HCF Infographics

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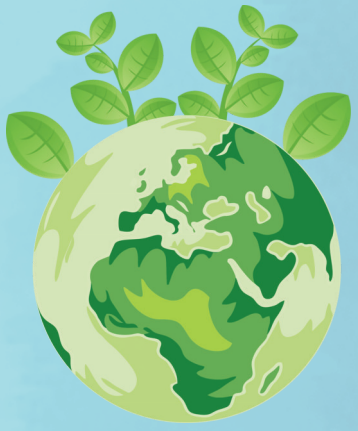

1

A Swelling Threat: How Rising Sea Levels Will Impact Our World

The seas and oceans of the world are characterized by a constant movement, as they ebb and swell constantly owing to the earth's rotation as well as the gravitational pull of the moon. However, in the past couple of decades, the water levels of the world have started to rise alarmingly.

Rising sea levels refer to the average increase in water levels of the Earth's oceans owing to the dangerous increments in the average temperatures of the Earth's surface owing to global warming. This causes glaciers and ice sheets to melt on a large scale, which then flow into the earth's water bodies, resulting in vast increments in their volume, which causes the water levels to rise. For example, the ice loss due to the melting of Greenland's ice sheet has increased seven times in the past decade: while it melted an average of 34 billion tonnes per year between 1992-2001, it amounted to an average of 247 billion tonnes per year between 2012 and 2016. Additionally, owing to rising temperatures, as our oceans become hotter gradually, the water therein expands, for warm water takes up more space than cold water, resulting in a further increase in sea levels.

Even as the rates of increase have been a couple of millimeters each year, this has resulted in a cumulative increase of around 8 inches (20 cms) since 1900, with around 3 of those inches having been increased in just the past 25 years. The rates then seem to be increasing at even steeper paces, from around 1.7 millimeters before the 1990s to around 3.4 millimeters in 2016.

These catastrophic consequences are a result of the green-

house effect owing to human activities such as the reckless burning of fossil fuels that release gases like carbon dioxide and methane into the atmosphere. These gases trap the heat of the sun without allowing it to escape and thereby contribute to an increase in the earth's temperatures. A disproportionately high amount of these gasses trap too much heat, and this results in excessive increases in temperature.

The worst consequence of rising sea levels would be witnessed in coastal areas. Over the coming years, currently populated land would submerge under the water, affecting between 470 and 760 million who live near the shores. Such vast amounts of people would either succumb to inundation or large-scale displacements, which would leave them homeless and vulnerable. Further, cities near seas face a greater risk of aggravated storms that are made even more dangerous because of rising sea levels, exacerbating chances of flooding while also causing more damage. This is because higher levels of water would allow these storms to push even further inland than otherwise. Additionally, increased water levels also greatly enhance the risk of nuisance flooding, which even though not life-threatening, is disruptive to daily life along with being exceedingly expensive. Even before total inundation happens, infrastructures ranging from roads to bridges, railway lines, along with industrial power plants are all threatened by rising sea levels.

Further, rising sea levels also put pressure on coastal ecosystems. Owing to even a slight increase in sea levels, coastal ecosystems would suffer significant damage. Minor and major forms of flooding would erode coastlines, causing them to recede inland while causing the additional harms of wetland flooding, and contamination of soil with

salt which would devastate plant life, along with causing aquifer contaminations. As waves reach further inland, they would wash away the grass that is responsible for holding sediments in place. This would result in the loss of important sediments that are responsible for enriching the soil. In addition to this, the salty ocean waters can also seep into the groundwater reservoirs making them unfit for drinking. This would also result in a loss of habitat for the numerous species like birds and turtles that rely on these coasts to provide them with safe environments.

Small island nations like Maldives, Tuvalu, Palau, Kiribati, and Fiji are the most susceptible to the dangers of rising sea levels, as they face the threat of absolute immersion. Communities from the Marshall Islands have already been forced to move as the world's first climate-change refugees, as higher waves and receding coastlines left the people with no safe place to retreat to during tropical cyclones.

