the community is essential for the sustenance of any system implemented.

CONCLUSION

Planning the waste management and recycling for all of the rubbish produced in our locality is an enormous task which involves both logistical planning and scientific knowledge and understanding in order to balance the impact on the environment and the cost effectiveness of the process.

Waste management and recycling collection can help conserve our planet's natural beauty which can be flawed by thoughtless disposal of waste, fly-tipping and senseless littering. Landscapes can be ruined through littering and places of tourist interest can lose their attraction; it is also a blight for those who live in areas where waste collection and recycling are not managed effectively and responsibly. Natural beauty is a legacy and a right for future generations and conserving it, as well as our natural resources, for their benefit is our responsibility today.

Local governments must provide the facilities and incentives necessary for all citizens to be able to shift landfill waste down other paths. To break through these challenges and move closer to maximum waste diversion, we need to be an informed and engaged public. Progress is hindered when only a small fraction of the population participates. Small acts in large numbers make big differences. Our contribution is critical, so we should do our part.

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CU ROLL NO - 202223-11-0091

CU REGISTRATION NO - 223-1211-0166-20

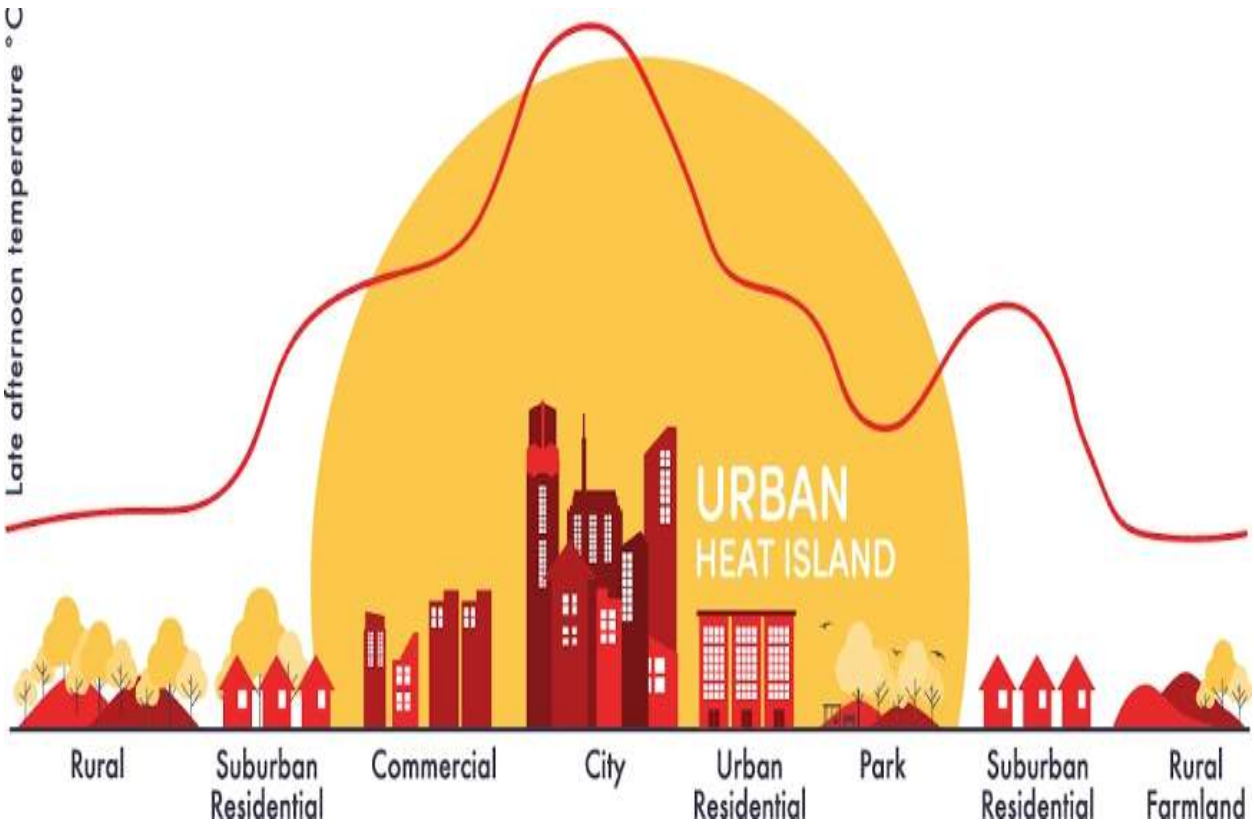
COLLEGE ROLL NO - PLSA20F672

SEMESTER - II

SUBJECT - AECC ENVS

Topic:

URBAN HEAT ISLAND EFFECT



Improving livelihood has favoured migration from rural to the urban areas leading to higher population density and growth of the urban crowd. Though urbanization has brought us closer, it has made us equally distant from nature.

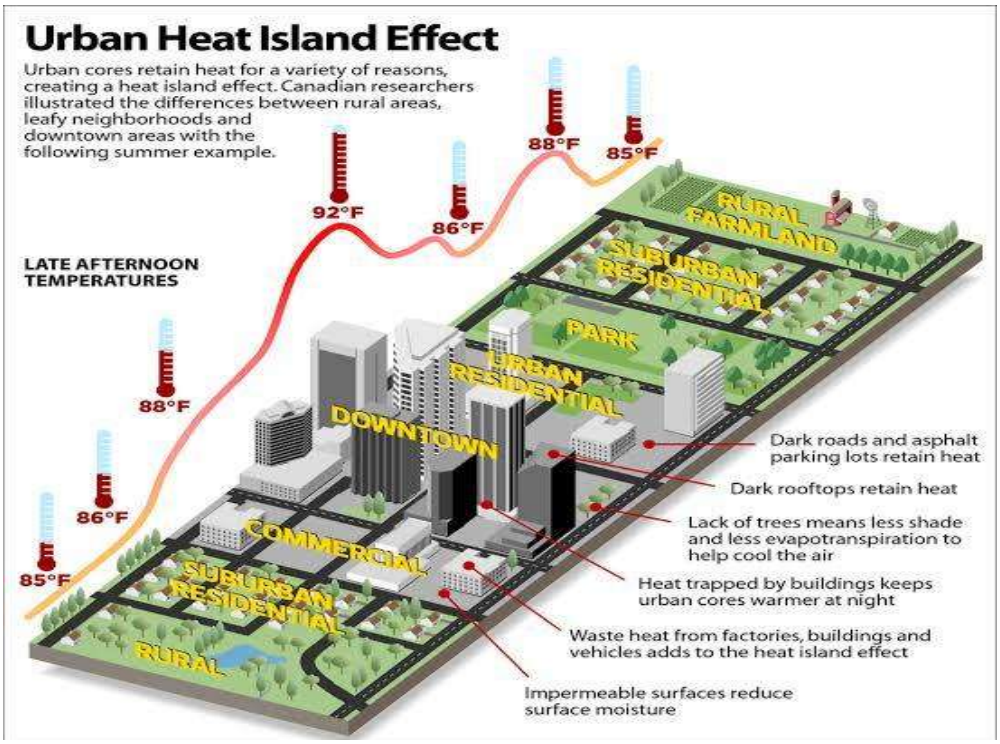
Towering concrete at the butchery of greenery has not only affected our choice of comfort but also the surroundings and our home: Earth. One of the most evident outcomes of extreme urbanization and widespread deforestation is the Urban Heat Island Effect.

MEANING:

An urban heat island (UHI) is an urban area that is significantly warmer than its surrounding rural areas due to human activities. The spatial configuration of cities influences the local urban energy balances due to which denser cities are more prone to becoming a heat island.

The phenomenon was first investigated by Luke Howard, a British manufacturing chemist and an amateur meteorologist in the 1810s.

CAUSES:



Urban Surface Features:

Urban surfaces absorb, reflect and re-emit solar energy due to certain characteristics such as thermal capacity, emittance, thermal absorbance and reflectance, thereby affecting UHI.
Urban areas generally exhibit low-albedo surfaces such as roads, rooftops and pavements, which are less capable of reflecting solar heat due to their radiative properties.
Also, most commonly used materials in urban areas are concrete and asphalt which possess high heat capacity.

Lack of Evapotranspiration :

Evapotranspiration is the process through which water evaporates and transpires from a surface area to the atmosphere, thus, providing sufficient moisture for cooling the surrounding air.
However, lack of vegetation and widespread deforestation in the urban areas play a major role in heat trapping.

Urban Geometry:

An urban canyon is a particular area which is flanked by buildings on its both sides creating a canyon like structure and thus making cities denser.
Such canyons provide multiple surfaces for the reflection and absorption of sunlight and eventually, increase the efficiency of heat absorption and also block the flow of wind which otherwise prevents pollutants from settling in the lower levels of atmosphere and enables cooling by convection.

Anthropogenic Heat:

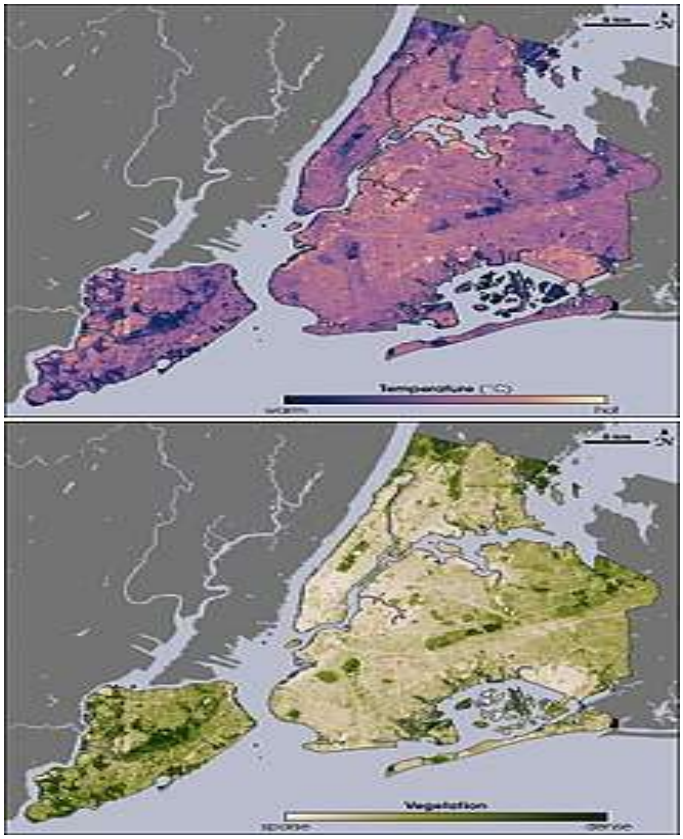
Heat caused due to human activity such as manufacturing, heating or cooling, lighting, transportation, heat from human and animal metabolism together constitute anthropogenic heat, which eventually leads to increased UHI.
The largest fraction of anthropogenic heat from buildings comes in the form of heat and moisture rejected by the building through its mechanical heating, cooling and ventilation systems.

High level of Pollution:

Higher urbanisation increases the level of pollution through the exhausts of the automobile industry, the use of air conditioning, refrigeration and so on.

The haze of air pollution that hangs over many cities can act as a miniature greenhouse layer, preventing the outgoing thermal radiation from escaping urban areas, thus leading to gradual ozone depletion.

EFFECTS:



Effect of heat upon vegetation

Urban heat accumulation affects the following:

Animals

Species good at colonizing can utilize such conditions provided by urban heat islands to thrive in regions outside of their normal range. Examples: grey-headed flying fox and the common house gecko. However, with attempts to mitigate and manage urban heat islands, rapid temperature changes and availability of food and water are reduced.

Weather

UHIs significantly affect the local meteorology, altering local wind and cloud patterns, humidity and precipitation which further enhances additional shower and thunderstorm activity.
According to an US Report, rainfall rates of affected cities have increased by 68% and also has affected the global climate by impacting the jet stream.

Human Health

UHIs characterized by high temperature can potentially increase the magnitude of heat waves within cities causing heat stroke, heat exhaustion and if severe, may lead to organ failure and even respiratory distress syndrome in adults.

Water Bodies

Increased temperature of water affects aquatic ecosystems. The warmer water of rooftops and pavements drained out to sewers and released into nearby lakes and creeks, impairs water quality.

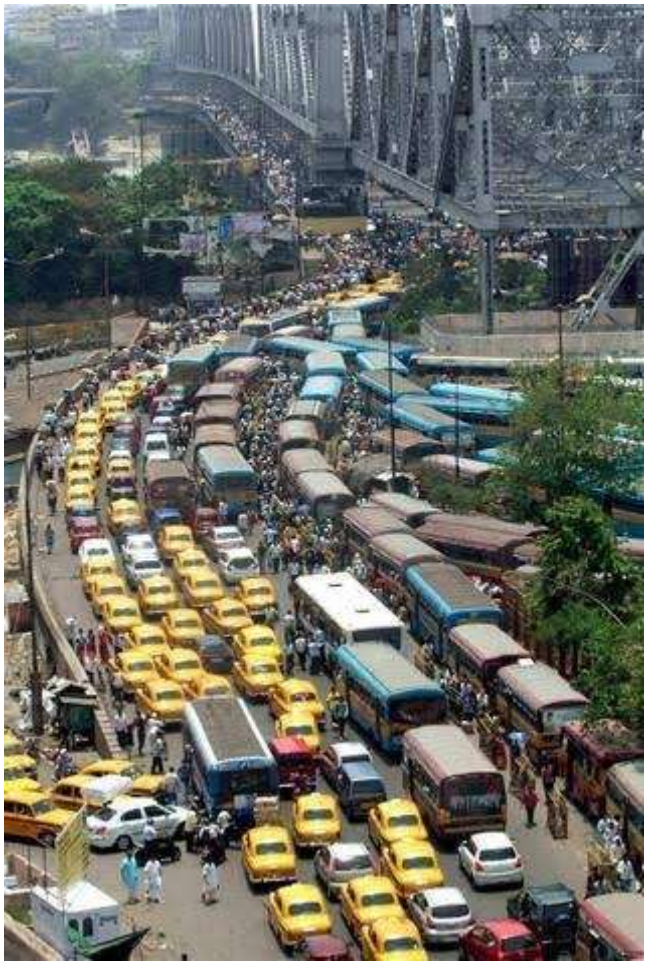
Energy Usage

Due to high temperature, additional energy is required for air conditioning and refrigeration in cities resulting in an increase in the level of pollutants, posing a threat on the climate and eventually, leading to ozone depletion.

Climate Change

The effect of UHI on Climate change is two-fold. Firstly, the heat build-up can worsen the condition of global warming in affected areas.
Secondly, it leads to increased electricity demand for cooling, causing a surge in the rate at which greenhouse gases are released into the atmosphere.

KOLKATA, IN PARTICULAR:



Traffic congestion in Kolkata

From leafy residential neighbourhoods of Alipore and Rajarhat to the heart of Kolkata, earlier known as Dalhousie Square to busy traffic intersections, India's eastern metropolis is showing undeniable symptoms of urban heat islands, mirroring the reality in other metropolises of the country.

Increasing vehicular traffic, intensive land use and encroachment of the wetlands are adding to the issue, according to a recently concluded research by Auburn University in the US in collaboration with the Indian Meteorological Department.

The annual growth of travel demand is increasing at the rate of 2.2% in Kolkata with doubling of traffic between 1996 and 2011, with high dependence on fossil fuel-based energy sources and a consequent rise in greenhouse gas emissions in recent times.

Predictably, the day and night time temperature difference is the highest on a national highway, considering its high traffic concentration, according to the report. Heat waves in Kolkata inflicted by the rise in temperature enables a high humidity in the city.

The 2018 IPCC Special Report warned that:
“At two-degree celsius-plus warming, Karachi and Kolkata could expect annual conditions equivalent to their deadly 2015 heat waves", referring to the year when heat-related illnesses killed at least 4,000 people in South Asia, primarily in India and Pakistan.

The 'City of Joy' is ironically having unhappy residents and visitors. The lush greenery and depths of the Ganges, have somehow lost their way into skyscraping concrete jungle.
Global climate might still be an unpredictable phenomenon but what is certain is mitigating the risk posed by climate change through urgent measures.

Kolkata during the Summer

MITIGATING MEASURES:

Rapid Industrialization and peaking economic development are both vital to the country and so is our sustainability. To combat UHI:

White Roofs:

A white roof is made from a reflective material such as vinyl that reflects at least 75 percent of the solar radiation and helps the surface area to cool down, thus reducing the heat buildup in cities.

Light pavements:

Light coloured, permeable pavements help in maintaining comfortable temperature as well as reduce stormwater to run-off.

Green roofs:

Green roof is the practice of having well watered vegetation being excellent insulators during the warm climate and helps induce a cooling effect and improves air quality.

Urban Afforestation:

Planting trees around the city increases albedo, reducing the heat concentration.
Trees can be planted alongside roads having a high traffic to facilitate a cooling effect against the heat emissions and exhausts released by vehicles.

Anthropogenic Heat Reduction:

Promoting pedestrians and cyclists, e-vehicles and strengthening public transportation can effectively reduce anthropogenic heat buildup.

