
Climate Change and Human Health: Risks and Impacts

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ABSTRACT

Fresh air, food, water, shelter are important aspects for the healthy living of the human beings but unfortunately the changing patterns in climatic conditions has deteriorated the quality of healthy atmosphere. Climate and weather have a huge impact on human health. Environment is affected by the changes in climatic patterns and weather extremes.

Climate change, together with other natural and human-made pollutants, threatens human health and well-being in numerous ways. It can affect people's health and well-being in many ways like pollution, toxins, and allergens in the environment which are causing an increase in respiratory and heart health issues, increased rate of food and water based water diseases, and mental health issues. Illness from increasingly frequent extreme weather events, such as heat waves, storms are common these days. Along with climate change, there is change in the range of disease-carrying insects, such as mosquitoes, ticks, and fleas that transmit Virus, dengue fever, malaria etc. to humans. This paper highlights the main causes and impacts of climate change and how it risks human health. It also focuses on the responsibilities of individuals towards curing the climate and needs to estimate the emerging threats to health.

Key Words: Climate Change; Environment; Human Health.

1. Introduction

Climate can be defined as the average weather conditions in an area over an extended time interval usually in decades. Climate contains info about average rainfall, sunshine and average temperature in different seasons.

Climate is the pattern of variation in temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particle count and other meteorological variables in a given region over long periods. A region's climate is generated by the climate system, which has five components: atmosphere, hydrosphere, cryosphere, lithosphere and biosphere ([Sondhi, 2020](#)).

1.1 Climate Change

The United Nations Framework Convention on climate change (UNFCCC) defines Climate Change as “a change of climate which is attributed directly or indirectly to human activities that alter the composition of the global atmosphere and which are in addition to natural climate variability observed over comparable time periods (Kuh, 2017).”

Change in climate can be defined as any systematic shift in long term statistics of an area in precipitation, temperature or wind. It reflects changes in the variability or average state of the atmosphere over time scales. Earlier the long term shifts in climate were natural due to various factors like earth's rotation, variations in sun energy, changes in earth's absorption power and volcanic activities. But now they are mainly due to human activities. In fact scientists believe that human activities are responsible for more than 90% of climate change.

1.2 Causes of Climate Change

Radical environmental changes can be seen due to global warming and greenhouse effects of harmful gasses. The uncontrolled burning of fossil fuels due rapid changes in lifestyle and industrial revolution in the last hundred and fifty years has impacted the environment to such a level that many worry if it is even possible to reverse the effects. The ever increasing demand of energy and transport whether its cargo or human has led to a globe full of heat trapping gasses. These gases are the reason for all the changes in our environment and we humans are the main reason for these gases. The heat waves reflected from the Earth are trapped by these gasses resulting in more heat in our atmosphere and thus causing Global Warming. In fact Global warming and climate change are synonyms for today's date.

There are a number of causes of global warming, typically the causes which lead to more greenhouse gases in the environment. These gases include carbon dioxide, methane, water vapor, nitrous oxide and some synthetic gases which contain fluorine. The biggest contributor is the burning of fossil fuels like coal, petroleum and natural gas. Most of the power generation is done by using fossil fuels and this adds a lot to global emissions. Another big fossil fuel consumer is the ever increasing vehicles and transport. Manufacturing of goods and industry are other big contributors to global emissions. Along with carbon

dioxide these industries also release various other harmful and pollutant gases. Industry itself needs large amounts of power which is produced in house mainly using fossil fuels. Cement industry alone contributes around two percent of total carbon dioxide emissions (Jones and Sullivan, 2020).

Rapid Deforestation for more agricultural land, expansion of cities etc. is becoming a barrier in natural recycling of greenhouse gasses. Agriculture activities also lead to more global emissions as oxides of nitrogen used in fertilizers are 300 times more potent than carbon dioxide in trapping heat waves. Also food production is increasingly dependent on farm machinery mainly using heavy oils. Even food packaging and distribution also contributes a lot to global emissions. Animal rearing produces methane which is 30 times more powerful greenhouse gas than carbon dioxide. Mining industry is also one of the biggest contributors of global emissions.