Therefore, what we need is immediate action to mitigate the worst consequences of climate change. Urgent actions should focus on reducing carbon emissions that reduce global warming, as an example of a long-term plan, and on using defense mechanisms such as coral reefs and sea walls to keep out the waves, as an example of a short-term solution to deal with the crises. As future generations are surely set to face the worst consequences of climate change, it is incumbent upon us to act now.

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2

Coral Reef Loss: How Our Oceans Are Unravelling?

An aquatic ecosystem characterized by remarkable and rich biodiversity, coral reefs - often called the "rainforests of the sea" - create healthy habitats that help sustain the lives of about one-fourth of the oceans' fishes. Aquatic organisms feed, house themselves, reproduce, and carry out all their life processes within the diverse space that coral reefs offer. Around half a billion people depend on reefs for their survival as it is the source of food and income, thus making it equally important for humans. However, coral reefs are facing an insurmountable scale of adversities today due to local and global concerns such as global climate change, overfishing, declining water quality, pollution, and unsustainable coastal development. Coral reefs, all across the globe, are dying.

When impacted by environmental stressors, coral reefs expel microscopic symbiotic algae zooxanthellae from their tissue. As this is the primary food source, corals become more sensitive in response to environmental stressors and turn pale or white, resulting in 'coral bleaching.' The only solution to recover from coral bleaching is to house back the expelled zooxanthellae, which is possible only by working against the root cause - the climate crisis and global warming. Thus, the present-day predicament of coral reefs is inextricably tied to the adverse repercussions of the global climate crisis and to save this remarkably essential aquatic ecosystem, one must act upon the need of the hour and attempt to mitigate the perils of climate change.

The factors that impact coral reefs include (but are not limited to):

1. **Natural phenomena such as El Niño, diseases, increased**

salinity after rainfall, hurricanes, increased sea surface. temperatures, etc.
2. Human threats such as pollution - land-based runoff and pollutant discharges, unhealthy tourism practices, overfishing, unsustainable fishing techniques (such as deep water trawling), coastal development, etc.
3. Global climate change and its subset components such as increasing levels of Carbon dioxide in water and rise in water temperature levels

Current studies state that if the above root causes are not mitigated, over ninety percent of the coral reefs will be pushed to a state of irreversible danger by the end of this decade. The United Nations Environment Program's (UNEP) 2020 report on the status of coral reefs in the world stated that around 14 percent of the world's coral reefs were lost in the time period between 2009 and 2018. The report carefully observes how reef algae - that grows during bouts of stress - exponentially increased by 20% over the period of study. As the decline in reefs corresponded to the increase in sea surface temperatures, the situation can only get worse with the repercussions of global warming. Close to 99 percent of coral reefs could completely disappear if emissions are not mitigated this decade - it is, indeed, the need of the hour to act upon the current situation.

The predicted increase in global temperature levels across this decade - around 1.5 degrees Celsius - has unimaginably negative effects on coral reefs. If ocean temperatures increase by 1.5 degrees, 70 to 90% of coral reefs will decline and if the temperatures increase by 2 degrees Celsius, the planet will be left with almost no reefs. The ecological imbalance this degradation and eventual disappearance can result in is unimaginable, and its scale - existing beyond normality - will be a reality that is

impossible to grapple with. The loss of coral reefs can also cause the socio-economic decline of individuals and communities that are dependent on related resources and hence, the consequences of the plight of coral reefs - in the absence of quick thoughtful intervention - spread across multifarious spheres of human life and society. The pertinent question then becomes, what can one do to change the current picture?

As the saying goes, it is better to start late than never. We are still not far from reaching a point of irreversible damage and we can make the aquatic ecosystems - by extension all ecosystems - healthier and safer through careful planning and action. A few suggestions for the same are:

1. **Conserve water - reduce runoff and wastewater, and don't let chemicals (such as fertilizers) flow into water bodies.**
2. **Choose sustainable seafood.**
3. **Make little and not-so-little contributions such as helping with beach clean-ups and changing everyday habits/practices that are unsustainable.**
4. **It takes corals a long time to create reef structures and therefore, let them belong where they are. Don't gift them as presents, they themselves are a gift from nature.**

Coral reefs form the foundation of not just aquatic ecosystems but the entirety of our planet. They are fighting the troubles induced by inconsiderate human actions and thus, individuals and communities should come together to help them recover and recuperate.