Water bodies:

Water bodies have a significant impact in reducing temperatures of the neighbourhood due to it's reflective surface and through evaporative cooling.

CONCLUSION:

Skyrocketing population exacerbates an already worrying situation. However, with careful planning and smaller steps, it's possible for mankind to turn the tide. Simple practices deployed on a large scale can help reduce the heat in our cities, inflicting a domino effect by improving our surrounding environments, as well.
As we firmly believe, "the climate emergency is a race we are losing but it is a race we can win".

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TOPIC: NOISE POLLUTION

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DEPARTMENT: POLITICAL SCIENCE

SEMESTER: II

COLEGE ROLL NUMBER: PLSA20F677

CU ROLL NUMBER: 202223-11-0094

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What is Noise Pollution?

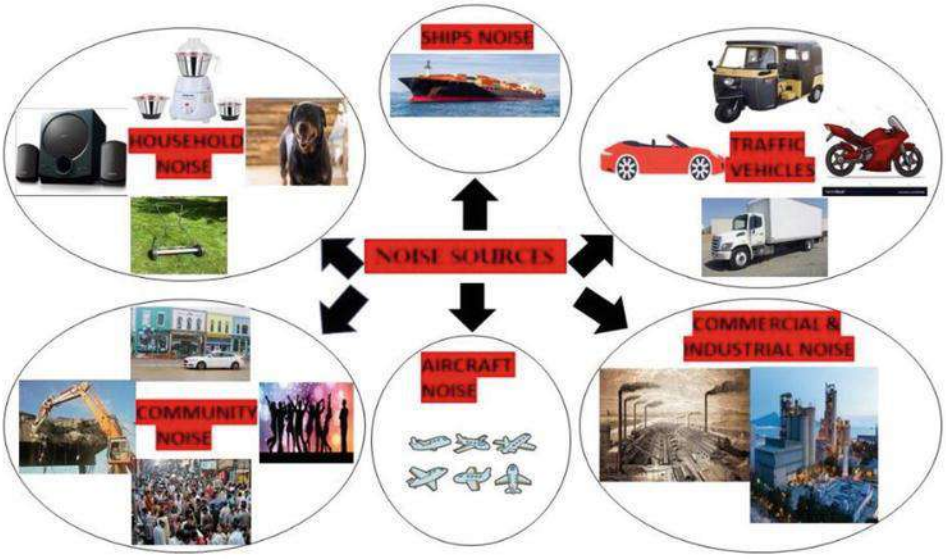
Noise pollution has become a major issue in our society. Increased urbanisation, transportation (all modes), and the problem of sound pollution pose a serious and multifaceted danger to the growth and development process. The world has been confronting a deadly threat to physical and mental health for the past thirty years, resulting in dysfunction of the same parts of the human body. Air, rail, and road transportation, as well as starting trucks, hard music, and Harley Davidson motorcycles, are all major contributors. Sleeplessness, hearing damage, and the work environment are examples of natural influences on areas of concern. Increased sound pollution is a huge hazard to humans and other species as a whole.

Our mother earth is getting tired of all the noises we create

Facts about Noise Pollution

These are some important facts about Noise Pollution-

1. Air, rail, and road transport are the primary sources of noise pollution in India's cities and rural areas.
2. Political gatherings, religious institutions, television, and entertainment, as well as barking dogs throughout the clock, are other sources. Transportation is a common occurrence. Working in Sound Pollution doubles the influence on human body stress, according to several research conducted in the United States.
3. In our country and across the world, industrial facilities, aero drums, bus complexes, railway tracks, and industrial cyclones are a never-ending source of sound pollution. The United States had a population-to-airplanes ratio of 1,000:400 in the 1980s, followed by Japan. Noise pollution has been a global problem since World War II, and it is particularly severe in wealthy countries today.

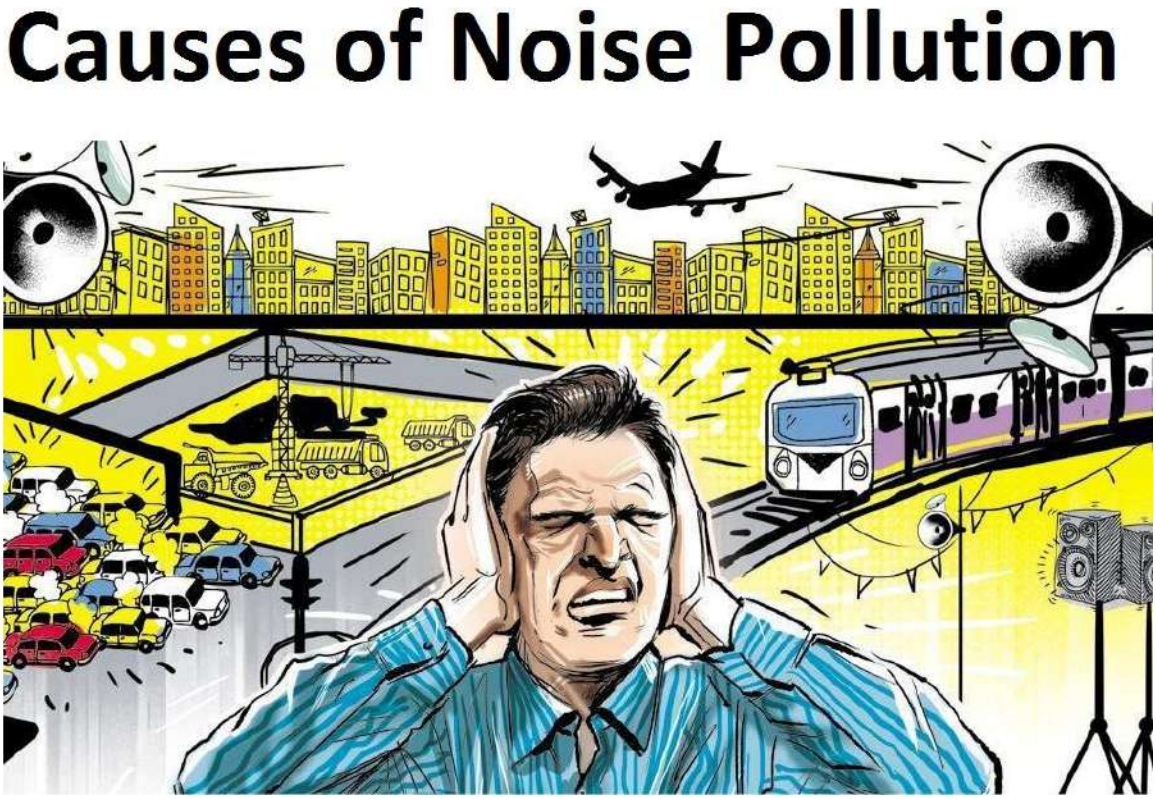


Different sources of noise pollution

Causes of Noise Pollution

There are two forms of noise pollution: Community Noise and Industrial Equipment Sound. Domestic sources include refrigerators, juice mixer grinders, televisions, washing machines, and gas cookers, among others, whereas industrial sound includes vehicles on the road, construction activities, fireworks, and loudspeakers from religious and political events.

1. Engineering firms, printing presses, textile mills, and metal industries all contribute to noi se pollution in the industrial sector.
2. Transportation systems, alarm systems, and social gatherings all contribute to noise pollution. Sound from vehicles travelling by air, road, rail, and water, as well as alarms from ambulances, VIP vehicles, and fire departments. The main sources are social gatherings such as weddings, parties, pubs, and places of worship; rule-breaking on all fronts is a constant danger to daily life.
3. Defense, Construction, and Miscellaneous Sources: Loud sound is produced by defence equipment such as tanks, explosions, military aircraft, shooting exercises, rocket launches, and jet planes. Construction in residential areas is common, and construction of roads, flyover bridges, and dams is also common. Other causes of noise pollution include stone cutting, mountain climbing, car repair businesses, blasting, and bulldozing.

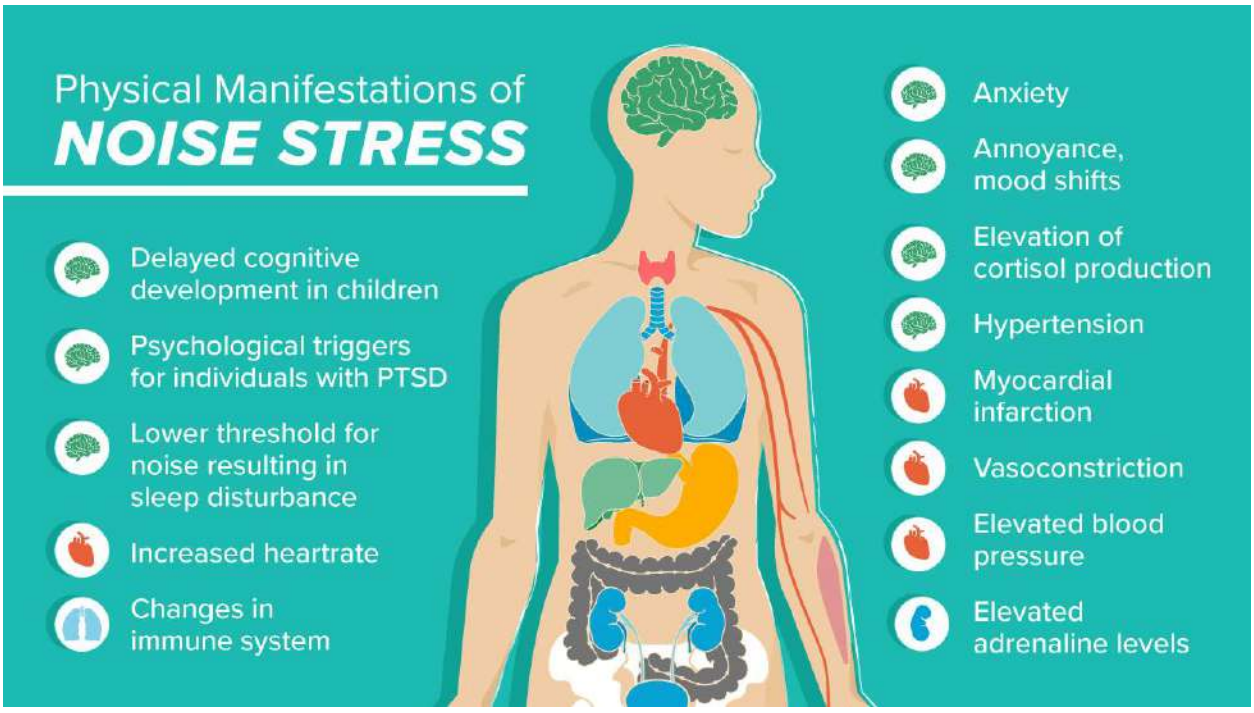


A very much self-explanatory picture

Effects of Noise Pollution

Some major effects were briefed as under-

1. The term "Noise-Induced Hearing Loss (NIHL)" is used to describe people who are sensitive to loud noises, which accounts for around 25% of the population in the United States. Nearly 30 million individuals are impacted by harmful noises, and the mining, industrial, and construction industries all contribute to sound pollution, and hearing loss is a common occurrence among the elderly.
2. In Germany, noise pollution causes memory loss and reading impairment in children. Another aspect is that the infant understanding noises in impact owing to the sounds of the television or radio, which acts as a barrier to learning the primary language.
3. In Tokyo, a US military installation is producing a great deal of noise, which is causing irregular blood pressure because of the sounds made as a result of winning tens of thousands of dollars in a case against the US Air Force.
4. Noise pollution has two sorts of consequences in India: auditory and non-auditory effects. The latter causes Auditory Fatigue and Deafness, whereas the non-auditory causes annoyance, lack of working productivity, verbal communication interference, and physical disorders such as increased heartbeats, B.P. and so on.



Physical effects of noise pollution on human body

How to Control Noise Pollution?

1. The central pollution control board established the first phase of the Noise Pollution Monitoring network in 35 major cities in March 2011, with the second and third phases covering about 160 cities in India.

2. The Environment Protection Act and Noise Pollution (Regulation and Control) Rules 2000 were adopted by the Government of India.

- Noise standards
- Restrict the use of Loudspeakers
- Restrict the over usage of horns, use of Constructions and Firecrackers
- Allotting responsibility to state pollution to take adequate measures etc.

3. The following are the elements of a WHO report to the United Nations Conference on Environment on Sound Pollution and Control:

- Silencing devices for aircraft, industrial, and domestic appliances are designed and manufactured.
- Modifications to machine design and operation, vibration control, soundproof booths, and sound-absorbing materials can all help to decrease it.
- Limiting motor traffic noise, prohibiting the use of blaring horns in industrial enterprises, entertainment areas, and residential areas, and establishing Silent Zones near schools, hospitals, and residential areas.
- To reduce indoor noise levels to 6 decibels, trees and shrubs can be planted in front of the building to provide some absorption.
- Bedrooms and living rooms should be on the quiet side, while kitchens, bathrooms, and elevators should be on the noisy side.

Say no to unnecessarily creating noises

Conclusion

Vegetation is used to combat noise pollution. Buffer zones must be established across the city. There is a pressing need to enact legislation to regulate noise pollution, as well as to educate people about noise pollution through radio, television, and newsreels in movie theatres. Its impacts on humans, and most all, public involvement and control, make it possible to limit and manage the threat to a sustainable and healthy existence on Earth. Apart from any other pollutions, only noise pollution may be reduced. It’s our duty to protect and conserve the nature because once too much damage is done there is no going back.

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SCOTTISH CHURCH COLLEGE

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CU roll no. – 202223-11-0100

CU registration no. – 223-1211-0190-20

Semester:-2

Department:- Political Science

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POLLUTION

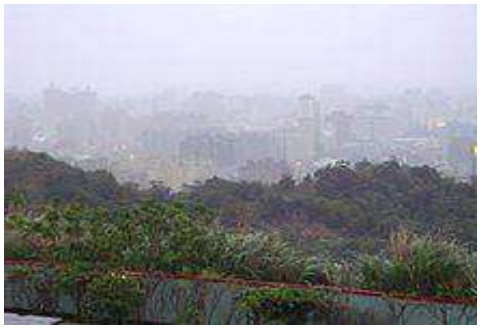
Pollution is the introduction of contaminants into the natural environment that cause adverse change. Pollution can take the form of chemical substance or energy, such as noise, heat or light. Pollutants the component of pollution, can be either foreign substance/energies or naturally occurring contaminants. Pollution is often classed as point source or nonpoint source pollution . In 2015, pollution killed nine million people worldwide.

Major forms of pollution include air pollution ,light pollution , litter ,noise pollution ,plastic pollution ,soil contamination ,radioactive contamination, thermal pollution visual pollution, and water pollution.

The litter problem on the coast of Guyana, 2010

- ## AIR POLLUTION:-

The release of chemicals and particulates into the atmosphere. Common gaseous pollutants include carbon monoxide, Sulphur dioxide, chlorofluorocarbon, and nitrogen oxides produced by industry and motor vehicles. Photochemical ozone and smog are created as nitrogen oxides and hydrocarbons react to sunlight. Particulate matter , or fine dust is characterized by their micrometre. Air pollution comes from both naturally and human made sources. However, globally human made pollutants from combustion ,



- **Smog pollution in Taiwan**

construction, mining, agriculture and warfare are increasingly significant in the air pollution equation. Motor vehicle emissions are one of the leading causes of air pollution. Principal stationary pollution sources include chemical plants, coal fired power plant, oil refineries , petrochemical plants, nuclear waste disposal activity incinerator, large livestock farms, PPVC factories, and other heavy industry.

- # ELECTROMAGNETIC POLLUTION:-

The overabundance of electromagnetic radiation in their non ionizing form like radio waves, etc. that people are constantly exposed at, especially in large cities. It's all unknown whether or not those types of radiation have any effect on human health, though.

- # WATER POLLUTION:-

By the discharge of industrial wastewater from commercial and industrial waste (intentionally or through spills) into surface waters; discharges of untreated sewage and chemical contaminants, such as chlorine , from treated sewage; release of waste and contaminants into surface run off flowing to surface water ; groundwater pollution from waste disposal and leaching into grounds, including from pit latrines and septic tanks; **eutrophication** and **littering.**

Industrial wastes

- # NOISE POLLUTION:-

Which encompasses roadway noise , aircraft noise, industrial noise as well as high intensity sonar.

- **Light pollution** includes light trespass, over-illumination and astronomical
- interference.
- **Plastic pollution** involves the accumulation of plastic products and microplastics un the environment that adversely affects wildlife habitat, or humans.
- **Soil contamination** occurs when chemicals are released by spill Or underground leakage. Among the most significant soil contamination are **hydrocarbons , heavy metals , MTBE , herbicides ,pesticides ,** and **chlorinated hydrocarbons.**
- **Thermal pollution,** is a temperature change in natural water bodies caused by human influence, such as use of water as coolant in a power plant.
- **Visual pollution,** which can refer to the presence of overhead power lines, motorway billboards, scarred landforms, open storage of trash, municipal solid waste or space debris.
- **Plastic pollution,** involves the accumulation of plastic products and micro plastics in the environment that adversely affect wildlife, wildlife habitat, or humans.
- **Radioactive contamination**, resulting from 20th century activities in atom physics, such as nuclear power generation and nuclear weapons research, manufacture and deployment.

