Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 15s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Consequences Of Climate Change And Mitigation Measures For Global Sustainable Development

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Cite this paper as: Dr. Chhavi Mangla, Dr. Aditya Kumar, Chetan Sharma, Dr. Satish Kumar, Dr. Seema Gupta, (2025) Consequences Of Climate Change And Mitigation Measures For Global Sustainable Development. *Journal of Neonatal Surgery*, 14 (15s), 727-732.

ABSTRACT

The mother earth is facing consequential environmental snag with fast depleting natural resources and threat to most of the ecosystems. A large number of environment's friend is showing concerns on overall change in climate of the planet. The general state of the world's climate is referred as 'Global Climate'. Climate change can be categorized into two kinds--natural climate change and anthropogenic climate change. The first reason of changing climate is increased green house gases (GHGs), cutting of trees and human projected activities, resulting in change in the form of increase in temperature, change in rainfall pattern, melting of glaciers and rise in sea level, occurrence of wildfires etc. [1]. Climate has a profound influence on life on earth. It affects landforms, soil types and biodiversity thereby becomes a serious global concern. However, there is a need of the hour to attenuate the effect of global climate change for sustainability. The mitigation define by Intergovernmental Panel on Climate Change (IPCC): "An anthropogenic intervention to reduce the sources or enhance the sinks of greenhouse gases". However, remedial steps need to be taken in order to embark upon these climatic issues. To end these hazards, innovative solutions must be brought forward.

Keywords: *Global warming, Green house gases, Climate change, Sustainability, IPCC*

1. INTRODUCTION

The planet earth is surrounded by many beautiful, fascinating and useful natural resources, but in the past few decades we observed that our earth has faced many environmental issues like depleting of natural resources and further threatening to the valuable ecosystems. Different scientists of the world, policy makers, social activists, the political people and economists are very much concerned about the preservation and conservation of natural resources. The deep concern has showed by different research persons, environmentalists and engineers [2].

Climate change is a natural process which is happening continuously. The variation in weather and climatic conditions are due to the uncertainty of atmosphere. Due to industrial revolution in last couple of decades, the climate change has increased manifold. The over exploitation of natural resources, urbanization, deforestation, luxurious living are also one of the cause of climate variability.

2. CONSTITUENTS OF CLIMATE

The temperature, winds, rainfall and pressure are considered as main constituents of climate which are highly variable in nature. They are closely interrelated and a change in one of these elements generally brings about changes in the others. The different climates on earth are produced by different combinations of these four elements. The climatic dynamics occurs

broadly due to variations in the amount, intensity and distribution of climatic constituents. In the study of climate, the main consideration is with the average occurrence of the various elements, their interrelationships and how they affect the environment?

3. CLIMATE COMPONENTS

Our earth is habitable and hospitable due to the favourable climatic condition brought about by the interaction among different components of climate system. The atmosphere of earth appears to be a blanket of gases. The atmosphere has evolved since the formation of earth and now it is nitrogen and oxygen rich gaseous blanket. The water vapours, trace gases and particulates present in the atmosphere are primarily responsible for the weather phenomena that are observed in the troposphere. The atmospheric phenomena occurring in the troposphere of the atmosphere primarily influence many of the human activities.

4. GLOBAL CLIMATE

Global climate is elementary impacted by the energy that the earth receives from the sun. Further, the climate is also known to be influenced by the amount of energy reserved and redistributed among atmosphere, sea and oceans. The global climate is also influenced by the ranges of mountains and position of continents. It is envisaged that the average surface temperature of the globe is around 5^{o}C which is three times more than the temperature of ice age [3]. The main caused emissions from pre-industrial period to the present age will remain for long period and will have adverse effects on environment [4]. Natural and Anthropogenic climate change are the two basic categories of climate change. It is further classified as long and short term climate change, on the basis of time scale. However, the records of geology show that the climate changes have occurred in the past also when the human beings were not present.

5. FACTORS INFLUENCING CLIMATE CHANGE

The primary source of energy that comes from the sun influence the Earth's temperature. The energy is received from the sun make the earth warm and when it returned back to the atmosphere the earth becomes cool. There are different natural b human caused factors which cause change in the balance of energy in earth.