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3

Liquid Gold?: Fossil Fuel Consumption and the Environmental Catastrophe

Fossil fuels are resources that mimic rocks, gasses, or liquids that are burnt to produce electricity. They are employed as energy sources in the electrical and transportation industries and include natural gas, coal, and oil. They are also a very major contributor to the pollution that ends up causing global warming which haunts us all. Coal, oil, and natural gas are examples of fossil fuels that helped shape the modern world. That has both good and terrible aspects. The birth of modern industry was made possible by this plentiful fuel supply, and numerous sectors still rely on it. However, it is equally undeniable that fossil fuels are severely damaging the ecology and climate. This has made it necessary to switch as quickly as we can from fossil fuels to renewable energy.

In addition to the air we breathe, the land and the water are also impacted by airborne nitrogen pollution. The most prevalent element in the air, nitrogen is necessary for life on Earth, including plants and animals. The natural equilibrium of nitrogen in the ecosystem may be disrupted by nitrogen sources from human activities including agriculture, industry, transportation, and the production of electric power. When fossil fuels are burnt by us, nitrogen oxides are then released into the atmosphere around us and help to create smog and acid rain which we observe. Nitrogen oxides are the aggregate name for the most prevalent nitrogen-related substances released into the atmosphere as a result of human activity.

Burning fossil fuels releases greenhouse emissions like carbon dioxide into the atmosphere, which trap heat and cause climate change. Following are some of the consequences of fossil fuels on the climate:

- **Ocean acidification: The ocean absorbs at least 25% of the carbon dioxide released by fossil fuels, altering the ocean's chemistry (pH). Such rising acidity also makes it extremely difficult for the construction of coral skeletons and shells by marine species. Ocean acidity has risen by 30% in the previous 150 years, endangering coral reefs, tourism, fishing, and economic activity.**

- **The National Oceanic and Atmospheric Administration asserts that the combustion of fossil fuels is causing climate change, which is causing greater amounts of severe weather conditions that result in disasters costing at least $1 billion per.**

- **Global sea level rise, a huge problem, is being caused by the melting of glaciers and land-based ice sheets as a direct result of the oceanic and atmospheric warming brought on by climate change. Since the late 1800s, sea levels have increased by roughly 9 inches, leading to more frequent floods, devastating hurricanes, and saltwater intrusion.**

Apart from this,

- **Fossil fuels emit dangerous air pollutants such as sulfur dioxide, nitrogen oxides, carbon monoxide, particulate matter, and mercury, every one of which is bad for the environment and people's health. Fossil Fuel air pollution can result in acid rain, eutrophication, destruction of crops and forests, harm to animals, and eutrophication (extra nutrients that can impact aquatic ecosystems by reducing oxygen levels).**

- **Fossil fuels produce water contamination through a**

variety of means, including oil spills and fracturing fluids. Between 1.5 million and 16 million gallons of water are used in each fracking well, and the wastewater that is produced can be hazardous and contain elements like lead, arsenic, cadmium, chlorine, and mercury that can pollute groundwater and water used for drinking.

- Over 99 percent of all plastics come from fossil fuels, which then contributes to plastic pollution. A total of 300 million tonnes of plastic garbage are created annually across the world, 14 million tonnes of which find their way into the ocean and destroy marine life and contaminate the food chain. The U.S. plastic sector emits 232 million tonnes of carbon dioxide equivalent year, and by 2030, its greenhouse gas emissions are projected to surpass those of coal-fired power plants. Plastics also have an impact on the climate.