Pollution can also be the consequence of natural disaster. E.g. **hurricanes** often involve water contamination from sewage , and petrochemical spills from ruptured **boats** or **automobiles.** Larger scale and environmental damage is not uncommon when coastal oil rigs or refineries are involved. Some sources of pollution, such as nuclear power plants or oil tankers, can produce widespread and potential hazardous releases when accident occurs.

A much more recently discovered problem in the **Great Pacific Garbage Patch,** a huge concentration of plastics, **chemical sludge** and other **debris** which has been collected into a large area of the Pacific Ocean by **North Pacific Gyre.** This is a less well known pollution problem than the others described above, but nonetheless has multiple and serious consequence such as increasing wildlife mortality, the spread of invasive species and human ingestion of toxic chemicals. Organization such as **5 Gyres** have researched the pollution and, along with artists like **Marina Debris,** are working toward publicizing the issue.

Pollution introduced by **light** at night is becoming a global problem, more severe in urban centres, but nonetheless contaminating also large territories, far away from towns.

Growing evidence of local and global pollution and an increasingly informed public over time have given to **environmentalism** and the **environmental movement,** which generally seek to limit human impact on the environment.

Plastic pollution on the remote island of Maui, Hawaii

Pollution control is a term used in **environmental management.** It means the control of emissions and effluents into air, water or soil. Without pollution control, the waste products from overconsumption, heating, agriculture, mining, manufacturing, transportation and other human activities, whether they accumulate or disperse, will degrade the environment. In the hierarchy of controls, pollution prevention and waste minimization are more desirable than pollution control. In the field of land development, low impact development is a similar technique for the prevention of urban runoff.

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. If we just think of washing our hands with soap, even with natural soap, this already is pollution.

Much is being done to control., monitor and rectify damage done by pollutants. The problem are diverse and some are only being recognized but it is important to keep close control over pollutants so that we can maintain the environment in an acceptable condition for future.

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ENVIORNMENTAL SCIENCE (AECC 2) TERM PAPER

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DEPARTMENT – POLITICAL SCIENCE

SEMESTER - 2

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I am highly grateful to my professors for assigning me such an interesting topic as my project for AECC 2. I am also thankful to my mother whose little yet strong help led to the completion of the project.

GLOBAL WARMING……

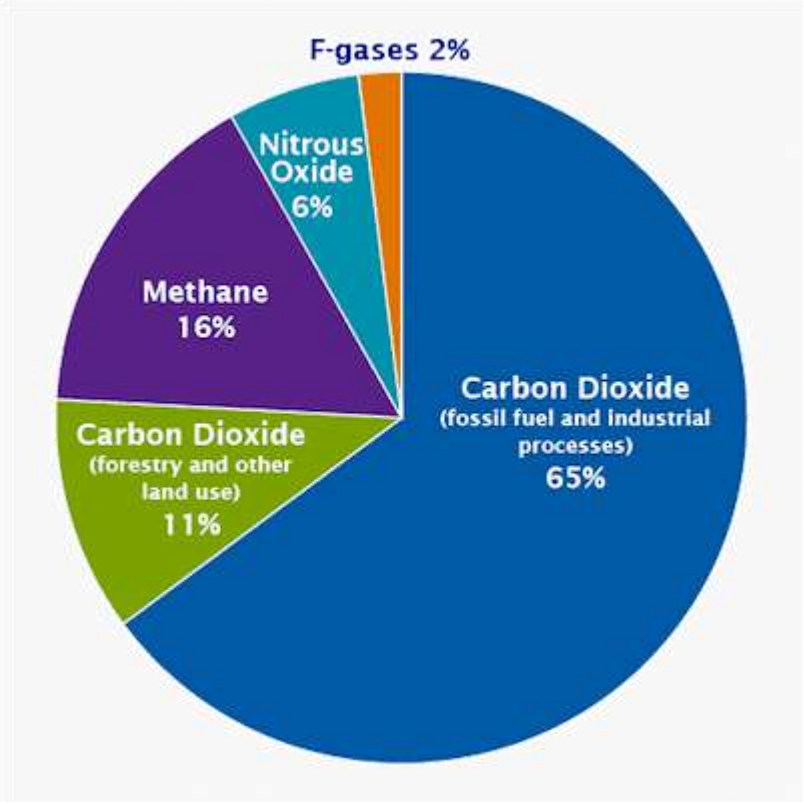
Global warming is the long term heating of the climate of the earth as observed since the pre-industrial period (between 1850 and 1900) due to human activities, primarily fossil fuel burning, that increases heat trapping green house gas levels in the atmosphere of the earth. Since the industrial revolution , the global annual temperature has increased in total by a little more than 1 degree Celsius, or about 2 degrees Fahrenheit.

CAUSES OF GLOBAL WARMING

Global warming occurs when carbon dioxide (co2) and other air pollutants collect in the atmosphere and absorb sunlight and solar radiation that have bounced off the surface of the earth. Normally this radiation would escape into space , but these pollutants , which can last for years to centuries in the atmosphere , trap the heat and cause the planet to become hotter . The heat trapping pollutants specifically carbon dioxide, methane, nitrous oxide, water vapor , and synthetic fluorinated gases are known as green house gases and there impact is called the GREEN HOUSE EFFECT. Though the natural cycles and fluctuations have caused the climate of the earth to change several times over the last 800,000 years , our current era of global warming is directly attributable to human activity- specifically to our burning fossil fuels like coal , oil , gasoline , natural gases that results in green house effect. In the United States the largest sources of green house gases is transportation (29 percent) followed closely by electricity production (28 percent) and industrial activity

(22 percent). Curbing dangerous climate change requires very deep cuts in emissions , as well as the use of alternatives to fossil fuels worldwide. The good news is that the countries around the globe have formally committed as a part of 2015 PARIS CLIMATE AGREEMENT-to lower the emissions by setting new standards and crafting new policies that were not working fast enough. To avoid the worst impacts of the climate change, scientists tell us that we need to reduce global carbon emissions by as much as 40 percent by 2030. For that to happen, the global community must take immediate and concrete steps to decarbonize electricity generation by equitable transitioning from fossil fuel based production to renewable energy sources like wind and solar; to electrify our cars and trucks ; and to maximize the energy efficiency in our buildings , appliances , and industries.

SOME GREEN HOUSE GASES



CO2 or carbon dioxide is produced any time something is burned. It is the most common GHG, constituting by some measures almost 55 percent of total long term green house gases. It is used as a marker by the United States Environmental Protection Agency, for example, because of its ubiquity. Carbon dioxide is assigned a GWP or Global Warming Potential of 1.

Methane or CH4 is produced in many combustion processes and also by anaerobic decomposition, for example, in flooded rice paddies, pig and cow stomachs, and pig manure ponds. Methane breaks down in approximately 10 years, but is a precursor of ozone, itself an important GHG. CH4 has a GWP of 28-36.

Nitrous oxide in parean (laughing gas), NO/N2O or simply NOx is a by product of fertilizer production and use, other industrial processes and the combustion of certain materials. Nitrous oxide lasts a very long time in the atmosphere, but at the 100 year point of comparison to CO2, its GWP is 265-298.

Flourinated gases were created as replacements for ozone depleting refrigerants, but have proved to be both extremely long lasting and extremely warming GHGs. They have no natural sources, but are entirely man-made. At the 100 year point of comparison, their GWPs range from 1,800 to 8,000 and some variants top 10,000.

ABOUT BLACK CARBON

Black carbon (BC) is tiny particles of carbon released as a result of the incomplete combustion of fossil fuels, biofuels and biomass. These particles are extremely small, ranging from 10 µm the size of a single bacterium to less than 2.5 µm (PM2.5), one thirtieth the width of a human hair and small enough to pass through the walls of the human lung and into the bloodstream.

Although BC – think of the plume of smoke from a chimney or a fire – falls out of the lower atmosphere in days, while it is suspended in the air, it absorbs the sun's heat millions of times more effectively than CO2. When wind carries BC over snow, glaciers or ice caps where it falls out onto the white, normally reflective surface, it is particularly damaging because it contributes directly to melting. Overall black carbon is considered to be the the second biggest contributor to global warming after carbon dioxide.

GLOBAL WARMING AND CLIMATE CHANGE…..(EFFECTS)

Climate changes will, and already are, affecting every aspect of the hydrologic cycle. Actions are needed to improve our understanding of water-related risks from climate change and to explore and implement strategies to reduce these risks. The Pacific Institute works to quantify climate change's impacts on water systems and resources, cooperating with diverse stakeholders to identify and develop solutions that promote more resilient water systems in the U.S. and abroad. It is not too late to act to slow the rate of climate change and to reduce the ultimate cost to public health, ecosystems, and the economy. We must reduce the severity of future climate change through efforts to cut or mitigate greenhouse gas emissions from our water systems, and we must adapt to climatic changes we can no longer avoid. The Pacific Institute has published leading reports on climate change, energy, and water; elucidated the connections between climate change, migration, and conflict; investigated the impacts of climate change on agriculture, as well as adaptation strategies; evaluated the effects of climate change-induced sea-level rise on the California coast; and more

CONCLUSION

1. Formally declare a national and *international Global Warming Extinction Emergency.*

2. Immediately pass *enforceable and verifiable* national and international laws that will successfully come close to our last chance,2025 ***l fossil fuel reduction targets.***

3. Order an immediate and all-out *mass mobilization* of ALL necessary resources and personnel to execute ALL the governmental and individual actions necessary to come close to the ***2025 global fossil fuel reduction targets*** and to fully resolve our current global warming *emergency*. And,

4. Do everything possible to start adapting to **the many coming severe global warming consequences** that we can no longer stop or avoid.

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POLITICAL SCIENCE HONOURS

TERM PAPER 2020-2021

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SEMESTER: 2

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Secondly, I would also like to thank my friends who helped me a lot of in finishing this project within the limited. It helped me increase my knowledge and skills.

THANKS AGAIN TO ALL WHO SUPPORTED

Shaheen Aslam

Signature

TOPIC:-

DISASTER MANAGEMENT

DISASTER MANAGEMENT

Disaster management is an organized management that deals with the responsibility to reduce the impact of disaster and played an important responsibility during Emergency.

DISASTER

Description on massive scale, either natural or man-made, occurring in short or long periods is termed as Disaster.

Loss of life and property due to this disaster have been steadily mounting throughout the world due to inadequate technology to combat disaster, rise in population, climate change, and continuing ecological degradation.

As per the statistic, India as a whole is vulnerable to 30 different types of disasters that will affect the economic, social, and human development potential to such as extent that it will have long-term effects on productivity and macro-economic performs.

There are discussed different types of natural disasters that are counted in the frequent list of hazards.

FLOODS

Floods are regarded as one of the most frequent natural disasters. A flood is an over flow of water on land. Sometimes a river might receive extra water, either from heavy rains or other water overflows from its normal path in the river bed and into the dry land. The major floods are caused in Ganga-Brahmaputra basin, which carries 60% of the total river flow of our country.

The reasons for floods are various like rains, river flow; strong winds in coastal areas, Dam breaking and ice or snow melt. In India, cyclones occur usually between April and May and also between October and December.

On 30th June 2021, the flood affected the districts of Assam affected over 7000 people along with the 13 roads and 4 bridges. The state government of Andhra Pradesh reported severe flooding caused by heavy rainfall on 26 November, 2020 due to the cyclone Nivar.

EARTHQUAKE

The earth quake is considered as one of the most destructive natural disaster. All natural earthquakes occur in the Lithosphere. An earth is simply put shaking of the earth's crust. It is caused due to the energy release, which triggers waves that travel in all directions. About 50%-60% of India is vulnerable areas are located in the Himalayan and Sub- Himalayan regions. There are different cases of earthquake in India.

On 15th January 1934, the earthquake hit Bihar caused the large numbers of people to be affected. This quake was considered to be one of the worst quakes in Indian history. Further, on 26th January 2001, the earthquake occurred in Gujrat and due to this, several towns and villages were destroyed.

TSUNAMI

The word ‘Tsunami’ literally means ‘harbor waves’. These are the series of waves and the characteristic feature that differentiates these waves is their long wavelength. Most tsunamis are caused by large earthquakes though all earthquakes cause tsunami. The giant were produced travels across the ocean at speed of 500-1000 km /hr.

On December 26, 2004 a 100- foot high tsunami triggered by an earthquake of magnitude 9.1, one of the largest ever recorded, from under the Indian Ocean killed more than 2300 people in South Asia. It hit the Andaman Nicobar Island and the east coast of India causing an enormous amount of destruction.

CYCLONE

A cyclone is any low- pressure area with winds spiraling inwards. Cyclones rotate anti clockwise in Northern Hemisphere and rotate clockwise in Southern Hemisphere. Thousands of people suffer from large and small cyclonic storms. Cyclones are of three types that are tropical cyclone, Extra-tropical cyclone and tornadoes.

India is a country in the North Indian Ocean that is most vulnerable to getting hit by tropical cyclones in the basin from east or from the west.

Recently, cyclone Tauktae impacted on various states like Kerala, Karnataka, Goa and Gujarat on 14 May 2021.

Moreover, super cyclone Amphan was a powerful and catastrophic tropic cyclone that caused widespread damage in Eastern India specifically west Bengal, Odisha and in Bangladesh in May 2020.

PROCESS OF DISASTER MANAGEMENT

Disaster management works at the different level at local, district and state level that complete the works in an organized manner.

1. **LOCAL LEVEL: -**The local government is responsible for manage disaster, for development and implementation of their Local Disaster Management Plan.
2. **DISTRICT LEVEL: -** If local government fails to manage its work than it look for DDMG for rapid mobilization of resources.
3. **STATE LEVEL: -**If the role of DDMG proofs inadequate then state government seek the matter to fill the gap in responsibility.

CONCLUSION

The role of disaster management cannot be avoided during disasters. It has an important place in the whole management of frequent disasters. It reduces the casualties, helps in constructing the houses, infrastructure and prevents the people from the mouth of death. During cyclones Fani, disaster management prepared warning system, timely action and well planned large scale eviction strategies helped 1.2 million people move safely into nearly 4000cyclone & shelters, thereby saving the lives of vulnerable population in the sensitive region

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POLITICAL SCIENCE HONOURS

TERM PAPER 2020-2021

NAME: SHAGUFTA NAAZ

CU ROLL NO: 202223-11-0107

CU REGISTRATION NO: 223-1211-0201-20

COLLEGE ROLL NUMBER: PLSA20F681

DEPARTMENT: POLITICAL SCIENCE

SEMESTER: 2

PROJECT TITAL: PROJECT TIGER

ACKNOWLEDGEMENT

I would like to express my special thanks of gratitude to my Sushmita Gonsalves who gave me the golden opportunity to do this wonderful project on the topic “PROJECT TIGER” which also helped me to do this wonderful research and I come to know about so many new things.

Secondly, I would also like to thank my friends who helped me a lot of in finishing this project within the limited. It helped me increase my knowledge and skills.

THANKS AGAIN TO ALL WHO SUPPORTED

Shagufta Naaz

Signature

TOPIC:

INTRODUCTION

At the turn of the 20th century, the population of tigers stood at 40,000, while by early 1970s, their number dwindled to 1827 according to first tiger census in 1972. This was worrying sign for the Indian Government, Environmentalist in general and for the nature in particular. The decrease in number of tiger meant that the biodiversity in the Indian forest regions were in jeopardy. As a result, there was a threat to the food web in nature.

Being the national animal of India, Indian government under the prime minister Mrs Indira Gandhi decided to take necessary steps to stop depletion of Tiger number sooner than later. On April 1973, the Indian government launched the project Tiger with the mission to increase of tigers and take adequate measures to prevent the decreasing number.

REASONS HOW TIGER POPULATION WAS DEPLETING

1. **UNINTERRUPTED HUNTING FOR PLEASURE:-**Before the consciousness regarding tiger population took birth, it can be said that tigers were not considered to be an animal at all because earlier in the medieval times by king and zamindars and high class people in the British era, it was their favorite's item to hunt. This was

indeed the case. At that time, it was irony that these high class believed tiger as a symbol of bravery while at the same time they used to hunt them to show ordinary citizen that were brave enough to hunt them.

2. **POACHING: -** Poachers use one of the following methods to kill a wild tiger.

a) **POISION: -** It is usually placed in the carcasses of domestic buffaloes and cows.
b) **TRAPS: -** These are made by nomadic blacksmiths, these traps are immensely strong.
c) **FIREARMS: -** These are used where hunting can be carried out with little hindrance.
d) **ELECTROCUTION: -** By tapping 230 volts -11 kv overhead electrical wires and laying a live wire on animals.
e)

3. **HUMAN INTERFERANCE IN ECOSYSTEM:** - An increase in human populations throughout tiger ranges in India has resulted in tiger habitats being reduced. Over the past 100 years tiger habitats have dwindled as they have been overtaken by agriculture, plantation, timber logging, human settlements and access routes. Only 7% of the tiger's historical range is intact today and tiger habitats are left in isolated areas. This results in small pockets of tiger habitat surrounded by human populations.