Natural Factors:

A number of natural factors are known to impact the climate of earth. Some of the natural factors are erupting volcanoes, continental movements, tidal currents etc. These factors have their effect on the intensity of climate change for a long interval of time and going on for hundreds of decades.

Anthropogenic Factors:

The human made factors result in a short term change in climatic conditions. The change in energy balance of earth is also reported in anthropogenic factors. A big change in climate from the starting of 20th century has been remarked by environmentalist which could not be natural one. The continuous upsurge in atmospheric temperature is actually upsetting for all of us.

6. GREEN HOUSE EFFECT/GREEN HOUSE GASES

The plant Earth is featured with natural greenhouse effect where certain gases in earth's atmosphere allow sunlight to enter. The phenomenon of trapping and reradiating of heat by green house gases in the atmosphere is referred to as *green house effect*. The natural green house effect keeps earth surface warm and roughly constant mean global temperature of +15^{0}C [5]. The earth's surface is warming and leading factor behind this is green house effect [6]. The main greenhouse gases include:

Water vapours: This is also known as abundant greenhouse gas (GHG) which spends a little time in the atmosphere. Most of heat is absorbed by CO_2 and water vapours in atmosphere, which add to heat that is already present. It has been reported that the water vapour circulation leads to increase green house effect thereby increase reaction effect [7].

Carbon dioxide (CO_2): Carbondioxide has received a lot of attention with respect to global warming. Main source for increase in concentration of CO_2 in atmosphere is due to burning of fossil fuels. CO_2 is known as most important green house gas which is produced both naturally as well as by human activities. Volcanic eruptions and animal respiration are the natural ways by which CO_2 is released into the atmosphere. The presence of CO_2 in atmosphere increase its impact and warm the atmosphere.

Methane: Methane is also known as green house gas that is found to be more stronger than CO_2 as it absorb more heat than CO_2. It comes from the digestion of ruminants such as cows, goats, buffalos etc. and from the decomposition of organic matter. Warming effect of methane is 20-25 times more than CO_2. Methane is also produced from wet land.

Nitrous oxide: It is observed as a powerful greenhouse gas which is primarily produced by the application of organic fertilizers. The burning of fossil fuels, industrial processes and combustion are also known to produce this gas. Globally, an average concentration of the three main greenhouse gases is projected to increase from 1990 to 2050 [8].

Chlorofluorocarbons (CFCs): The rate of growth of CFCs in the atmosphere increasing year to year. These are highly stable synthetic compounds of carbon and halogens. These compounds were produced especially for refrigeration and air conditioners.

Ozone: Ozone is a form of oxygen. The atmosphere's ozone occurs in the stratosphere where it is produced naturally. It is simply a pollutant which absorbs incoming solar radiation.

Fluorinated gases and aerosols: Some of the fluorinated gases also contribute to global climate change. They are emitted in small amount but they are highly potent green house gases. Such gases utilized as substitutes for ozone depleting substances [9]. Atmospheric aerosols are the suspended particles present in atmosphere. They are produced from both natural and human sources.

7. CONSEQUENCES OF INCREASED GLOBAL CLIMATE CHANGE

Climate change is a long lasting change which put direct and indirect stress on various sectors and the carbon dioxide is the primary cause for global warming [10-12].

Rise in Atmospheric Temperature:

The industries like automobile, power generative plants, cutting of trees from forest, human activities etc. release the GHGs and heating the planet earth. Due to excessive heat in atmosphere, an increased intensity of heat-related deaths, illness, rising sea level, more storm intensity and a large number of dangerous consequences has been arisen. Climate change involves heightened temperatures across numerous worlds [13-14].

Changing landscapes:

The changing patterns of weather due to increase in temperature have resulted in movement of biodiversity around the globe especially towards up mountain slopes and polar regions. The workers have come to conclusion that there is variation in weather pattern which could be attributed to shortage in natural resources, melting of ice etc. which leads high temperature and cause loss and threatening to biodiversity species [15].