- Oil spills: The extraction, as well as movement, and refinement of fossil fuels can very much result in oil spills that hurt local residents and animals, degrade ecosystems, erode shorelines, and ultimately result in the closure of sites such as parks and beaches, and even fisheries.

In another manner, fossil fuels exacerbate global warming. Soot and other small particles darken the surface of snow and ice as they fall on them. As a result, it absorbs more heat from the sun and melts more quickly. The ground surface darkens much more when the snow cover disappears, absorbing heat even more quickly. This is one of the causes of the earlier and quicker melting of ice and snow in many locations, which lowers freshwater supplies.

Overall, fossil fuels are harmful to the environment, and we must quit using them for all of our energy needs.

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4

Losing Life: Why Soil Degradation Threatens Food Security

In the modern world, many essential environmental threats are being given attention as the consequences of human action over the last few centuries come to light. One major issue is soil degradation, which refers to the deterioration of soil quality, resulting in the loss of its fertility and vital nutrients.

Soil is an extremely crucial resource for both humans and the planet. It is teeming with life: in fact, a handful of soil has more living organisms than all the people on Earth. Thus, it acts as a habitat for microorganisms and also filters and purifies our water. Furthermore, it also protects us against floods and helps combat drought, and is one of the greatest sequestrators of carbon, holding the largest terrestrial store of carbon, which mitigates the effects of climate change.

Most importantly, soil brings food to our plates: without soil acting as the medium for plants, large-scale agriculture would be impossible. It acts as a foothold for the roots of plants and also gives them the nutrients they need to grow. Additionally, the living organisms in the soil contribute to healthy plant growth as well and often share a cyclical relationship where organic waste from plants offers them nutrients.

Thus, it is no exaggeration to say that the degradation of soil is a huge and critical issue that must be solved. Creating new soil takes longer than a human lifetime: it is a finite and necessary resource. Without healthy soil and its contribution to the Earth's ecosystem, human life would be likely impossible to sustain.

What is soil degradation?

Soil degradation is the physical, chemical, and biological decline in soil quality, affecting fertility, its ability to serve as a habitat for organisms, and the vital ecosystem functions it completes. A recent report by the United Nations stated that about one-third of the total farmable land in the world has been degraded and that in the next 60 years if current rates of loss persist, there is a possibility that all of the world's topsoil will become unproductive.

Soil degradation could include the following:

1. **Water erosion (which includes sheet, rill, and gully erosion)**
2. **Wind erosion**
3. **Salinity (which includes dryland, irrigation, and urban salinity)**
4. **Loss of organic matter**
5. **Decline of fertility**
6. **Soil acidity or alkalinity**
7. **Structure decline (which includes soil compaction and surface sealing)**
8. **Mass movement**
9. **Soil contamination (which includes effects of toxic chemicals and pollutants).**

This decline in soil health is caused by a multitude of factors and has increased in the last few decades due to both human activities and climate disasters. The process of degradation is natural, as simultaneously, more topsoil is also being produced, but the pace has increased to an unprecedented, dangerous degree. This is caused by

by intensive farming practices as the population rises and global demand for food intensifies, and also by other human activities like overgrazing, intensive cultivation, forest fires, and construction work. Increasing urbanization also plays a role, and the use of harmful chemicals, fertilizers, and pesticides contaminate soil as well.

How does soil degradation impact food security?

When soil is disturbed, and its compactness and plant anchors are removed, it becomes vulnerable to wind and water erosion. Furthermore, when forested land is converted into farmland, as seen most explicitly in the Amazon rainforest, crucial nutrients are removed and organic matter can often not be replenished by the yield-focused processes of conventional agriculture. This also means that the soil loses about 50-70% of its carbon-storing capacity.

Without biodiversity, soil cannot perform its essential ecosystem services, and in the worst cases, barren land results in desertification, where the soil is damaged beyond repair and cannot grow most plants. This is our biggest threat today: the loss of productive land and healthy soil necessary for agriculture.