4. 

CONSERVATION PROCESS IN PROJECT TIGER

Conservation of tiger requires the following knowledge.

1. The natural habitat of tiger and its food habit.
2. About the breeding habit and breeding season of tiger.
3. Its relation with other animals.
4. The number of animals present at any given time, reasons for their diminishing or Increasing.

LEVEL OF CONSERVATION

Conservation of tigers is done at the following levels.

LEVEL 1: - The population of the tigers in any reserve is to be determined from time to time. The reasons for either their increase or decrease are to be noted. In case of decrease, the reasons are to be located and appropriate measures are to be undertaken.

If the encounter severe disease then it should be diagnosed and immediate treatments are to be made. If the decrease in number is due to poaching then constant vigilance is to be maintained to keep poachers away.

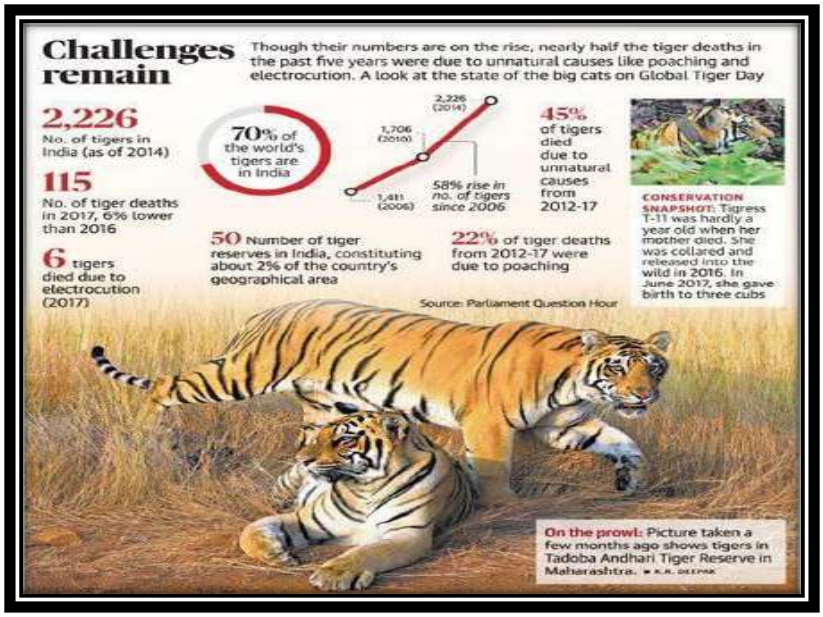
LEVEL 2: - The food of tiger comprises of deer, sumbar, wild boar etc as it is a carnivore. Care should be taken to keep the food animals in sufficient numbers, so that the tiger need not come out of the forest for food and get killed by the hunters.

LEVEL 3: - It is essential to have knowledge about the breeding season of the tigers and the numbers of litters born. The litters should be protected from all sorts of danger including diseases. The diseased and litters or tigers should be imprisoned and treated later released into their natural habitat.

ACHIEVEMENTS OF PROJECT

More than 45 years have passed and it will be able unjust to say that project tiger is a campaign without success.

1. **PROTCETION OF ENTIRE ECOSYSTEM: -** With project tiger in action, there has been a stringent protection of entire ecosystem. With division of tiger reserves into transition zone, Buffer zone and Core zone, the forest officials were successful in maintaining least disturbance in the last two zones.
2. **INCREASE IN NUMBERS OF PREY AND PREDATORS: -** The project Tiger was launched keeping in mind to increase the number of tigers and at the same time, control the dwindling of tiger decrease. But for the survival of the tigers, a significant amount of prey is required for the predator to fill their hunger and at the same time maintain the food web. This helped to prevent the tiger to migrate from their reserves to find food in human settlement, thus preventing human- tiger conflict.


Challenges remain
Though their numbers are on the rise, nearly half the tiger deaths in the past five years were due to unnatural causes like poaching and electrocution. A look at the state of the big cats on Global Tiger Day
2,226
No. of tigers in India (as of 2014)
115
No. of tiger deaths in 2017, 6% lower than 2016
6 tigers died due to electrocution (2017)
70% of the world's tigers are in India
2,226 (2014)
1,706 (2010)
1,411 (2006)
58% rise in no. of tigers since 2006
45% of tigers died due to unnatural causes from 2012-17
CONSERVATION SNAPSHOT: Tigress T-11 was hardly a year old when her mother died. She was collared and released into the wild in 2016. In June 2017, she gave birth to three cubs
50 Number of tiger reserves in India, constituting about 2% of the country's geographical area
22% of tiger deaths from 2012-17 were due to poaching
Source: Parliament Question Hour
On the prowl: Picture taken a few months ago shows tigers in Tadoba Andhari Tiger Reserve in Maharashtra. K.K. DEEPAK

CONCLUSION

Project Tiger has been undertaken by more than fifty national parks, and every park is putting an equal effort to save the endangered species. Increasing four thousand tigers in the past few years in one of the landmark achievement of the project. Humans have stopped hunting and illegal trading of tiger skin to a very large extent. The project has made sure that tigers do not have to suffer because of selfish human needs. All the other animals that were depleting because of human interference has stopped. The national parks are taking initiatives to save and conserve every animal.

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SEMESTER II

CU REGISTRATION NO.:

223-1211-0204-20

CU ROLL NO.:

202223-11-0109

COLLEGE ROLL NO.:

PLSA20F683

SUBJECT:

ENVS

: ACKNOWLEDGEMENT :

In this project report, we studied and analyzed present scenario of environmental pollution, awareness and scope of beautification and conservation going hand-in-hand. The experience was a very rich one. I got to know about the reality at the grassroots level and was also able to identify the problems through which we identified and studied about industry and non-industry practices to curb and control environmental pollution.

I would like to thank my teachers for giving us the opportunity to work on this project. Without your guidance and support this project would not have been possible. Further I would like to thank my friends who helped me in completing my assignment.

Lastly sincere gratitude to my college, i.e., Scottish Church College and the university for inclusion of our day to day life topics and learning opportunities.

POLLUTION

Pollution is the introduction of harmful materials into the environment. These harmful materials are called the pollutants. Pollutants can be natural, such as volcanic ash. They can also be created by human activity, such as trash or runoff by factories. Pollutants damage the quality of air, water, and land.

Pollution is a global problem. Although urban areas are usually more polluted than the countryside, pollution can spread to remote places where no people live. For example, pesticides and other chemicals have been found in the Antarctic ice sheet. In the middle of the northern Pacific Ocean, a huge collection of microscopic plastic particles forms what is known as the Great Pacific Garbage Patch.

TYPES OF POLLUTION IN INDIA:

- AIR POLLUTION
- WATER POLLUTION

- LAND POLLUTION
- NOISE POLLUTION

AIR POLLUTION:

Air Pollution in India is a serious health issue. Of the 30 most polluted cities in the world, 21 were in India in 2019. As per a study based on 2016 data, at least 140 million people in India breathe air that is 10 times or more over the WHO safe limit and 13 of the world's 20 cities with the highest annual levels of air pollution are in India. The 51% of pollution is caused by the industrial pollution, 27% by vehicles, 17% by crop burning and 5% by fireworks. Air pollution contributes to the premature deaths of 2 million Indians every year. Emissions come from vehicles an industry, whereas in rural areas, much of the pollution stems from biomass burning for cooking and keeping warm. In autumn and spring months, large scale crop residue burning in agriculture fields – a cheaper alternative to mechanical tilling –

is a major source of smoke, smog and particulate pollution. India has a low per capita emissions of greenhouse gases but the country as a whole is the third largest greenhouse gas producer after China and the United States. A 2013 study on non-smokers has found that Indians have 30%weaker lung function than Europeans.

The Air (Prevention and Control of Pollution) Act was passed in 1981 to regulate air pollution but has failed to reduce pollution because of poor enforcement of the rules.

In 2015, Government of India, together with IIT Kanpur launched the National Air Quality Index. In 2019, India launched 'The National Clean Air Programme' with tentative national target of 20% - 30% reduction in PM 2.5 and PM 10 concentrations by 2024, considering 2017 as the base year for comparison.

WATER POLLUTION:

Water Pollution is a major environmental issue in India. The largest source of water pollution in India is untreated sewage. Other sources of pollution include agricultural runoff and unregulated small-scale industry. Most rivers, lakes and surface water in India are polluted due to industries, untreated sewage and solid waste.

Water conservation in India is gaining pace. The Ganga rejuvenation efforts by the union government, the Yamuna clean-up are some of the government-initiated efforts. The Chennai River Restoration trust's efforts to clean the Cooum, Adyar rivers in Chennai and civil society efforts spearheaded by organizations like Environmentalist Foundation of India (E.F.I) to clean lakes and ponds in the country are seen as significant development towards wter conservation

THE GANGES:

More than 500 million people live along the Ganges River. An estimated 2,000,000 persons ritually bath daily in the river, which is considered holy by Hindus. Ganges river pollution is a major health risk.

NRGBA was established by the Central Government of India, on 20 February 2009 under Section 3(3) of the Environment Protection Act,1986. It also declared Ganges as the "National River" of India. The chair includes the Prime Minister of India and Chief Ministers of states through which the Ganges flows.

THE YAMUNA:

By an estimate by 2012, Delhi's sacred Yamuna River contained 7,500 coliform bacteria per 100cc of water. A number of NGOs, pressure groups, eco-clubs, as well as citizens' movements, have been active in their task to clean the river.

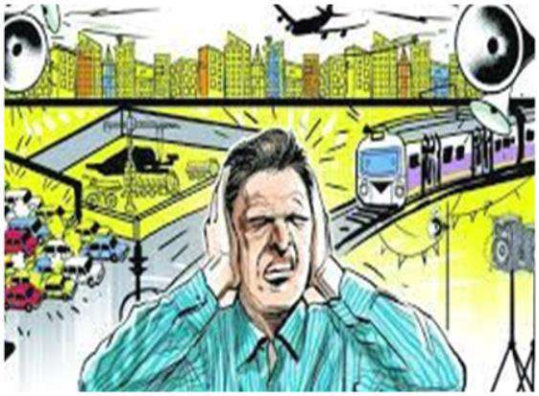
Even though India revised its National Water Policy in 2002 to encourage community participation and decentralize water management, the country's complex bureaucracy ensures that it remains a "mere statement of intent". Responsibility for managing water issues is fragmented among a dozen different ministries and departments without any coordination. The government bureaucracy and state-run project department has failed to solve the problem, despite having spent many years and $140 million on this project.

LAND POLLUTION:

Soil pollution can be defined as the addition of substances to the soil, which adversely affect physical, chemical and biological properties of soil and reduces its productivity. Soil constitutes the upper crust of the earth which supports land plants and animals. Like air and water, soil also gets polluted. The process of soil formation is very slow; therefore, the soil may be considered as non-renewable resource. This makes the problem of soil pollution.

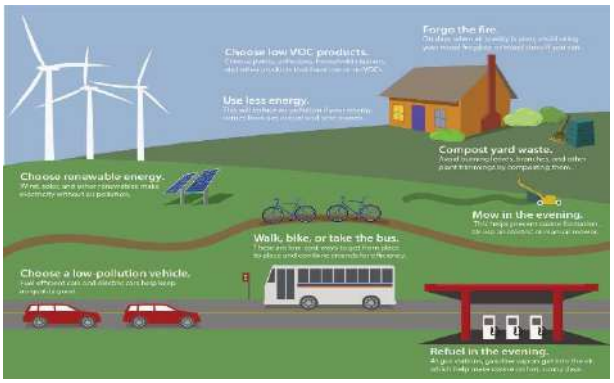
NOISE POLLUTION:

Noise is an environmental phenomenon. Noise, commonly defined as unwanted sound, can interfere with work, rest, recreation and sleep. We are exposed to noise throughout our life. It is not only a nuisance but also a threat to our health.



HOW TO REDUCE:

AIR POLLUTION:



1. USING PUBLIC TRANSPORT
2. RECYCLE AND REUSE
3. NO TO PLASTIC BAGS
4. REDUCTION OF FOREST FIRES AND SMOKING
5. USE FILTERS FOR CHIMNEY
6. AVOID USAGE OF CRACKERS
7. AVOID USING OF PRODUCTS WITH CHEMICALS
8. IMPLEMENT AFFORESTATION

WATER POLLUTION:

1. *Pick up litter and throw it away in a garbage can.*
2. *Blow or sweep fertilizer back onto the grass if it gets onto paved areas. Don't put fertilizer on the grass right before it rains. The chemicals will wash into storm drains and waterways.*

3. *Mulch or compost grass or yard waste. Or, leave it in your yard if you can't compost. Don't blow leaves into the street. This clogs and damages storm drains.*
4. *Wash your car or outdoor equipment where it can flow to a gravel or grassy area instead of a street.*
5. *Don't pour your motor oil down the storm drain. Take it to the nearest auto parts store.*
6. *Never clean up a spill by hosing it into a storm drain. Place kitty litter, sand, or another absorbent on the spill. Once the liquid becomes solid – sweep it up a throw it in a garbage can.*

➢ LAND POLLUTION:

1. *4R's to control land pollution – Reduce, Reuse, Recycle and Remove.*
2. *Reforestation and afforestation should be practiced.*
3. *Farmers should use organic fertilizers, adopt integrated pest management strategy, and practice crop rotation.*
4. *Proper disposal of industrial waste.*

➢ NOISE POLLUTION:

1. *Shut the door when using noisy machines.*
2. *Use earplugs.*

3. *Lower the volume.*
4. *Follow the limits of noise level.*
5. *Go green by planting trees.*

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C.U. Registration No:- 223-1211-0205-20

C.U. Roll No- 202223-11-0110

College No- PLSA20F684

Subject - ENVS

Topic - ENVIROMENTAL MOVEMENTS

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I would like to express my sincere thanks to Dr. Susmita Gonsalves, for her valuable guidance and support in completing my project.

I would also like to express my gratitude towards our principal Dr. Madhumanjari Mandal for giving me this great opportunity to do a project on Environmental Movements. Without their support and suggestions, this project would not have been completed.

Krisha Santra

"What we are doing to the forests of the world is but a mirror reflection of what we are doing to ourselves and to one another"

Mahatma Gandhi

ENVIROMENTAL MOVEMENTS

IN

(India)

-: CONTENT :-

⇒ Environmental and ecological movement are among the important examples of the collective actions of several social groups. Protection and recognition of constitutional and democratic rights, which are not defined by law but form an important part of the day to day living of the subaltern masses like the control over their resources, the right of people to preserve their culture, protection of environment and maintenance of ecological balance are significant concern of these movements, as they affect the human life to a great extent.

Though legislations and regulations are the foundations of most environmental protection policies, the global nature of resources and pollution make international legislations and convention essential. Public interest Litigations and People's Movement have also played very important role in environmental protection.

BISHNOI MOVEMENT

⇒ The Bishnois are considered as the first environmentalists of India. They are born nature lovers. They late The Bishnoi movement is not only one of the most important mov-ements in India but also a forerunner of all environmental movements such as Chipko Andolan.

*Movement: The movement took place almost 300 years ago when the Maharaja of Jodhpur Abhay singh wanted to build a new palace and for he needed some wood. Bishnois were living near the place but when they saw that the soilders began to cut the trees, a lady named Amrita Devi Bishnoi, stated hugging trees to save them. she refused to let the kingsmen cut the trees. Her head was severed. Seeing their mother lay down her life for the trees, her daughters clung to them. their heads were sever d too. Follow to them the neighboring village folk join with them. More than 300 people were killed for non obeisance and for trying to protect the trees.

When the King came to Know of this, he was ashamed of his mistake. He apologized to the Bishnoi community, Ordered to stop felling the trees and hunting of wild animals in Bishnoi areas and punished those who transgres-sed his orders.

Success ■ This sacrifice not only inspired the "ChipKo Andoloan" by Sunder Lal Bahuguna but also the Government of India in the form of "Amrita Devi Bishnoi Smrithi Paryavaran Award" for contributing to environ-ment conservation. In memory of all 363 Bishnois, Khejri trees were planted around the area which is still rich in flora and fauna, and every year, the Bishnois assemble there to remember the sacrifice made by their people in september on shukla Dashmi of Bhadrapad.

The love of Bishnois for nature has helped them survive the droughts of the Thar Desert.

A woman feed an orphaned fawn.

Amrita Devi protested against the King's men attempting to cut green trees as it is prohibited in Bishnoi religion.

CHIPKO MOVEMENT

Chipko movement, also called Chipko andolan, nonviolant social and ecological movement by rural villagers, particularly women, in India in the 1970s, aimed at protecting trees and forests slated for government-backed logging. The movement originated in the Himalayan region of Uttara Khand in 1973 and quickly spread throughout the Indian Himalayas. The Hindi word chipko means "to hug" or "to cling to" and reflects the demonstrators primary tactic of embracing trees to impede loggers.