There are also many natural causes of climate change. Volcanic eruptions are one of the main natural carbon dioxide contributors to the environment. Along with CO₂, volcanic eruptions add a ton of ash and pollutants in the air resulting in changes in environment (Gilfillan, 2017), which is resulting in climate change. Solar variation or the sunspots are other major natural causes formed due to storms on the outside layer of the sun driven by its magnetism emitting a lot more light and heat waves which drastically affects the temperature on earth (Centre for Disease Control & Prevention(CDC),U.S.). Other factors affecting climate change are earth's eccentricity and axial tilt, Ocean currents etc. Natural forest fires are also increasing due to low precipitation which is in addition to global emissions.

1.3 Effects of Climate Change

Effects of climate change are already being seen, heat waves and rise in temperature are regular news stories. In fact 2020 has been the hottest year on record. Heat waves and high humidity are frequent affairs now which are a great threat to human health. While heat waves with low humidity lead to more forest fires. Temperatures will continue to rise with more hot days in the year and a few very cold days. The mortality rate from heat waves is far higher than other natural calamities.

Precipitation levels have been affected greatly by global warming as wet seasons see more average rainfall than before and dry seasons are getting more dry. This affects the general vegetation and forest cover of an area. There are more storms, landslides and floods every year costing billions of dollars. Tropical cyclones are increasing not only in number but also in their intensity bringing in more devastation every time. Droughts are also increasing as higher temperatures lead to more evaporation, thus areas with less rainfall are scarcer of water more than ever before.

Global sea level has risen by about 5-8 inches since recordkeeping started around 1880's and is projected to rise about 8 inches more by 2100 (United States Environmental Protection Agency, 2017). This poses a

serious threat to the cities near the ocean as they are prone to more floods during the high tides. Also global emissions lead to more acidification of seawater as they absorb more carbon dioxide from the air.

Melting of icecaps is one of the general headlines in our news. Scientists believe if emissions continue we may have an ice free Arctic Ocean near the mid-century and many species will disappear forever (Jayawardhan, 2017).

1.4 Effects on Health

The condition of our planet affects our health in one way or another. Health risks caused by climate change are increasing every day according to the new UN report. There is a need to draw attention to ways in which the health of the planet affects human health and well-being. The people in developing countries are most likely to be affected but people of developed nations are not safe either. The whole world will feel the impacts sooner or later. The health risks involved are as follows-

1.4.1 Thermal Impacts- Global warming will lead to more severe heat waves and prolonged summers which will cause more deaths and heat related illness. Urban areas are more affected than the rural counterparts. Extreme heat can cause heart attack, dehydration and other cardiovascular and respiratory diseases.

1.4.2 Air Quality- Air quality is largely affected due to emissions and results in many diseases.

Asthma being the most well-known of among the diseases caused by polluted air. Shift in climates can cause asthma attacks more likely and even other respiratory disorders.

Increase in ground level ozone is one of the biggest concerns. As warm stagnant air leads to formation of more ground level ozone, a pollutant and component of smog, more people are led to premature deaths and illness. Ozone causes acute inflammation in lungs, damages lung tissues thus reducing lung function and increasing asthma attacks. Particulate matter greater than 2.5 ppm in air is very harmful for lungs and is mostly the result of burning fossil fuels. Exposure to this polluted air for long can cause various cardiovascular diseases including lung cancer (Marabito, 2022). Smog mainly in winter seasons is a very serious health hazard. Increasing Wildfires also leads to smoke clouds which travel to long distances thus polluting air. Pollen allergies are very common affecting a large number of people and the seasons are prolonged due to climate changes (Sharma, 2012).

1.4.3. Extreme weather - Extreme events like flooding, droughts and storms are on the rise. They have devastating effects during and even after the calamity. Roads and bridges get damaged bringing halt to essential services. Food, water scarcity in the areas hit is often seen. Contaminated water in drought hit areas

is the only source of water sometimes. Mental trauma and gastrointestinal illness increase due to such factors.

1.4.4. Vector borne diseases- Mosquitoes, ticks and flies are some of the vectors which carry a host of bacteria, viruses and protozoa from animals to humans. Mosquitoes in flood affected areas carry viruses like malaria and dengue, they thrive on waste waters. Ticks that carry lyme disease get activated early due to rising temperatures and also have their range extended towards north with each passing year.

1.4.5. Water borne diseases- Increasing temperature can alter the bacteria vibrio vulnificus to grow at different times in a year and at different places. Research shows a direct link between increasing temperature and diarrhoea. Runoff and storms with excessive rainfall will lead to contamination of water bodies and increase in salinity of the sea which cause increasing exposure and risk of water-borne illness (United Nations, 2017, Climate Change Impacts).