Soil is a non-renewable resource and many food production regions are at risk of losing this, particularly in developing countries whose resources have routinely been exploited. The reason we have arrived at this critical juncture are multifold, including lack of knowledge, mismanagement of the natural world, or an approach that misses the interlinks between soil and food security.

Humans obtain a vast majority of nutrition from the land -

as opposed to aquatic ecosystems. Thus, maintaining soil fertility must be of utmost importance, as it directly relates to their welfare. Currently, the loss of cropland is happening at a rate 10-40 times higher than the rate of topsoil formation; simultaneously, the World Health Organization reports that more than 48 million people today are facing levels of hunger that qualify as an emergency.

Declining soil quality directly translates into lower crop yields and poor-quality produce, and with this deterioration, it becomes increasingly challenging to meet the food demands of the world. The future, with the looming climate crisis, holds even more obstacles, as rising global temperatures and extreme weather events intensify erosion and salinization. To combat this threat, one must emphasize sustainable land management practices that seek to conserve soil health and promote biodiversity, including agroforestry, the use of organic fertilizers, crop rotation, conservation initiatives, and investment in infrastructure and technology to improve yield without damaging the environment further.

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5

Unraveling Disaster: The Consequences of Systemic Deforestation

Deforestation refers to the decrease in the area of forests across the world, and is most often, the result of human activities such as urbanization, agricultural cropland expansion, mining, or the extraction of lumbar and wood from these forests, causing them to rapidly decrease in size. Deforestation poses an immense risk for biodiversity loss and climate change. While deforestation has existed as a practice for many years, it is becoming increasingly systemic and organized and it has now evolved into systemic deforestation where forests and lands are deliberately cleared and removed as a result of complex economic, social, and political motivations.

Systemic deforestation is not the result of isolated individual actions, but rather a collective decision that is driven by intricate economic and political factors. For instance, forests are most commonly cleared for large-scale commercial agriculture such as the production of palm oil and soybeans, etc. While we may believe such deforestation is beneficial in increasing the overall crop and food production, the encroachment of forested lands poses detrimental consequences for the biodiversity inhabiting them and the environment. In addition, the cutting down of trees for lumber and wood is often sustainable, where trees are cut at a faster rate than they are planted. Finally, urbanization and infrastructural development are one of the greatest contributors to the systemic degradation of forests, where extensive lands are cleared to accommodate roads, buildings, and factories in remote parts of the country.

The forests are home to over 80% of the world's land-based biodiversity and contribute significantly to the availability

of freshwater and the quality of the air we breathe. Unsustainable and rapid systemic deforestation can have a life-threatening impact on the health of the environment and the many species that inhabit it.

Let's take a look at some of the consequences of systemic deforestation:

- **Climate Change**

Climate change is a direct consequence of deforestation, where the large-scale destruction of forests leads to a rapid increase in the emission of greenhouse gasses. With fewer trees available to convert carbon dioxide to oxygen, the amount of carbon dioxide in the atmosphere drastically increases. This eventually causes a rapid increase in the temperature causing Global Warming. Global warming can cause more frequent droughts, floods and cyclones, and wildfires, leading to widespread loss of lives and livelihoods.

- **Soil Erosion**

The lack of forests and trees that hold together the soil means the topmost layer of soil is more susceptible to erosion as a result of rainfall or water streams flowing through it. The topmost layer of soil is the most fertile, while the layers below are rougher in comparison. The erosion of this fertile soil exposes these underlying layers, which are far less fertile and compatible for the production of crops, plants, and trees. This can not only cause food shortages in the future, but also large-scale biodiversity loss, and eventually lead to desertification of fertile land.

- **Water Shortage**

Forests play a critical role in the water cycle and assist in ensuring the supply of water. Trees hold groundwater in

their roots, and also release water back into the atmosphere. With fewer trees available, the water vapor that is released back into the atmosphere decreases and the amount of water underground also decreases. Deforestation, when combined with fewer and lower rainfalls, can eventually lead to severe droughts and water shortages.