Reason:- In the early 1973 the forest department refused to allot ash to the Dashauli Gram Swarajya Sangha, a local cooperative organisation based in chamoli districts, for making agricultural implements. On the other hand, the forest department allotted ash trees to a private company. This incident provoked the DGSS to fight against this injustice through lying down in front of timber trucks and burning resin and timber depots as was done in quit India movement. When these methods were found unsatisfactory, Chandi Prasad Bhatt - one of the leaders suggested of embracing the trees and thus 'Chipko' was born.

Leaders: Environmentalists like Chandi Prasad Bhatt and Sunderlal Bahuguna led the ChipKO Movement in Garhwal Himalayas. Gaura Devi, Head of the village Mahila Mangal Dal. Mobilized village woman for the movement when company men marched to cut the trees. It's slogan was —
— " What do the forest bear? Soil, water and pure air are the basis of life."

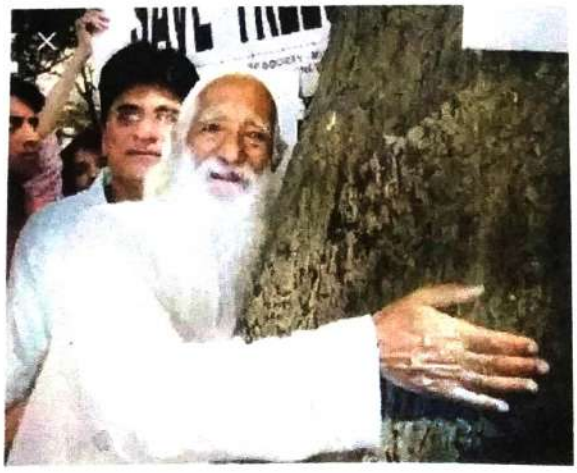
Success :- As a result of this struggle, the Government replaced the contractor system and formed Uttar Pradesh Forest Department Corporation and the forest related activities were encouraged through local cooperatives. In 1981, as a response to Bahuguna's indefinite fast, the Government constituted an eight member expert committee to prepare a comprehensive report on the Himalayan forest policy. The protests achived a major victory in 1980 with a 15 years ban on tree felling in the Himalayan forests of the state by the order of Mrs. Indira Gandhi.

Gaura Devi: Head of the village MMD.

Chipko Movement: one of the strongest movements to conserve forest in India. lead by women.

Founder of C.Andolan chandi Prasad Bhatt with Sunder Lal.

Participants of all woman.



Sunder Lal Bahuguna, Enlightened the country and out world about the movement, its success and environmental impacts.

SILENT VALLEY MOVEMENT

This movement is regarded as one of the most important ecological movements in India. Silent valley is the narrow of the Kunthi River in the state of Kerala in the south west of India at high elevation. Its 8950 hectares of rain forest is rich with valuable plants and animals. In 1973; the state government of Kerala decided to build a dam across the gorge in order to generate hydro electri-city. It would have drowned valuable forest and threatened the loss of wild life. Even the government's ecological task force expressed its dissatisfaction over the loss of forest and wild life.

Participants: By 1979, students, voluntary organization like Kerala Sastra Sahitya Parishad, Science forums, teachers, progressive citizens and journalists began to work against the project.

Success:- In 1979, save silent valley committee emerged. This hue and cry among all circles led the government headed by the then Prime Minister Mrs. Indira Gandhi, to set up a high-level technical committee chained by Prof. MGK Menon and accepted its recommendation that the project should not be proceeded with and that the valley should be preserved as a precious biosphere reserve

Silent valley is home to the largest population of lion-tailed macaque. they are the world's rarest and most threatened Primates

Silent valley

the Kuntipuzha is a mayor river flows 15 oelectrie.

NARMADA BACHAO ANDOLAN

The Sardar Sarovar Project aimed at construction of a massive dam on Narmada river in Maharashtra and Gujarat began in collaboration with world Bank in 1978. The Sardar Sarovar dam is one of the largest dams ever constructed. It consisted of more than 3000 major and minor dams with an outlay of approximately 25000 crore. The project was estimated to displace nearly one million people and submerge nearly 350,000 hectares of forestland and 200,000 hectares of cultivated land.

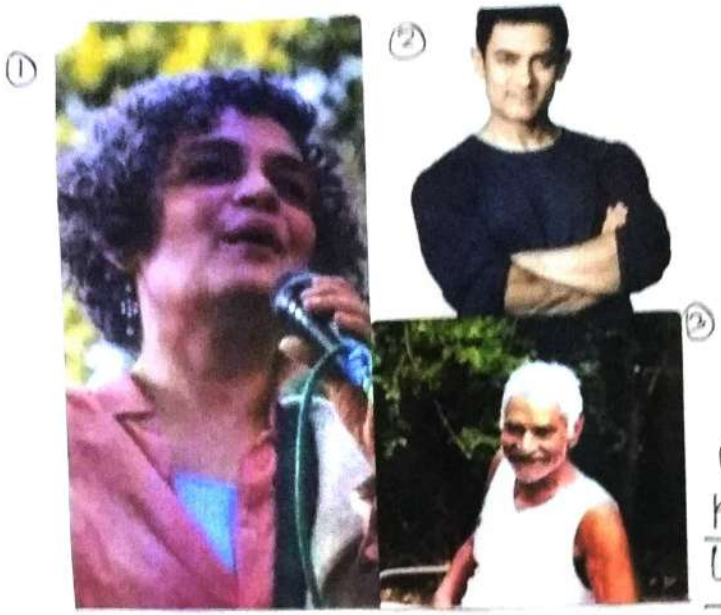
Movement:- By 1985, people from all sections of society started mass movement to save Narmada. The movement first started as a protest for not providing proper rehabilitation and resettlement for the people who have been displaced by the construction of Sardar sarovar Dam. Later on, the movement turned its focus on the preservation of the environment and the ecosystems of the valley, growth oriented development policies and traditional rights of forests.

Leaders:- The Narmada Bachao Andolan founded in 1989 and started under the leadership of Baba Amte, later lead by Medha Patkar and eminent Novelist Arundhuti Roy intensified the movement. They organized Jan Vikas Sangharsha Yatra in December, 1990 and around 6000 protesters marched from Rajgha, Madhya Pradesh to Gujarat.

Success:-

The environmental groups pressurized World Bank and the outcome of the pressure was that world Bank withdraw support from the project The environmental issue was taken into court and in October 2000, the SC gave r judgment approving the construction of the Sardar Sarovar Dam with a condition that height of the Dam could be raised to 90m. Which is higher than they demanded. Now the project is financed by the state goverment and expected to be completed by 2025.

Although not successful, as the dam could not be prerented, but this movement of Narmada Bachao Andolan has successfully constructed an anti-big dam belief in India and outside. It also successful to bring the question - "What is most important?"



① Arundhvati Roy ② Amir Khan ③ Baba Amte
Leaders of NBA

Narmada Bachao Andolan - People involved

Rally in Khandwa in November 2008

Conclusion :-

It is said that History is the true teacher, we must learn from it but as well said by Georg Wilhelm Friedrich Hegel that "History teaches us that man learns nothing from history" is also true and if it is not true, we need to learn from Bishnois and other environmentalists that environment is more important than our lives. We can not exist without nature. Protection and conservation of the environment must be our primary purpose in life. We even must be ready to die for nature and this how we can save our planet. They showed us the real path. They are our **real heros.**

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TITLE :ENVIROMENTAL POLLUTION

NAME :GOURI ROY

COLLEGE ROLL NO. : PLSA/HISG/ENGM

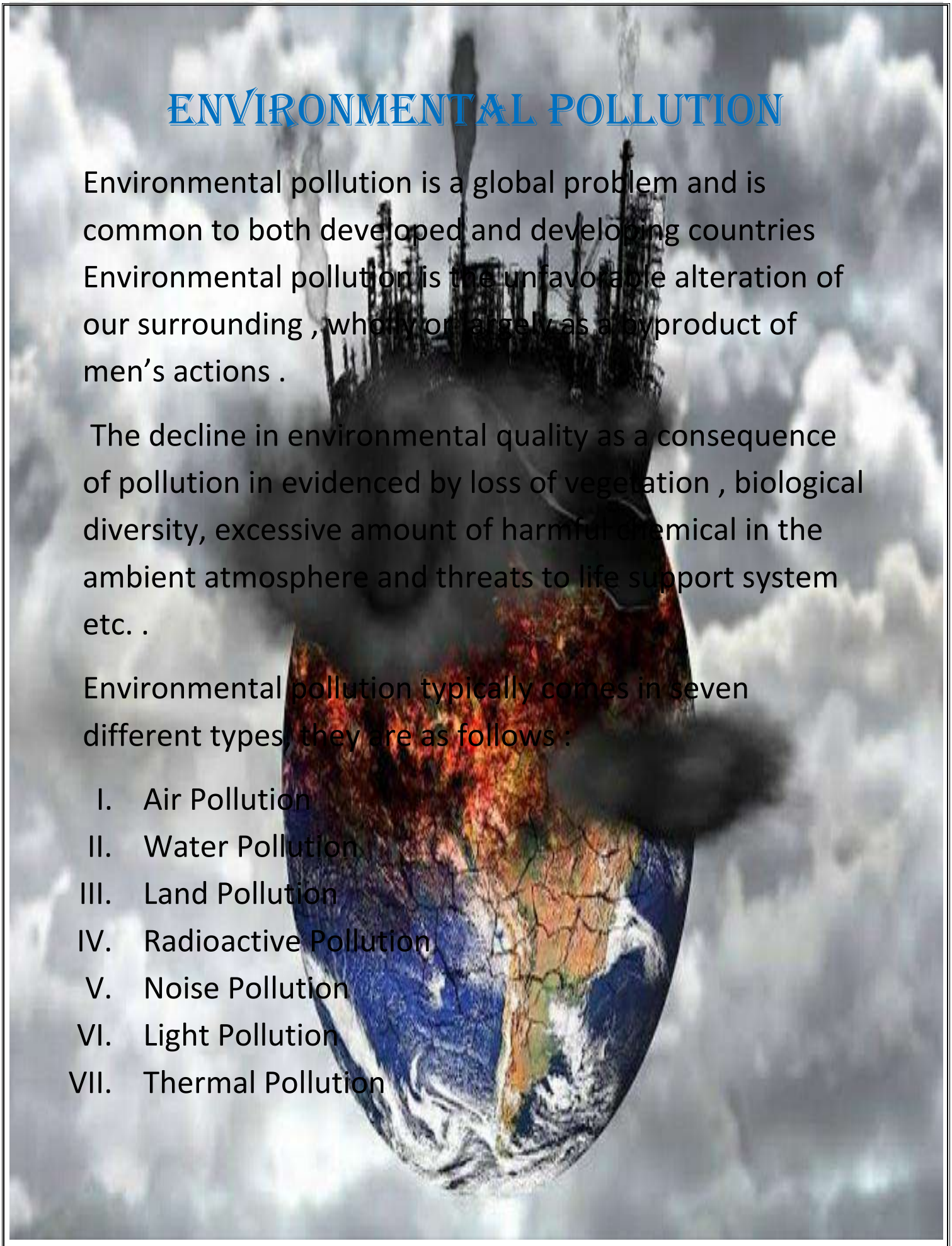
DEPARTMENT : PLSA/ HISG /ENGM

SUBJECT : AECC-2

SEMESTER : 2ND SEMESTER

CU ROLL NO. :202223_11_0116

REGISTRATION NO. :223_1212_0090_20



ENVIRONMENTAL POLLUTION

Environmental pollution is a global problem and is common to both developed and developing countries Environmental pollution is the unfavorable alteration of our surrounding , wholly or largely as a byproduct of men's actions .

The decline in environmental quality as a consequence of pollution in evidenced by loss of vegetation , biological diversity, excessive amount of harmful chemical in the ambient atmosphere and threats to life support system etc. .

Environmental pollution typically comes in seven different types, they are as follows :

I. Air Pollution
II. Water Pollution
III. Land Pollution
IV. Radioactive Pollution
V. Noise Pollution
VI. Light Pollution
VII. Thermal Pollution

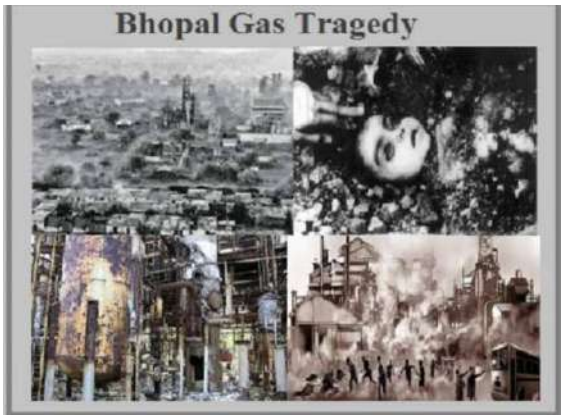
MAJOR POLLUTION

AIR POLLUTION

Air pollution is when noxious gases and chemical gets added in the air, which are detrimental to human health.

SOURCES OF AIR POLLUTION

Sources includes burning of fossil fuel, industries and coal based electric power plants. Burning of crops, waste and garbage. Construction of buildings add large amount of suspended particles which cause air pollution.



Example: The Bhopal Gas Tragedy of 1984.

EFFECTS OF AIR POLLUTION

Air pollution has direct and indirect impact on life in different manners full stop air pollutants includes both points source and non point source pollution.

These pollutants can go up in the atmosphere and infect our clouds creating acid rain, or they can just hang out like smog does and make it harder for people to breathe.

Some other effect of air pollution are mentioned below: it can also cause headaches, dizziness and nausea. Air pollution can also cause long term damage to people's nerves, brain, kidney, liver and other organs.

Global warming is a direct consequence of the greenhouse effect which is produced by the high emission of carbon dioxide into the atmosphere produced by factories automobiles etc.

CONTROLLING MEASURES

Controlling emissions related to transportation can include emission control on vehicles as well as use cleaner fuels.

Economic incentives such as emission trading , banking and emission cap can be used.

Planting more and more tress to increase the amount of fresh air to the surrounding.

WATER POLLUTION

Human need water to survive. That is a fact . However, trash and chemical can get thrown into the ocean and lake. This called water pollution.

CAUSES OF WATER POLLUTION

Water pollution can be caused through natural or human activities, they are as follows,

Natural cause of water pollution includes algae blooms and volcanos .

Leaking sewer lines may add trihalomethanes as well as other contaminants into ground ending up contaminating surface water.

Agriculture runoff carry fertilizers pesticides insecticides and other pollutants into water bodies like ponds , lakes.

However man also cause water pollution through trash and waste water from factories.

EFFECTS

Not only effect fish and other marine life and human life but also have a devastating effects on the water cycle. Marine ecosystems are also threatened by marine debris, which can strangle, suffocates and starve animals.

Waterborne pathogens, in the form of diseases causing bacteria and viruses from human and animals are major cause of illness from contaminated drinking water.

CONTROL MEASURE OF WATER POLLUTION

Treatment of sewage waste before discharging into water bodies to reduce toxicity .some chemical methods helps in controlling it are precipitation , the ion exchange process, reverse osmosis, reusing, reducing and reuse etc.

LAND POLLUTION

Land pollution happens when the soil gets contaminated by fertilizers and chemical being dumped.

SOURCE

Increase in the urbanization contribute to land pollution as construction uses forest lands, which led to exploitation and destruction of forests.

While waste collected from house offices and industries are thrown away not disposed properly can decrease the quality of the soil.

Besides domestic waste, pesticides used by farmer to increase crops yields also pollutes the land when they are washed into the soil.

EFFECT OF WATER POLLUTION

It can seriously disrupts the balance of nature and in extreme cases can cause human fatalities.

Vegetation that provides food and shelter is destroyed. Exterminates wild life etc. The pollution can seeps into the ground water or run into lakes and streams creating a vicious pollution cycle etc..

CONTROL OF LAND POLLUTION

a. Proper garbage disposal
b. Recycle of garbage
c. Reduce use of pesticides
d. Avoid over packaged items , etc.

NOISE POLLUTION

Noise pollution is caused by loud noises that can hurt the human ears.

SOURCES OF NOISE POLLUTION

Industrialisation had led to an increase in noise pollution as the use of heavy machinery are used produces unwanted noise.

Increased number of vehicles in the roads has led to noise pollution.

Events like weeding , festivals any form of public gathering involve loudspeaker to play music resulting in the production of unwanted noises.