1.4.6. Food safety- Food safety and distribution is highly affected by changing weather conditions. Salmonella infection and other bacteria thrive in warm environments thus causing gastrointestinal distress and in some cases death. Also, a warm environment leads to growth of many pathogens. Fungus and weed growth is greatly affected by climate. Sea surface water contains more mercury in a warm environment which gets passed to humans through seafood.

1.4.7. Mental health - Any change in surroundings directly impacts the behaviour, health and thoughts of Human being. Severe impacts of climate change can lead to forced migration of people, leading to a complete change in their lifestyle. The trauma of natural calamities affects mental health greatly (WHO Report, 2018).

2. Environmental Laws in India

The milestone for India in the journey of environment protection is the *UN Conference on the Human Environment* (Stockholm, 1972). Under the influence of this declaration, the *National Council for Environmental Policy and Planning* within the Department of Science and Technology was set up in 1972. This Council later evolved into a full-fledged *Ministry of Environment and Forests (MoEF)* which today is the apex administrative body in the country for regulating and ensuring environmental protection. After the Stockholm Conference, in 1976, constitutional sanction was given to environmental concerns through the 42nd Amendment Act, 1976, which incorporated them into the Directive Principles of State Policy and Fundamental Rights and Duties.

Though India already has several substantive laws for prevention and/or regulation of any activity that may cause climate change, including:

- Setting up of the National Council for Environmental Policy and Planning was set up in 1972 which was later evolved into the Ministry of Environment and Forests (MoEF) in 1985.
- Policy Statement for Abatement of Pollution and the National Conservation Strategy and Policy Statement on Environment and Development brought out by the MoEF in 1992
- EAP (Environmental Action Programme) was formulated in 1993 with the objective of improving environmental services and integrating environmental considerations into development programmes.
- National Environment Policy, 2006
- Water (Prevention and Control of Pollution) Act, 1974
- Water (Prevention and Control of Pollution) Cess Act, 1977
- Air (Prevention and Control of Pollution) Act, 1981
- Atomic Energy Act of 1982
- Motor Vehicles Act, 1988
- The Wildlife (Protection) Act, 1972
- The Forest (Conservation) Act, 1980
- Environment (Protection) Act, 1986 (EPA)
- The National Environment Appellate Authority Act, 1997
- Public Liability Insurance Act (PLIA), 1991
- National Environment Tribunal Act, 1995
- Environment Impact Assessment (EIA) Notifications,

Besides the afforested legislations, rules and policies, there are several other plans and incentives by the governments for energy conservation and to mitigate impact of climate change.

3. Role of Judiciary

Indian environmental law has seen considerable development in the last decades. Most of the principles under which environmental law works in India today were gifted by judicial interpretations. The orders and directions of the Supreme Court cover a wide range of areas whether it is air, water, solid waste or hazardous waste.

Some of the judgments wherein various principles relating to environment law were judicially recognised are worth mentioning:

- ❖ In *M.C. Mehta v. UOI, WP (C) 13029/1985*, the Hon'ble Supreme Court in its order dated 24-10-2018, decided that no motor vehicle conforming to the emission standard BS-IV shall be sold or registered in the entire country with effect from 01.04.2020, and the same shall be substituted by BS-VI compliant vehicles. Certain orders were also passed therein with respect to imposing a ban on diesel vehicles to curb the air pollution.