- Biodiversity Loss

Forests provide shelter, food, and water to thousands of species of flora and fauna, and their rapid destruction leaves them without the means to sustain themselves. This leads to the loss and extinction of many species of animal and plant life which does further cause disturbances in the food change and the ecological balance.

Deforestation also has a significant impact on human health and the economy. The endless exploitation of natural resources such as wood can cause a drastic shortage in the future and consequently slow down the economic growth and output of the country. Moreover, the mass migration of species displaced from these forests increases the risk of cross-transmission of viruses and bacteria between humans and animal species. The stale pools of water that accumulate as a result of soil erosion and deforestation also create the perfect breeding grounds for mosquitoes that carry deadly viruses and cause illnesses such as malaria, dengue, chikungunya, and yellow fever.

Addressing systemic deforestation will require a multi-pronged and comprehensive approach where illegal mining activities and deforestation are regulated, sustainable land use is actively promoted, local organizations and communities working towards forest management are

supported, and large-scale reforestation initiatives are implemented.

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6

A Tangled Web Woven: Overpopulation, Poverty, and a Failing Society

The ongoing climate crisis poses a significant threat to nations across the globe and its repercussions have been felt for the past century, with a drastic increase in ambient air temperatures, extreme weather events, and rising sea levels. Human-induced climate change and environmental degradation have had a myriad of effects in recent years, including an increase in greenhouse gas emissions which has subsequently contributed to global warming, depletion of the ozone layer, and air pollution. Therefore, climate change is also inextricably linked with population growth, and each additional individual on Earth increases the total sum of carbon emissions. Overpopulation, poverty, and the decline of society are interconnected challenges that form a tangled web, one that is tightly woven around the pressing issue of climate change.

According to the United Nations, over one-third of 50 surveyed Nobel laureates stated that environmental degradation or population rise was the most significant threat to mankind. There is a nuanced and complex relationship between population increase and environmental degradation, one that is characterized by a slew of negative consequences for the Earth and its inhabitants. The world is presently witnessing unprecedented population growth, with the global population standing over a staggering 8 billion people presently. This is primarily due to an increase in the average human lifespan due to advancements in healthcare, medicine, and nutrition, as well as increasing levels of fertility in many nations. Let's take a closer look at the growing global population by examining the most populous country in the world.

In April 2023, India set a historic record by overtaking China as the most populated country in the world, with a population of 1,425,775,850. India's population has grown by more than 1 billion since 1950, even though the growth rate has stagnated in recent years. Additionally, the country's population is not evenly distributed amongst its 28 states and 8 union territories.

Uttar Pradesh is one of the most populous states, with around 235 million people, and it is predicted to contribute significantly to India's projected population growth in coming years, along with Bihar. In comparison, India's southernmost states such as Tamil Nadu and Kerala, which are also characterized by higher literacy rates and economic prosperity, have declining population rates.

India is ill-equipped to handle its booming population, and this results in increased poverty in a country that is already characterized by extreme income inequality. The estimated number of people living in poverty in India ranges from 34 million to 373 million (2.4% of the population to 29.5% of the population) depending on varying estimates. With inadequate public health measures, waning food security, and insufficient educational resources, India's rank as the world's most populous country does not bode well for its rating on the poverty scale. Further, the income inequality in the country is glaringly apparent, as India recently shot up to third place as the country with the most billionaires in the world, boasting 169 billionaires. The stark contrast between the glitz and glamor of billionaire homes and the overcrowded, dilapidated slums in the country speaks volumes about the unequal distribution of wealth and resources. Poverty stems from a vicious cycle in India, as individuals who are denied opportunities and access to

resources are often socially excluded and ostracized, and remain economically weaker than the rest of society. A lack of equitable access to wealth and resources results in poorer educational outcomes and therefore unemployment or underemployment which further perpetuates the cycle of poverty for future generations.