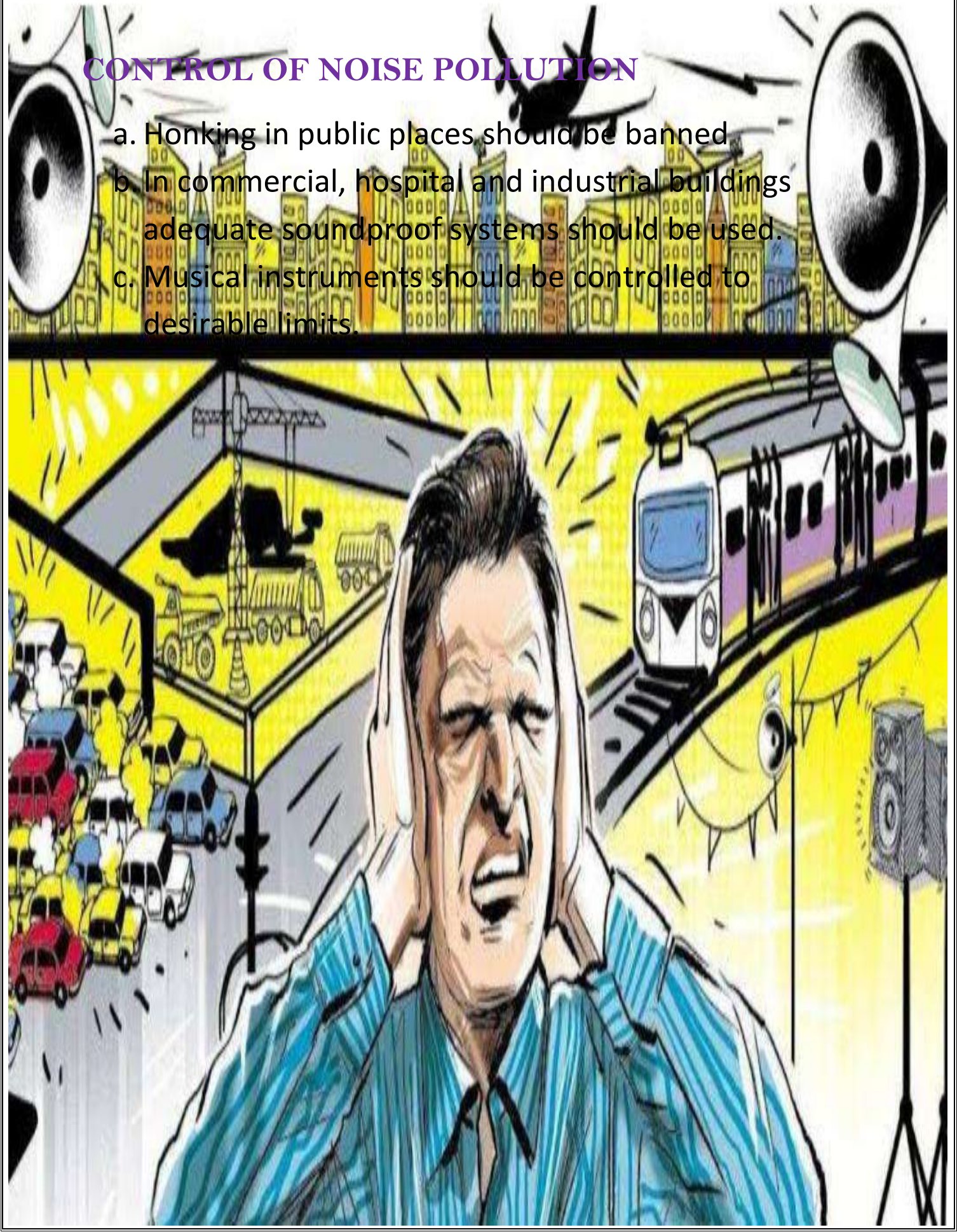
EFFECTS OF NOISE POLLUTION

Hypertension is a direct results of noise pollution which is

Some other effects of noise pollution are as follows, hearing loss , sleeping disorder, cardiovascular issues , nerves irritation etc.

CONTROL OF NOISE POLLUTION

a. Honking in public places should be banned
b. In commercial, hospital and industrial buildings adequate soundproof systems should be used.
c. Musical instruments should be controlled to desirable limits.



CONCLUSION

It is the responsibility of everyone to protect our environment. So, lets us fulfill our responsibilities towards our environment protection, creating a quality ecological environment and sharing wonderful green living together.

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MARINE POLLUTION

PAPER- AECC2

DEPARTMENT- POLITICAL SCIENCE [HONS.]

SEMESTER-2ND

CU. ROLL NUMER-202223-11-0117

CU.REGISTRATION NUMBER-223-1212-0093-20

COLLEGE ROLL NUMBER-PLSA20F648

COLLEGE NAME- SCOTTISH CHURCH COLLEGE

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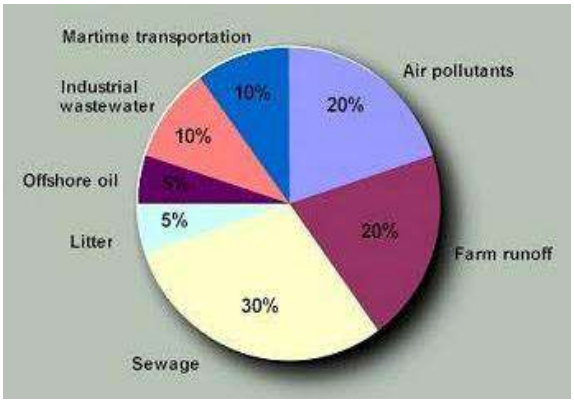
I would like to make a heartfelt thanks to my teacher, SUSHMITA GONSALVES ,for making me understand each n every topic accurately and patiently and giving us the golden opportunity to do this wonderful project work on ‘MARINE POLLUTION’ which also helped me in doing a lot of research and I came to know so many things. I would also like to thank my friends and batch mates who helped me in completing this project. I am really thankful to all of you.

MARINE POLLUTION

One of the ecosystems where the impact of mankind has been felt severely, is the marine world. For a long time man has felt that the oceans were so vast and so full o life , that they could not be depleted, and that they could tolerate whatever level of pollution we would throw at them. Nothing was less true, as we can see now, mankind has managed to deplete a large percentage of the fish population and has marked a number of the largest mammals on the planet fir extinction. Marine pollution can be defined as the introduction of substances to the marine environment directly or indirectly by man resulting in adverse effects such as hazards to human health obstruction of marine activities and lowering the quality of sea water.

Worldwide seas and oceans aril e under threat where recent accidental oil spills, such as the ERIKA tragedy, EMARALD in Israel, ENNORE OIL SPIL in India, these accidents, have jeopardized the marine environment, causing both immediate and long –term damage to coastal and marine habitats and ecosystem. The tragedy in Alaska (December 2004) demonstrate the permanence of such phenomena.



[Fig.1- pollutants entering oceans]

SOME MAJOR CAUSES OF MARINE POLLUTION:- While the causes of marine pollution may be similar to general water pollution there are some very specific causes that pollute marine waters. Here are some points mentioned-

- The most obvious inputs of waste is through pipes directly discharging waste into the sea. Very often municipal waste and sewage from residences and hotels in coastal towns are directly discharged into the sea.
- Pesticides and fertilizers from agricultural which are washed off the land by rain enter water courses and eventually reach the sea.
- Petroleum and oils washed off from the roads normally enter the sewage system but storm water overflows carry these materials into rivers and eventually into the seas.
- Offshore oil exploration and extraction also pollute the seawater to a large extent.
- People in rural parts using rivers, ponds as their daily place of bathing, washing clothes utensils, and also cleaning their cattle there and those water bodies are emerging in the sea.
- Dumping of daily wastages in these rivers and making a pile of it is a problem for rivers as well as seas.

[Fig.2- wastages on river side]

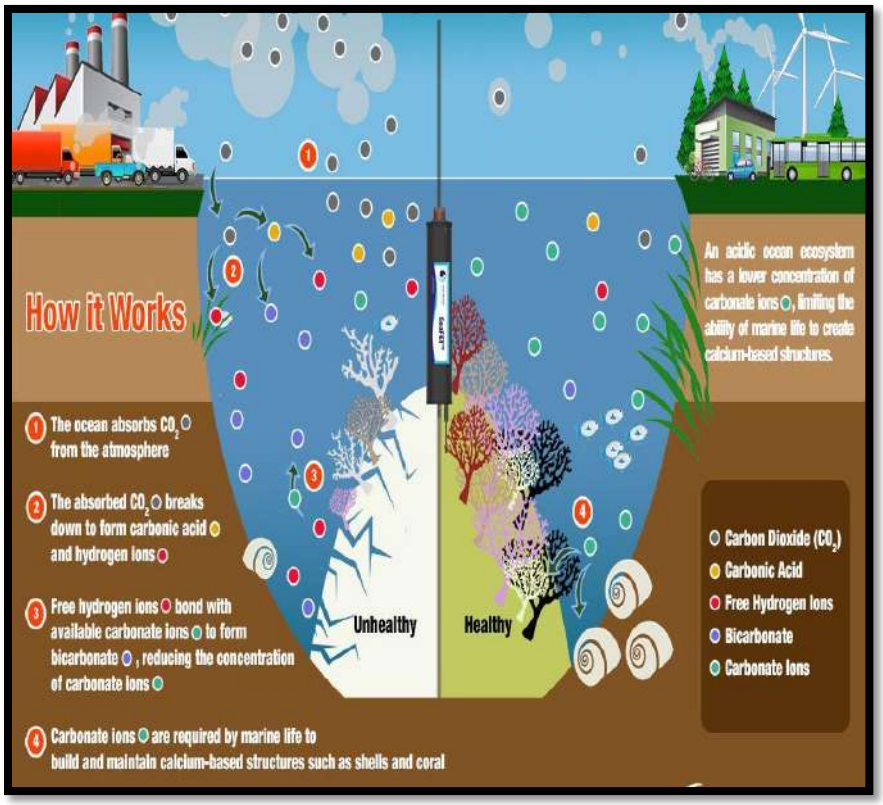
There are some more severe reasons of the pollution of marine ecosystem as following-

OIL SPILLS AS A POISON FOR MARINE HABITATS - Oil spill is a discharge of oil in the sea by the ship carrying crude oils, petroleum. Oil pollution of the sea normally attracts the greatest attention because of its visibility. Analysis of SAR images has shown that the seas are most heavily polluted along the main shipping routes and that oil spill depends on wind and most often caused by accidents involving tankers, barges, pipelines. It has its own process of cleaning and restoration. Depending on circumstances, oil spills can be very harmful to marine birds, sea turtles and mammal, and can also harm fish and shellfish. Some major oil spills in history are ATLANTIC EMPRESS 1979,CASTLLO DE BELLVER 1983 etc.

[Fig.3- oil spill disaster in Mauritius]

NUCLEAR WASTE AND GLOBAL WARMING:- Some years ago 13 countries used ocean dumping as a method to dispose of nuclear/ radioactive waste. Radiation caused by certain industries contaminates kelp and plankton which is a basic element in many animals diet consequently leading to endangering some species of marine life. Radiation in Japan Sea has created a global risk for all in some passing years.

As greenhouse gases trap more energy from the sun, the oceans are absorbing more hear, resulting in an increase in sea surface temperatures and rising sea level, increased ocean acidity makes it more difficult for certain organisms, snuch as corals and shellfish ,to build their skeletons an shells.



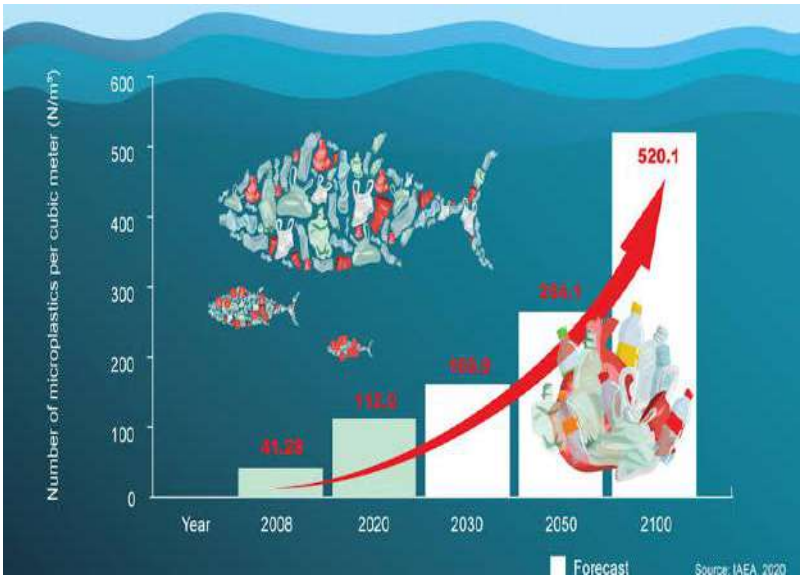
[Fig.4- Acidification of coral reefs]

Pollution from ship yards, ship scraps, plastic and debris are some more major reasons for the increasing ocean pollution and playing a harsh role in endangering the marine life.

PRESENT COVID-19 SCENARIO AND EFFECTS ON THE MARINE LIFE

Amid the covid-19 pandemic the earth is getting ready to face another disaster. This part is enlightenment above one of the major cause of ocean pollution regarding plastic and micro plastic caused pollution during pandemic. Plastic pollution already exists on the earth but in the period of one year this is emerging as a threat for the earth. According to the Hong Kong-based NGO Oceans Asia, approximately 300 million tons of plastic is produced worldwide every year, with more than 8 million entering oceans. The use of face mask, personal protective equipment kits, and vinyl and latex gloves has reached at its peak as they are saviors for people in such pandemic. But the problem begins with the inappropriate disposal of these covid-19 wastes they are getting usually disposed in sea water. All these equipments mend from polycarbonate and due to its inability of degradation it has a longer life span. Beaches in France and Hongkong are witnessing disposal of covid-19 wastes. This is like adding fuel in fire. It is so far causing Marine Life a big loss. Whales, turtles, sharks and so many big fishes are getting trapped in it or by mistake they eat this which is causing their death. With some present data and in formations scientists are calling for a wake. Micro plastics that are taken up by marine life can accumulate in toxicity and create adverse health effects as they move through the food chain. This occurs through a process known as biomagnifications.

[Fig.5- used face masks found on the beach of France] **[Fig.6- used masks around turtle]**



[Fig.7-microplastics abundance in eastern tropical Pacific]

MEASURES THAT SHOULD BE TAKEN:- Images of floating trash islands, giant accumulations of plastic larger than entire countries, are becoming painfully familiar these days. Our seas and oceans have increasingly become repositories for millions of tons of pollutants, with subsequent severe environmental, health, social, and economic impacts. Here a are some steps can help in reducing these pollutants –

1. Reduction in use of single use plastic – like some other small countries every country should contribute in this step by banning its use and going towards eco friendly baggage.
2. Control over industrial wastage- High skilled team of researchers should come forward to make them aware of proper and complete disposal of the wastage.
3. Strengthening laws on sea litter- regulations and acts should be created for controlling these dangerous disposal of chemicals and plastic wastage
4. Development of technology- to warn ships about the quantity and carrying power of oils in ship or in case of spills control it more faster

5. Make people aware- this is the most important part can be played by each and every human being to be aware and make others aware about proper disposal of litters.

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AECC PROJECT ON ENVS

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WATERSHED MANAGEMENT

Watershed management is the process of guiding and organizing the use of land and other resources in a watershed to provide desired goods and services without adversely affecting soil and water resources. Each project under the programme is a micro-level effort to achieve this objective by treating the under productive or unproductive land and taking up allied activities for the benefit of the landless. The programmes adopt a common strategy of multi resource management involving all stakeholders within the watershed who, together as a group, co-operatively identify the resource issues and concerns of the watershed plan with solutions that are environmentally, socially and economically sustainable.

OBJECTIVES OF WATERSHED MANAGEMENT

Watershed management is an attempt to halt land degradation and a holistic process for getting maximum production out of land. Watershed management implies rational utilization of land and water resources for optimum and sustained production, with the minimum of hazard to natural resources. With a bit of acumen and proper judgement, the rain water can be made to move down the slopes slowly, ensuring optimum infiltration and percolation, automatically solving the problem of soil erosion. Reducing the impact of the rain on the soil, checking its speed at various intervals, taking up all operations on the contour and diverting the excess to prevent the, pressure, are some of the procedures one could adopt; a process that starts at the highest point of the watershed and ends right down in the lower part.

WATERSHED MANAGEMENT PROGRAMMES IN INDIA

To accelerate the pace of development of wastelands/degraded lands the Government had set up the National Wasteland Development Board in 1985 under the Ministry of Environment and Forests. Later a separate Department of Wasteland Development in the Ministry of Rural Development and Poverty Alleviation was created in 1992 and the National Wastelands Development Board was transferred to it. In April 1999, Department of Wastelands Development was renamed as the Department of Land Resources to act as the nodal agency for land resource management.

Consequently, all land-based development programmes and the Land Reforms Division were brought under this department. Drought Prone Areas Programme (DPAP), Desert Development Programme (DDP) and Integrated Wastelands Development Programme (IWDP) were the watershed management programmes implemented by the department.

Later for optimum use of resources, sustainable outcomes and integrated planning, DPAP, DDP and IWDP were consolidates as the Watershed Development Component of Prime Minister Krishi Sinchayee Yojna (WDC-PMKSY).