- ❖ In *M.C. Mehta v. UOI, AIR 1987 SC 1086 (Oleum Gas Leak case)*, the Supreme Court formulated an indigenous jurisprudence of Absolute Liability in compensating the victims of pollution caused by hazardous and inherently dangerous industries.
- ❖ In *M.C. Mehta v. Union of India, AIR 1988 SCR (2) 538*, wherein the issue of pollution of the Ganga river by the hazardous industries located on its banks was highlighted, the Hon'ble Supreme Court ordered the closure of a number of polluting tanneries near Kanpur.
- ❖ The Hon'ble Supreme Court in the case of *TN Godavarman Thirumulpad v. Union of India and Ors. (1997) 2 SCC 267, W.P.(C) No. 202 of 1995* dealing with the issue of livelihood of forest dwellers in the Nilgiri region of Tamil Nadu being affected by the destruction of forests, passed a series of directions.
- ❖ *M.C. Mehta v. Kamal Nath, (1996) 1 SCC 38* is a case where there was an attempt to divert the flow of a river for augmenting facilities in a motel. The Supreme Court interfered by recognizing the Public Trust Doctrine and held that the State and its instrumentalities as trustees have a duty to protect and preserve natural resources such as rivers, lakes, forests, open spaces and other common property resources.
- ❖ In *Vellore Citizens Welfare Forum v. UOI, AIR 1996 SC 2718*, the Supreme Court adopted the Precautionary Principle to check pollution of underground water caused by the leather industries in Tamil Nadu. The Hon'ble Court also opined that the precautionary principle and the Polluter Pays Principle are part of the environmental law of the country.
- ❖ In *Indian Council for Enviro-Legal Action v. UOI, AIR 1996 SC 1446*, the Supreme Court reiterated and applied the principle to restore the environment of a village whose ecology had been destroyed by the sludge left out by the trial run of the industries permitted to produce the 'H' acid.
- ❖ The Principle of Sustainable Development was also recognized by the Supreme Court of India in the *M.C. Mehta v. Union of India (Taj Trapezium case), AIR 1997 SC 734*.

4. What initiatives can be taken to regulate global warming?

Every country now-a-days is making policies to curb emissions or is part of the agreements of the United Nations to make certain laws for global warming. Mere enactment of laws is not enough, their implementation is essential. As an individual, it's our duty to know our responsibilities and to make efforts towards curbing emissions. There are many small steps which can be taken by every individual for our safe future. Some of such steps for protection of our health are as given below:

Step Up- It is a crucial time to demand stricter measures and laws for protection of environment and degradation of climate from our governments and also to make contributory efforts in implementations of such laws. We need to raise our voice towards all projects which are unhealthy for our nature and carried out for the sake of development irrespective of its dangerous consequences. Development should not be at the cost of the environment.

Public Transport- Use of public transport for traveling saves a lot of fuel and emissions. So the use of public transport should be promoted. Government should provide adequate and clean transport facilities to encourage people to shift to public transport from their own vehicles.

Active Transport- Active transport using bicycles or walking should be encouraged. Not only is it good for the environment, it's good for human health as it reduces risk of obesity and other diseases.

Use of Clean Energy- Clean energy should be promoted. Solar energy use is on the rise. Now-a-days, large solar farms are coming up in order to meet the demand of energy and it's time for individuals to jump on the bandwagon by installing solar cells on home rooftops. It will cut down a lot of fossil fuel emissions, especially from 'coal', which is used in power plants.

Using EV's- Electric vehicles are in trend as every well-known brand is coming up with their own Electric vehicles. Although their actual impact is debatable as energy used to charge still comes mainly from fossil fuel power generators but we still use a lot less energy on mobilization. Also using clean energy to charge it, saves the environment enormously.

Rich Diet- Eating a diet rich in plant-based foods, including fruits, vegetables, nuts, seeds and whole grains, and with fewer animal-based foods is good for your health and the environment.

As part of a well-balanced, regular diet and a healthy, active lifestyle, eating the recommended amount of fruit and vegetables for [men](#) and [women](#) every day can help you reduce obesity and maintain a healthy weight, lower your cholesterol and lower your blood pressure.

Reducing your consumption of high kilojoule processed foods will help to reduce excess energy consumption and reduce the environmental impacts associated with these foods. Processed foods are generally high in saturated fat, added sugars or salt, take more energy to produce and are usually packaged, which contributes to landfill waste.

Life in Natural ways - Cooling and heating your home naturally will help you remain comfortable all year round, and save on energy (WHO Report, 2018).

5. Conclusion

We all understand that climate change is a complex bio-physical phenomenon with profound implications for human civilizations and life on the planet. It is now well accepted that human beings have interfered with basic natural cycles, such as energy and water cycles, which have kept our planet in different conditions. Carbon dioxide levels are now at their highest level. At present, we can say that human health is in danger but in the future our existence, lives are at stake.

It is high time to consider the danger of a situation and to take small or big actions in accordance with our roles in our society. We can act in the full range of roles that we occupy – as workers, students, consumers, investors, educators, entrepreneurs and as citizens. And we have acted in all of our areas like – our homes, schools, workplaces and in public life. We can all work to get out the message that climate change is real, it is happening and we need to take action now to address it. Along with our duties towards society, we have to

be more careful towards our health. We have to follow a healthy eating lifestyle with physical exercise to improve our immunity.

We can say- 'Think and act now, else no Tomorrow'.

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