Overpopulation only exacerbates the issue, and an increase in the number of individuals fighting over limited resources leads to inevitable social decline. Overpopulation not only impacts poverty, but also has environmental costs as there is added pressure on available natural resources and ecosystems. An increasing population also leads to greater carbon emissions and waste generation, and therefore greater pollution and degradation of the environment. The effects of climate change also disproportionately impact the poor — the rich contribute to emissions far more than the poor, but suffer a lot less. There is a distinct relationship between income and per capita carbon dioxide emissions, and industrialized countries along with oil-producing nations produce the most amount of emissions. Therefore, it is apparent that the poor who are most vulnerable to the effects of climate change, suffer the most and pay for the lifestyle of the rich. This is only compounded by overpopulation and together, it leads to a failing society, one that is characterized by depleting natural resources and a rising population.

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A Looming, Invisible Enemy: How Air Pollution is Choking Our Cities?

Air pollution refers to the contamination of air quality by several types of pollutants by chemical, physical, or biological agents that range from smoke to poisonous gases and particulate matter. Because air envelops us completely, such that it is impossible to entirely escape from it, air pollution is an extremely serious health hazard. According to the World Health Organization, air pollution results in approximately 7 million premature deaths around the world every year. Furthermore, currently, nine out of ten humans breathe air that is polluted beyond the WHO's stipulated limit. Outdoor air pollution is a pervasive problem that is no longer restricted to underdeveloped and developing countries, as populations in even developed countries have started to breathe polluted air.

While there are natural processes that cause air pollution such as volcanic activity and wildfires that release substances like chlorine, sulfur, smoke, and ash, the chief cause of air pollution is human activities that involve the burning of substances such as fuels and garbage. Burning fossil fuels for purposes of transportation, electricity, or industrial processes release vast amounts of gasses into the atmosphere that are harmful chemicals, which not only cause air pollution but also cause global warming. According to the Environmental Protection Agency (EPA), air pollutants can be classified into six primary types: particulate matter such as PM 2.5 and PM10, lead, oxides of nitrogen, carbon monoxide, oxides of sulfur, and ground-level ozone. Sulfur and nitrogen oxides are directly responsible for acid rain, which not only causes harm to humans but also degrades biodiversity by injuring plant and animal life. Particularly, in the case of particulate matter, small particles like PM 2.5 prove the most

dangerous as they can evade the body's defense mechanism and get lodged in our lungs and bloodstream.

Air pollution causes severe damage to our health. Both short-term and long-term exposure to polluted air can leave one susceptible to a wide variety of diseases. This includes higher chances of strokes, obstructive pulmonary diseases, cancers of the lung, trachea, and bronchus, along with aggravated asthma and respiratory infections. Air pollution places undue stress on the heart and lungs by requiring them to work more to supply adequate levels of oxygen to the body to compensate for the gases like carbon monoxide that have mixed with the hemoglobin in our blood. The people who are the most vulnerable to air pollution are individuals with heart and lung diseases, outdoor workers, pregnant women, newborn children, and elderly people.

In the past few years, New Delhi—India's capital city—has particularly witnessed abysmal air quality. The pollution has reached fatal levels and is the worst in the winter months when a thick cloud of smog enwraps the city, reducing not just visibility but also the potential for life to exist. In 2019, even as the average annual PM concentration in India was 58.1 micrograms per cubic meter, Delhi witnessed an average annual PM concentration of 98.6 micrograms per cubic meter. These levels are the worst for any capital city in the world. The main causes of air pollution in Delhi are vehicular exhausts, industrial processes like power generation, small-scale industries like brick kilns, waste burning, along with slash-burning surrounding areas. Despite this, the response of central and state governments has been minimal. Even after the Supreme Court's direction to the Central Pollution Control Board to introduce the Graded Response Action Plan, the implementation has been staggered and

inefficient. Several other schemes such as the Odd-Even directive, and the National Clean Air Programme have been similarly ineffective.

As air pollution continues to choke us and deteriorate our health and quality of life, it becomes critical to take urgent action to address this issue. Urgently implemented public policy that aims at structural reforms is the only way forward. Not only do we need an overhaul how we use energy through a transition to cleaner sources of energy, but we also need to reshape public transportation that minimizes our reliance on private modes. Even as this entails massive investments in capacity building over the long term, it is imperative that we make this choice. Additionally, we need a stricter implementation of laws that require industries to gain environmental clearances for their emissions.