Prime Minister Krishi Sinchayee Yojna (Watershed Management Development Component) (WDC-PMKSY)

The main objective of the WDC-PKMSY are to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil vegetative cover and water. The outcomes are prevention of soil erosion, regeneration of natural vegetation, rain water harvesting and recharging of the ground water table. This enables multi-cropping and the introduction of diverse agro-based activities, which help to provide sustainable livelihood to the people residing in the watershed area.

Neeranchal is a World Bank assisted National Watershed Management Project. Neeranchal is designed to further strengthen and provide technical assistance to the Watershed Component of PKMSY, in general, to enhance its delivery capacity. The programme is being implemented in nine participating states- Andhra Pradesh, Chattishgarh, Gujarat, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan and Telangana. For achieving the major adjectives of the Watershed Component of the Pradhan Mantri Krishi Sinchayi Yojana (PKMSY) and for ensuring access to irrigation to every farm (HAR KHET KO PANI) and efficient use of water (PER DROP MORE CROP), Neeranchal is primarily designed to address the following concerns:

*bring about institutional changes in watershed and rain fed agricultural management practices in India

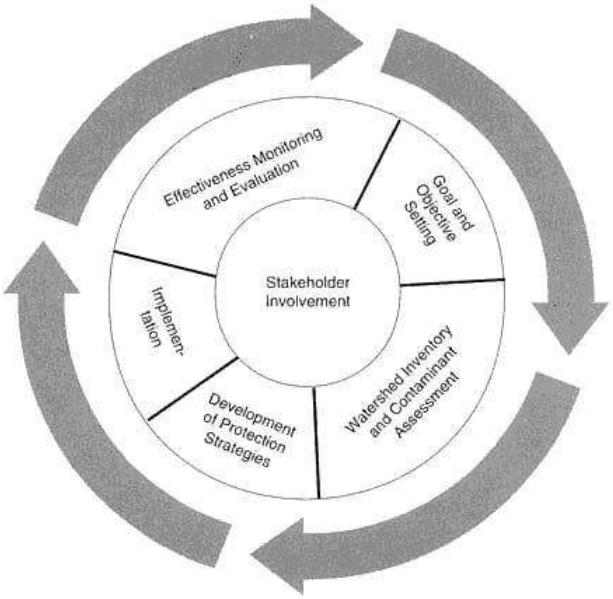
*device strategies for the sustainability of improved watershed. Management practices in programme areas, even after the withdrawal of project support.

*through the watershed plus approach, support improved equity, livelihoods, and incomes through forward linkages, on a platform of inclusiveness and local participation.

The World Banks's watershed management projects in Himachal Pradesh, Uttarakhand, and Karnataka are recognized as some of the leading examples for integrated watershed management in arid zones, rain fed lowlands, and higher elevation sites. These projects combine participatory micro watershed planning for soil and water conservation with broader livelihood support programs. Forests are a major part of these projects, both with traditional plantations and horticulture on both private and common lands. Total spending on forestry-related programs represents about 30% of the total project budgets. Each project has developed a range of innovative practices that could inform not only large centrally-financed government schemes in India, but also Bank-financed watershed programs in other countries.

ENVIRONMENT LAW

Environmental laws often dictate the planning and actions that agencies take to manage watersheds. Some laws require that planning be done, others can be used to make a plan legally enforceable and others set out the ground rules for what can and cannot be done in development and planning. Most countries and states have their own laws regarding watershed management. Those concerned about aquatic habitat protection have a right to participate in the laws and planning processes that affect aquatic habitats. By having a clear understanding of whom to speak to and how to present the case for keeping our waterways clean a member of the public can become an effective watershed protection advocate.



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ENVS PROJECT.

DEPARTMENT OF POLITICAL SCIENCE
C.U. ROLL NUMBER: 202223-11-0125
C.U REGN NUMBER: 223-1213-0107-20
COLLEGE ROLL NUMBER: PLSA20F652.

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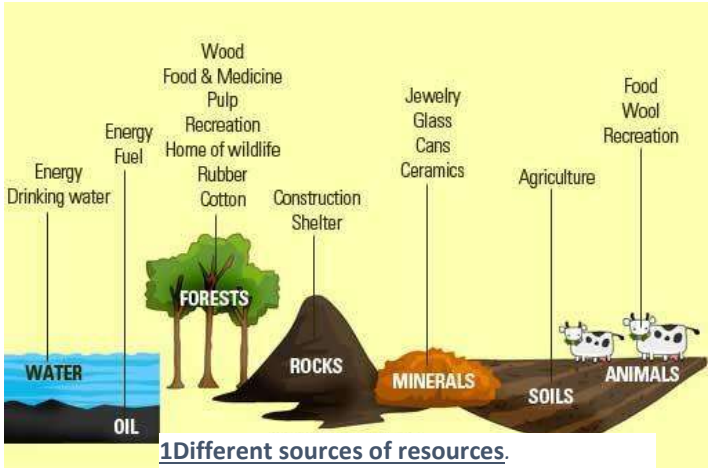
I would like to express my heartfelt gratitude to the University and the College for giving us an opportunity to study such an essential discipline. I would like to thank my teachers for giving us this project, it has increased my awareness about the environment and has helped me acquire habits which positively impact and are favorable for the environment.

NATURAL RESOURCES AND SUSTAINABILITY

Our environment provides us with a variety of goods and services necessary for our day to day lives. These naturally occurring resources include air, water, soil, minerals along with climate and solar energy, which form the non-living 'abiotic' part of nature. The 'biotic' or living parts of nature consists of plants and animals, including microbes. Plants and animals can only survive as communities of different organisms, all closely linked to each other in their own habitat, and requiring specific abiotic conditions. Thus, forests, grasslands, rivers, mountains, deserts, lakes and the marine environment all form habitats for specialized communities of plants and animals to live in. Interaction between abiotic aspects of nature and specific living organisms together form ecosystems of various types. Many of these living organisms are used as our food resources. Others are linked to our food less directly, such as pollinators and dispersers of plants, worms in the soil which recycle nutrients for plant growth and fungi and termites that break-up dead plant material so that micro-organisms can act on the detritus to reform soil nutrients. These natural resources can be classified into two categories: renewable and non- renewable resources. Renewable resources are those which can naturally regenerate themselves



1Different sources of resources.

after use, these include wind, water, natural vegetation, solar energy and animals. Non-renewable resources, on the other hand, cannot regenerate or they take too long to replenish. They exist in limited quantities. These include fossil fuels, crude oil, precious metals, minerals and rocks.

With an increase in human population, there has been a rise in the demand for natural resources and humans have started overutilization of these resources to meet the demands. Looking at the current situation, the indiscriminate use of modern resources is such that the possibilities of the succeeding generations and the developing nations having access to their fair share is very rare. Furthermore, the consequences are dreadful and the result on the environment will induce severe damages which go beyond the carrying capacity of the environment. We all have heard tales about earth's grim future as a result of the world's ecosystem being under increasing pressure to provide an expanding population with a supply of food, fiber and fuel.

However, with judicious utilization of these resources, we can sustain the resources for the future generation. Preservation and management of natural resources is important for maintaining community and sustainability.

2 **Examples of Natural Resources**

What are sustainable natural resources.

3 Unsustainable procurement of wood

For natural resources to be sustainable they have to meet two conditions

i) they should be renewable

ii) they should be managed properly.

For example, wood is a renewable resource because even though we cut down trees, more trees will grow. However, wood is not inherently a sustainable resource because many people and companies obtain wood in an irresponsible and non-sustainable way. If you cut down too many trees faster than they can grow, then wood is not being procured in a sustainable way. If the production plant waste materials pollute the air and contaminates the water, the wood produced ceases to be sustainable. Even though wood is natural and renewable, it has to be managed responsibly to be sustainable.

SUSTAINABLE MANAGEMENT OF RESOURCES.

We rely on natural resources to supply our basic needs ranging from food, shelter, Clothing, healthcare and energy. However, not much has been done to ensure the sustainability of these resources. In fact, we have not treated nature with the same kindness that it has served us with over the years. In order to ensure a sustainable society, we have to recognize the impacts of our lives on nature, the resources it offers and take necessary actions towards reducing the risks.

Researchers and scientists have been on the job to come up with measures for conserving a variety of the natural resources that are greatly threatened like water, soil, biodiversity and vegetation. Today, governments and agencies have also formulated policies towards the sustainable management of nature. Although the policies vary from one country to another, they generally focus on reducing the strain on natural resources. These policies focus on advocating for the use of recycled products, cutting down the rate of carbon emissions, protection of water bodies and forests.
Another important area of focus is the regulation of mining
activities to ensure that the resources are not depleted.

We can also help our environment by becoming responsible consumers. There are several ways in which we can practice sustainability at home.

1. reducing the use of plastic. Traditional plastics are derived from fossil
   fuels which is a non-renewable natural resource. To reduce plastic consumption we can:
   - Buy our food in bulk rather than individually wrapped items.
   - Bring our water bottle and reusable mug on the go – this avoids having to buy single-use bottles and cups.
2. Reduce electricity consumption. To lessen our electricity consumption, we can:

- Make sure that most of our electricity is renewable (such as from wind and solar energy). We can check how your home energy is produced by contacting your electricity provider.
- Turn off appliances and lights when they are not in use.
- Switch our incandescent light bulbs to LED bulbs as they are much more energy-efficient.

3. Try to buy second hand whenever possible. Thrift shopping articles of clothing is not only less expensive but also sustainable as they don't need an additional use resources. It is also a very trendy practice.

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ENVIRONMENTAL STUDIES

C.U ROLL NO- 202223-11-0129

C.U REGISTRATION NO-223-1241-0144-20

COLLEGE ROLL NO- PLSA20F666

DEPARTMENT POLITICAL SCIENCE HONOURS

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

GLOBAL WARMING

Global warming is a gradual increase in the earth' s temperature generally due to the greenhouse effect caused by increased levels of carbon dioxide, CFCs, and other pollutants. Global warming is the phenomenon of a gradual increase in the temperature near the earth' s surface. This phenomenon has been observed over the past one or two centuries. This change has disturbed the climatic pattern of the earth. However, the concept of global warming is quite controversial but the scientists have provided relevant data in support of the fact that the temperature of the earth is rising constantly. There are several causes of global warming, which have a negative effect on humans, plants and animals. These causes may be natural or might be the outcome of human activities. In order to curb the issues, it is very important to understand the negative impacts of global warming. The major cases of global warming are: deforestation, use of vehicles , chlorofluorocarbon , industrial development , over pollution etc. Plants are the main source of oxygen. They take in carbon dioxide and release oxygen thereby maintaining environmental balance. Forests are being depleted for many domestic and commercial purposes. This has led to an environmental imbalance, thereby giving rise to global warming. The use of vehicles, even for a very short distance results in various gaseous emissions. Vehicles burn fossil fuels which emit a large amount of carbon dioxide and other toxins into the atmosphere resulting in a temperature increase.

EFFECT OF GLOBAL WARMING

With the excessive use of air conditioners and refrigerators, humans have been adding CFCs into the environment which affects the atmospheric ozone layer. The ozone layer protects the earth surface from the harmful ultraviolet rays emitted by the sun. The CFCs has led to ozone layer depletion making way for the ultraviolet rays, thereby increasing the temperature of the earth. With the advent of industrialization, the temperature of the earth has been increasing rapidly. The harmful emissions from the factories add to the increasing temperature of the earth.. Increase in population means more people breathing. This leads to an increase in the level of carbon dioxide, the primary gas causing global warming, in the atmosphere. These are man made causes of global warming. There are also environmental cause of global warming. These are : volcanoes , watervapour , forest .

GLOBAL WARMING

largest natural contributors to global warming. The ash and smoke emitted during volcanic eruptions goes out into the atmosphere and affects the climate. Water vapour is a kind of greenhouse gas. Due to the increase in the earth' s temperature more water gets evaporated from the water bodies and stays in the atmosphere adding to global warming. Forest blazes or forest fires emit a large amount of carbon-containing smoke. These gases are released into the atmosphere and increase the earth' s temperature resulting in global warming. These are the causes of global warming. There are also the effect of global warming . They are: Rise in temperature , climate change , spread of diseases , loss of natural habit , etc. Global warming has led to an incredible increase in earth' s temperature This has resulted in an increase in the melting of glaciers, which have led to an increase in the sea level. This could have devastating effects on coastal regions. Global warming has led to a change in climatic conditions.

There are droughts at some places and floods at some. This climatic imbalance is the result of global warming. Global warming leads to a change in the patterns of heat and humidity. This has led to the movement of mosquitoes that carry and spread diseases This is yet another major impact of global warming on biodiversity. Air pollution occurs when the air contains gases, dust, smoke from fires, or fumes in harmful amounts. Tiny atmospheric particles - aerosols - are a subset of air pollution that are suspended in our atmosphere. Aerosol can be both solid and liquid. Most are produced by natural processes such as erupting volcanoes, and some are from human industrial and agricultural activities. These are the effects of global warming. We can stop global warming by planting more trees , create more sustainable

BEFORE AND AFTER GLOBAL WARMING

GLOBAL WARMING can be reduced by planting more trees, reducing air pollution ,drive less, recycle more, use less hot water. This incentives taken by all of us can protect our planet from global warming. **Global warming from anthropogenic GHG emissions could potentially impact the North Atlantic THC due to changes in temperature, precipitation, melt water, and circulation patterns.**

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NAME: ARUNDHATI ROY

COLLEGE ROLL NUMBER: PLSA20F641

DEPARTMENT: POLITICAL SCIENCE

CALCUTTA UNIVERSITY ROLL NUMBER: 202223-11-0132

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I would like to thank my teacher to give me this opportunity to work on this project and knowing more about the earth and the problems associated with the ever-rising pollution present in the world today.

ENVIRONMENTAL POLLUTION

Environmental pollution is described as "the contamination of the earth/atmosphere system's physical and biological components to the point where normal environmental processes are negatively affected."

TYPES OF ENVIRONMENTAL POLLUTION:

There are five different types of environment pollution:

a) AIR POLLUTION: The presence of compounds in the atmosphere that are damaging to human and other living beings' health, or that damage the climate or materials, is referred to as air pollution. Gases, particles, and biological molecules are just a few examples of air contaminants.

b) WATER POLLUTION: Water pollution occurs when water bodies become contaminated as a result of human activity. Lakes, rivers, oceans, aquifers, and groundwater are examples of water bodies. When toxins are introduced into the natural ecosystem, water contamination occurs.

c) LAND POLLUTION: Land pollution is defined as the dumping of solid or liquid waste materials on land or underground in such a way that they contaminate the soil and groundwater, endanger public health, and create ugly situations and nuisances.

d) RADIOACTIVE POLLUTION: The deposition or presence of radioactive chemicals on surfaces or within solids, liquids, or gases, if their presence is unexpected or undesirable, is referred to as radioactive contamination.

e) THERMAL POLLUTION: Thermal pollution, often known as "thermal enrichment," is the worsening of water quality caused by any process that alters the temperature of the surrounding water. The use of water

as a coolant by power plants and industrial enterprises is a common source of thermal pollution.

EFFECTS OF ENVIRONMENTAL POLLUTION ON HUMAN HEALTH

Perinatal disorders, infant mortality, respiratory diseases, allergies, malignancies, cardiovascular disorders, increased oxidative stress, endothelial dysfunction, mental disorders, and a variety of other detrimental effects are only a few of the many harmful effects of environmental pollution.

Though the short-term impacts of environmental pollutants are frequently addressed, the wide range of risks of air pollution beginning in childhood and their potential impact on chronic non-communicable diseases in adulthood should be emphasised.

Environmental particle exposure has been related to higher morbidity and death from a variety of diseases, organ

abnormalities, malignancies, and other chronic disorders, according to numerous studies.

As a result, now is the moment to act and reduce pollution. Otherwise, the ecosystem will be degraded by waste products from consumption, heating, agriculture, mining, manufacturing, transportation, and other human activities.

Different types of remedies should be considered based on the strength of scientific evidence about the negative health impacts of environmental pollution and the magnitude of their public health impact.

Public awareness, in addition to industrial aspects, should be raised in this regard. Similarly, health professionals have a unique ability to assist in the prevention and mitigation of negative environmental consequences, and this capability should be emphasised in their everyday practise.

This special issue focuses on expanding the breadth of research into the health impacts of contaminants in the air, water, and soil environments, as well as novel methods for measuring and removing them.

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MEASURES TAKEN BY THE GOVERNMENT

A lot of new measures have been taken by the municipality to curb environmental degradation and to manage solid waste:

The revised Solid Waste Management Rules (SWM), 2016, were recently announced by the Union Ministry of Environment, Forests and Climate Change (MoEF&CC). These will take the place of the Municipal Solid Wastes (Management and Handling) Rules, which have been in effect for 16 years.

The ministry previously announced plastic, e-waste, biomedical, hazardous, and construction and demolition waste management rules, as well as plastic, e-waste, biomedical, hazardous, and construction and demolition waste management standards.

The new rules now apply to urban agglomerations, census towns, notified industrial townships, areas under Indian Railways' control, airports, special economic zones, places of pilgrimage, religious and historical significance, and State and Central Government organisations, in addition to municipal areas.