Threat to wildlife:

The changing weather conditions affect the vegetation pattern and forcing the faunal diversity to migrate to a new habitat. It influences the species relative abundance, range shifting, activity timing and habitat [16]. The fast declining of biodiversity could be attributed to some of the key factors like temperature, rainfall and wildfires [17].

Ocean acidification /Sea level rise:

The sea levels are rising and glaciers are melting with fast speed. The impact of rising sea level can be easily observed in the coastal or low lying areas, islands which adversely affect the population of these areas. Accordingly [18-20] the irregular weather patterns, melting of glaciers lead to elevated sea level are well known domestic and international effect of climate change [18-20].

Increased risk of drought, fire and floods:

The climate change significantly impacted the natural environmental disasters year to year resulting in substantial loss of many lives [21]. With the increase in global temperatures, it increases the amount of moisture which evaporates from terrestrial as well as aquatic zone, leading to increase drought conditions. The drought affected land is known to be more vulnerable to flooding in rainy or monsoon season.

Intensified storms and damages:

It is envisaged from the scientific findings that hurricanes and tropical storms become more prominent due to increased global temperature which last for long duration, unleashing winds and to make more damage to different ecosystems and their valuable communities. Climate change significantly impacted the survival of the global forests [22].

Ailments and diseases:

The increase in temperature causes more heat-related diseases and even death to human being. The scientific community has linked these fatal heat waves with change in weather pattern. The number of disease causing organisms has been evolved due to changing climatic conditions in different ecological zones. Different skin-borne diseases, water borne diseases, air borne diseases, food borne disease are experienced by the people time to time [23-25].

Impact on production, food security and economic losses:

The economic growth of a county is also depends upon its agriculture and its productivity. Solar energy, temperature, rainfall are the important drivers of plant growth and development. But the changing weather conditions could result in the loss of productivity and growth. Now a days, climate change has become one of the major concern for policy makers at domestic and international level [26-28]. The change in climate has significant impacts on agricultural field, supply of food and its

security. To provide food security to a huge population is a matter of concern that may lead to compromised quality in food products, high value of food stuff and inadequate distribution of food [10].

8. MITIGATION MEASURES

In general, the 'mitigation' means the reduction in green house gases. Various governments at national and international level have started mitigation measures to reduce emission of green house gases to overcome global warming. The workers have acknowledged different community actions in order to mitigate the consequences of global climate change [29]. Focusing on reducing the severity of green house gases being emitted majorly from human activities, "Mitigation" emphasizes and promotes the transition to renewable energy resources, enhancement of energy efficiency, adoption of regenerative agricultural practices along with reduction of deforestation. Effective mitigation requires integrated approach of society and government. Several community actions have been already taken across the globe acknowledging all areas of environmental and human correlation like IPCC, UNFCCC, Kyoto Protocol, NAPCC. Though, these communities are crucial in guiding and achieving global and national mitigation goals. India has been actively participating in global climate conferences, discussions, seminars and advocating for climate justice and global sustainability. Accordingly [31] reduce the use of fossil fuels, enhanced the production of E-vehicle, battery technology, smart planning for cities etc. are able to achieve global sustainability.

Still mitigation effects face challenges at every step due to ever increasing demand for mineral resources and fossil fuels. These challenges offer new direction to mitigation measures to be more effective and resilient in order to contribute to sustainable development by combating challenges at world's deep rooted level.

9. CONCLUSION

The global climate change or global warming is a bitter reality. Due to involvement and over-exploitation of nature and natural resources by human being has put this world under pressure. Appropriate remedial measures required to be taken to tackle with this serious issue. The climatic problems are not only the matter of concern for human being but also to the microbes, plants and animals of the globe. Innovative scientific solutions required be brought forward in order to end this global hazard.

FUTURE SCOPE: The study provides us the knowledge why global atmospheric temperature is rising and affecting us? There is need of the hour to tackle this devastating situation well in time before the things get worst. The necessary steps to limit the emission of GHGs at various levels are required in order to achieve sustainable goals.

AUTHOR CONTRIBUTION: This work was done unitedly with all the authors

CONFLICTS OF INTEREST: There is no conflict of interest.

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