To change the fate of millions of people across the world who are forced to breathe hazardous air, we must start taking air pollution as the serious issue that it is, instead of as an unavoidable problem. Only by tackling these environmental hazards seriously, would we be able to bequeath a safe planet to our future generations.

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8

Biodiversity Crisis: How Ecological Destruction is Harming Ecosystems

Human activities on our planet have been negatively impacting the environment for decades, and the depletion of our natural resources as well as the degradation of natural habitats and ecosystems left our planet in a fury. This growing crisis is causing the loss and eventual extinction of many different species of microorganisms, animals, and plants. This is called biodiversity loss.

Biodiversity refers to the rich diversity of species that inhabit a given space and includes the variety of animals, plants and trees, microorganisms, and the ways in which they interact with each other and their environment. The existence of biodiversity is important for many different environmental processes that make life possible on Earth. For example, maintaining ecological balance, regulating climate, cross-pollination, and nutrient cycling are all facilitated with the help of different species of life. Consider the role of bees in pollinating apple and maple trees or a variety of grasses.

According to the World Wildlife Fund Report 2022, of the total monitored and endangered species in the world, this population recorded a decline of 68% between 1970 and 2016. Research in the field has found four main human-induced causes that are contributing to biodiversity loss:

- **Habitat loss**

Destruction of naturally existing habitats is the biggest cause of biodiversity loss. It could be deforestation, pollution of water bodies, or removal of beehives. Such destruction destroys the habitat and food sources of the species living there and displaces them into unnatural habitats. Whereas species that cannot migrate often become

extinct.

- Over-exploitation

Our planet's expanding overpopulation is taxing our natural resources and systems while increasing the demand for these resources. As a result, resources are being overexploited in order to fulfill our population's expectations. Overfishing, wildlife trade, deforestation, and minding are just a few of the ways humans are taxing and abusing the earth's scarce natural resources. Such exploitative activities leave the species dependent on them for survival with few to no means of sustaining themselves.

- Pollution

Improper waste disposal practices, especially industrial and agricultural waste, are contaminating the soil and natural water resources. This pollution of natural resources is destroying ecosystems and limiting the ability of various flora and fauna to survive.

- Climate change

An increase in greenhouse gas emissions from activities such as the burning of waste, industrial processes, and the use of non-clean energy sources is leading to worsening air quality levels, rising temperatures, and erratic rainfall, which significantly affect biodiversity on Earth.

Furthermore, the introduction of non-native invasive species also contributes to this loss of biodiversity to a great extent, where such species inhabit and colonize existing environments, causing disturbance to natural habitats and ecosystems. It is also a direct result of human activity, as such species are either introduced into native environments as a result of human intervention or migrate

as a result of displacement of their natural environments.

While invasive species, pollution, climate change, habitat destruction, and overexploitation contribute individually to the loss of biodiversity. These activities are usually interdependent and suggestive of a larger problem of insensitivity towards the environment, which in conjunction with each other accelerate the process of biodiversity loss.

Biodiversity loss endangers and wipes out thousands of species and causes imbalances in ecosystems which result in the emergence of invasive species of animals and plants. In addition, this also affects the quality of soil and water available to us, which is integral to the production of food. It also affects the ability of forests and oceans to absorb CO2 and release oxygen into the atmosphere which perpetuates the ongoing global warming crisis. These consequences are dire not only for these species and the environment but also for human life on Earth, as seen in the recent COVID-19 pandemic, which has caused millions of deaths worldwide. Such pandemics could become the norm if the environmental crisis continues to exacerbate at the present rate.

If we continue down this path, ecological degradation will eventually lead to an environment that is unfit even for human life. To ensure the survival of life on Earth, we must work tirelessly to avoid the loss of biodiversity and ensure that we maintain our ecosystems.

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