The highlight of the SWM rules, 2016 were: segregation at source, collection and disposal of sanitary waste, collect back scheme for packaging waste, user fees for collection, waste processing and treatment, promoting use of compost, promotion of waste to energy, revision of parameters and existing standards, management of waste in hilly areas, etc.

CONCLUSION

Pollution's effects on the environment are seen in significant health problems. Many people suffer from respiratory problems, low immunity, kidney and lung malignancies, tumours, and other chronic illnesses. Both plant and fauna in the oceans are rapidly disappearing. The condition of the soil and the crops is deteriorating.

As a result of the world's environmental pollution and global warming, which had become a substantial problem, melting icebergs in Antarctica resulted in rising sea levels. Rising carbon pollution poses a risk of natural disasters such as earthquakes, cyclones, and other natural disasters. The Hiroshima-Nagasaki and Chernobyl disasters in Russia have irreversibly harmed humanity.

Different countries around the world are responding to these calamities in the most effective way possible. More public awareness campaigns are being established to educate people about the hazards of pollution and the importance of protecting our environment. Greener lifestyles are becoming increasingly popular; here are a few examples: Lights that use less energy, new climate-friendly autos, and the usage of wind and solar electricity

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SUBJECT: ENVS

TITLE: AIR POLLUTION

CONTENTS

FIG: Air Pollution.

INTRODUCTION

Pollution is the introduction of harmful materials into the environment. These harmful materials are called pollutants. Pollutants can be natural, such as volcanic ash. They can also be created by human activity, such as trash or runoff produced by factories. Pollutants damage the quality of air, water, and land.

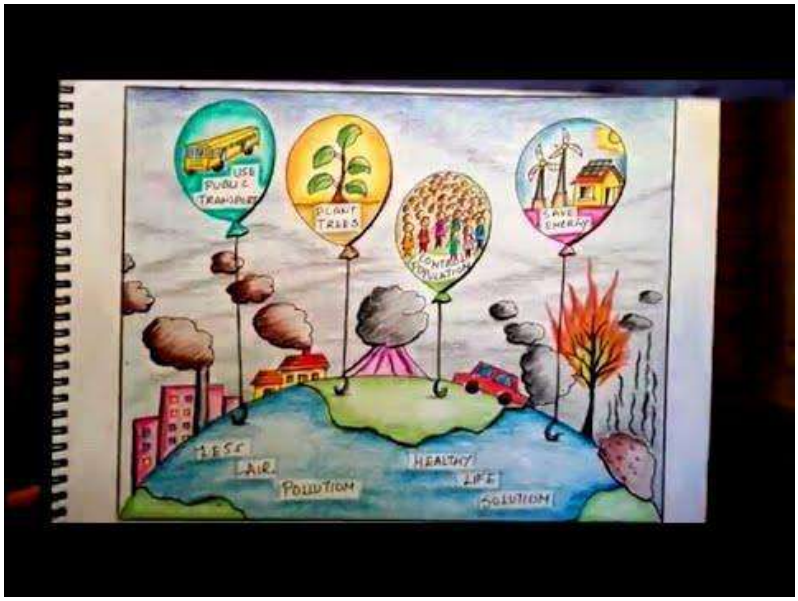

FIG: A poster depicting different kinds of pollution in our environment.

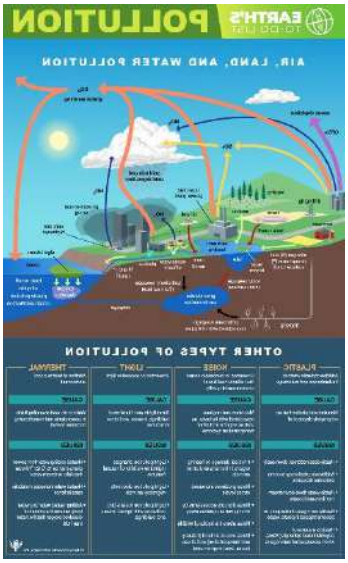

FIG: Pollution Flow

FIG: Excess garbage that leads to pollution.

AIR POLLUTION

Air pollution can be defined as an alteration of air quality that can be characterized by measurements of chemical, biological or physical pollutants in the air. Therefore, air pollution means the undesirable presence of impurities or the abnormal rise in the proportion of some constituents of the atmosphere. Air pollution is one of the biggest threats for the environment and affects everyone: humans, animals, crops, cities, forests, aquatic ecosystems.

FIG: This poster depicts the harmful gases that we inhale during pollution and how dangerous it is for us.

FIG: These figures show us the impact of poisonous material released in water or the toxic substances that get mixed due to air pollution.

CONTRIBUTES

Air pollution is caused by the presence in the atmosphere of toxic substances, mainly produced by human activities, even though sometimes it can result from natural phenomena such as volcanic eruptions, dust storms and wildfires, also depleting the air quality .

Manmade sources of **air pollution** sources are:

1.Combustion of fossil fuels, like coal and oil for electricity and road transport, producing air pollutants like nitrogen and sulphurdioxide.

2.Emissions from industries and factories, releasing large amount of carbon monoxide, hydrocarbon, chemicals and organic compounds into the air

3.Agricultural activities, due to the use of pesticides, insecticides, and fertilizers that emit harmful chemicals

4.Waste production, mostly because of methane generation in landfills.

FIG-1

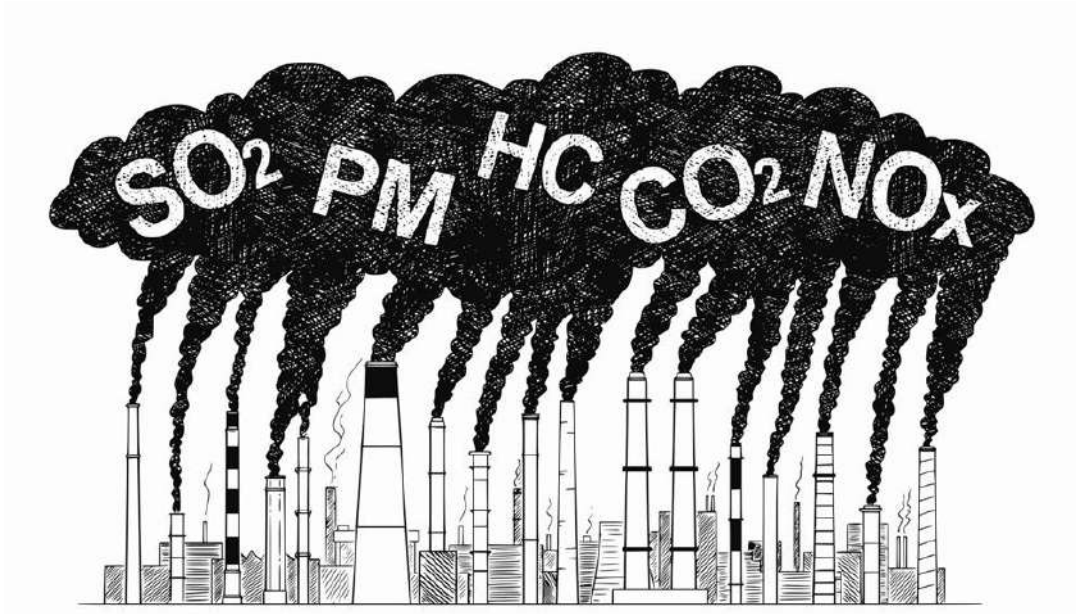

FIG-2: These figures explain how harmful toxic /substances are released in environment and cars and factories are major sources of air pollution.

FIG: Burning plastic leads to Air pollution.

FIG: Burning of field, using pesticide, etc that leads to air pollution.

Natural sources of air pollution are:

- Volcanic eruptions
- Windblown dust
- Sea-Salt Spray
- Emissions of volatile Organic compounds from Plants

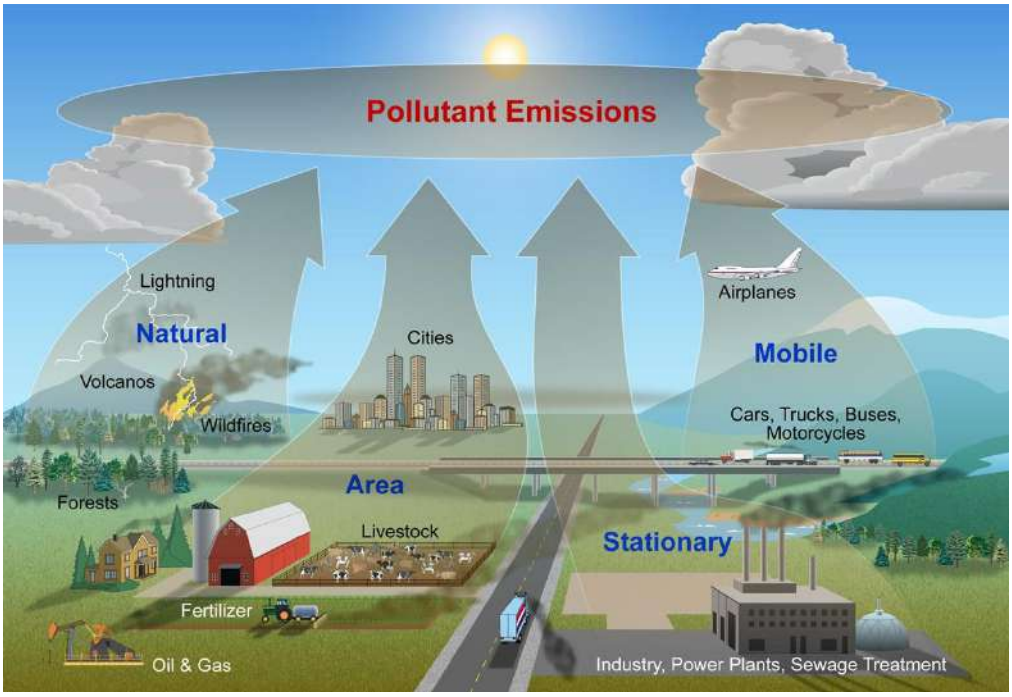

FIG: This diagram represents how do different natural and man-made components are responsible for Air pollution. In this diagram we can see all the sources together that leads to air pollution which is the major reason of environmental degradation.

EFFECTS OF AIR POLLUTION

The effects of air pollution on the human body vary depending on the type of pollutant and the length and level of exposure—as well as other factors, including a person's individual health risks and the cumulative impacts of multiple pollutants or stressors.

Smog and soot

These are the two most prevalent types of air pollution. Smog (sometimes referred to as ground-level ozone) occurs when emissions from combusting fossil fuels react with sunlight. Soot (also known as particulate matter) is made up of tiny particles of chemicals, soil, smoke, dust, or allergens—in the form of either gas or solids—that are carried in the air. The sources of smog and soot are similar. Both come from cars and trucks, factories, power plants, incinerators, engines, generally anything that combusts fossil fuels such as coal, gas, or natural gas.

Smog can irritate the eyes and throat and also damage the lungs, especially those of children, senior citizens, and people who work or exercise outdoors. It's even worse for people who have asthma or allergies: these extra pollutants can intensify their symptoms and trigger asthma attacks.

Hazardous Air Pollutants

A number of air pollutants pose severe health risks and can sometimes be fatal even in small amounts. Almost 200 of them are regulated by law; some of the most common are mercury, lead, dioxins, and benzene. Mercury attacks the central nervous system. In large amounts, lead can damage children's brains and kidneys, and even minimal exposure can affect children's IQ and ability to learn

. Greenhouse gases

By trapping the earth's heat in the atmosphere, greenhouse gases lead to warmer temperatures, which in turn lead to the hallmarks of climate change: rising sea levels, more extreme weather, heat-related deaths, and the increased transmission of infectious diseases. In 2018 carbon dioxide accounted for 81 percent of the country's total greenhouse gas emissions, and methane made up 10 percent. Another class of greenhouse gases, hydrofluorocarbons (HFCs), are thousands of times more powerful than carbon dioxide in their ability to trap heat. In October 2016 more than 140 countries reached an agreement to reduce the use of these chemicals—which are found in air conditioners and refrigerators—and develop greener alternatives over time.

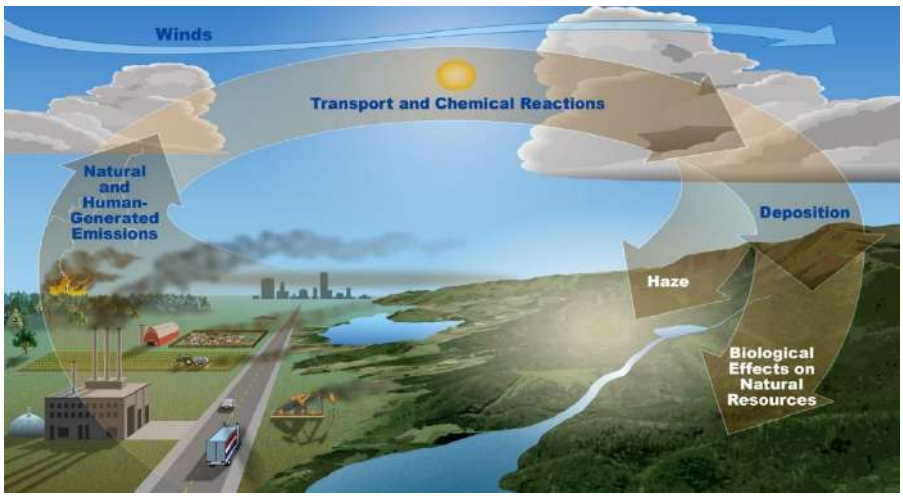

FIG: factors of pollution.

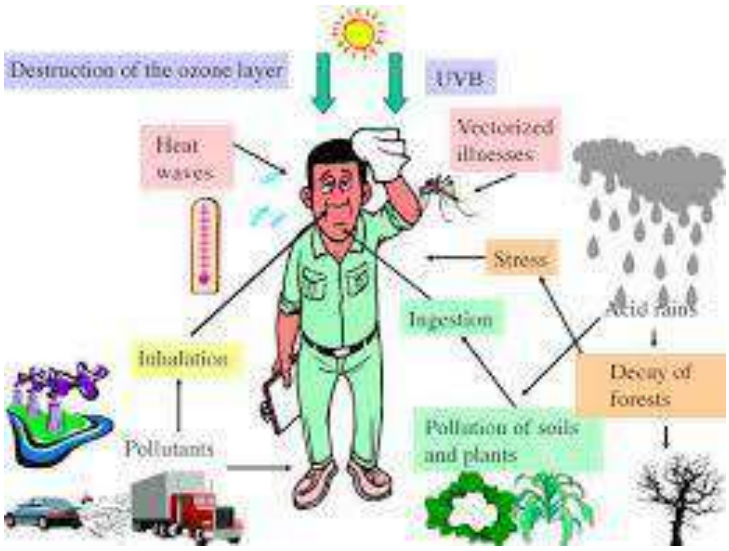

FIG: Air Pollution a silent killer.

Ways to Stop Air Pollution

Reducing pollutants in the air is important for human health and the environment.

Community

At the community level, you can reduce air pollutants by choosing to walk, cycle or take public transport rather than drive a car.

You can also keep your car in good condition and drive to reduce fuel consumption and minimise emissions.

You can buy items that have low-energy manufacture and use requirements, or which can be recycled.

Good urban design and planning can also reduce pollution by having cleaner, ‘greener’ choices for the public. These may include increasing walking and cycling paths and having urban ‘hubs’ where people work, play and shop locally, reducing their need to travel.

Farmers

Farmers can reduce air pollution by conducting hazard-reducing burning at times when smoke impacts are likely to be minimal.

Also, sugar cane can be harvested green, which removes the associated smoke impact.

Industry

Industries can use pollution control devices to remove pollutants by absorbing, filtering, diluting or dispersing them.

Government licensing and regulation are effective ways to minimise emissions from industry.

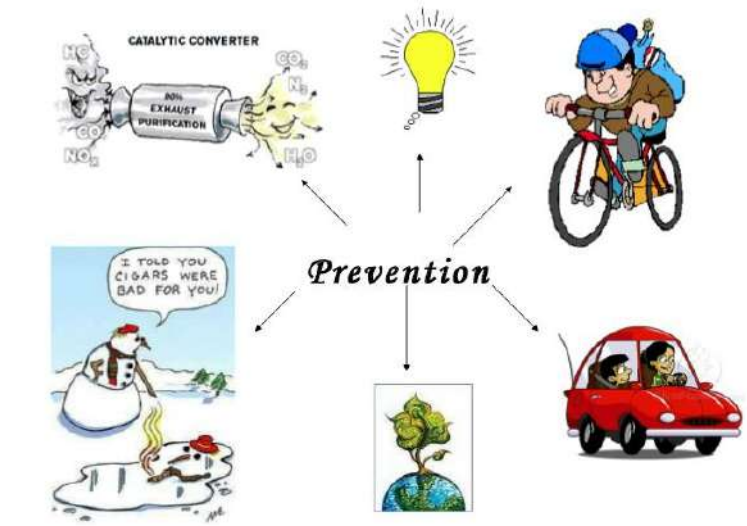

Fig: These figures explain us how we can conserve our Environment.

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