

## GLOBAL WARMING: A MAJOR PROBLEM FOR CLIMATE CHANGE

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### ABSTRACT

The present paper indicates that the climate change is the major environmental issue of this era. Global warming & Climate change adversely affect the whole ecosystem of our biosphere. Increase of green house gases in the atmosphere (or change in composition of gases) warming the earth's atmosphere which affects the land life (human life as well forest life), water life (aquatic life) and air life (bird's life). The human activities like deforestation, industrialization, urbanization, excessive use of refrigerators and ACs, over burning of fossil fuel and increase in no. of automobiles, etc are the major sources in increasing the concentration of green house gases in the atmosphere, thereby imbalance the atmospheric temperature. The earth's biosphere is overloaded with excessive heat forming CO<sub>2</sub> which effect climate with disastrous consequences like Glaciers melting, uneven changes in seasons, increase in sea levels, etc. The present paper gives the different facet of 'Climate Changes', the major sources of its, impacts of climate change on biosphere, some measures for alleviation of global warming and bringing awareness among the peoples.

**Keywords:** Global Warming, Green house gases, Climate change, impacts and measures for alleviation.

### INTRODUCTION

A rise in global temperature by more than the average global temperature i.e 15° C is called **global warming**. In the last 50 years the average temperature of the earth has increased by 1°C. The change in composition of gases affect the balance between the amount of energy received and that bouncing back from the earth into the space, thereby changing the average temperature. The gradual increase in the temperature of our earth is really the major issue. The main reason of this is only and only global warming.

Sunlight comes from the sun in form of solar energy, form it approx. 30% solar energy reflected back to space while remaining 70% of solar energy enters the earth atmosphere, where it absorbed by the atmosphere, oceans, seas, lakes and it heat the planet. This heat is then radiated back to space in form of IR radiation. Most of IR light absorbed by Green House Gases and redirected back towards the earth, causing the atmosphere warm. The problem arise as a result of humans purposely increasing the quantity of greenhouse gases in the atmosphere during the previous 200 years at an alarming rate. Recent measurements of global warming have supported the hypothesis that the earth is actually warming as a result of a human-enhanced greenhouse effect. During the past 100 years, the planet's surface temperature has increased most dramatically. The average surface temperature of the Earth increased by 0.6 to 0.9 degrees Celsius between 1906 and 2006, but over the past 50 years, the pace of temperature growth has nearly doubled. [1].

Landfills and agricultural decomposition of biomass and animal dung produce millions of pounds of methane gas. Several nitrogen-based fertilizers, such as urea and diammonium phosphate, as

well as other soil management practices emit nitrous oxide into the atmosphere. These greenhouse gases remain in the atmosphere for decades or even longer after being emitted. During the industrial revolution in 1750, carbon dioxide and methane levels have risen by 35% and 148%, respectively, according to the Intergovernmental Panel on Climate Change (IPCC).

## **GREENHOUSE EFFECT**

### **What is green house?**

The glass chamber which allows sun rays to pass through it and heat up the external atmosphere i.e. soil and plant. The warm soil & plant emit IR radiation. The glass chamber is opaque to IR radiation. So, all the heat energy generated remains trapped in green house. This cause increase in temperature inside the chamber and maintain the temperature which is required to survive the plant.

### **Green house effect on earth**

It is the similar effect as in green house. Atmosphere around the earth acts as glass chamber of green house. Like glass, the atmosphere around the earth trap the sun heat and maintain the earth's temperature i.e. keep it warm as fit for life. This is called **natural Green house effect**.

The lowermost layer of atmosphere i.e. troposphere, traps the heat by natural process but due to the presence of certain green house gases like carbon dioxide, ozone, methane, chlorofluorocarbons (CFCs), nitrous oxide, water vapors and in some cases chlorine and bromine containing compounds around the earth, the trapped heat partially radiated back to the surface of earth making it warmer. In this way, presence of these gases disturbs the radiative equilibrium in the atmosphere and raises the temperature of earth climate called **green house effect**.

### **Green House Gases**

#### **The following list of greenhouse gases and their sources:**

1. The most prevalent greenhouse gas is **water vapor**, but there are other, equally significant gases. Some result from human action while others emerge naturally.
2. The most major greenhouse gas produced by human activity is **carbon dioxide, or CO<sub>2</sub>**, which is mostly generated by the combustion of fossil fuels. It is the primary cause of climate change. Nowadays, the annual emissions of carbon dioxide (CO<sub>2</sub>) are at 28 billion tonnes. Over the following century, carbon dioxide levels in the atmosphere will rise from roughly 0.03% now to virtually probably 0.06% (a doubling) and maybe 0.09% as a result of human emissions (a tripling).[2]
3. When vegetation is digested, burnt, or allowed to decompose without oxygen, **methane** is created. Grazing cows and other animals, rice fields, and garbage dumps all emit a lot of methane.
4. Although **nitrous oxide** occurs naturally in the atmosphere, human activity is raising the levels. When chemical fertilizers are used, nitrogen oxide is generated. When manure and chemical fertilizers are employed in agriculture, nitrous oxide is generated.
5. **CFCs**, another class of compounds that harm the ozone layer, and other synthetic chemicals with fluorine and chlorine belong to the halocarbon family.

## **GLOBAL WARMING CAUSES**

The greenhouse gases are the major factors responsible behind global warming. They consist of gases such as carbon dioxide, methane, nitrous oxides, and occasionally compounds including chlorine and bromine. The radiative balance in the atmosphere is altered by the accumulation of these gases. Since greenhouse gases absorb part of the Earth's emitted radiation and reflect some of it back towards the surface, they have the overall effect of warming the Earth's surface and the lower atmosphere.

The ozone layer's thinning is the second main factor contributing to global warming. The major cause of this is the presence of source gases that include chlorine. These gases split apart in the presence of UV light, producing chlorine atoms that then catalyze the breakdown of ozone. Aerosols in the atmosphere contribute to global warming by altering the climate in two ways. In addition to scattering and absorbing solar and infrared light, they may also change the microphysical and chemical characteristics of clouds, which might either shorten or lengthen their duration. The earth is cooled by solar radiation scattering, while the air is heated directly by aerosols' absorption of solar energy rather than indirectly through the Earth's surface. There are several ways in which humans contribute to the amount of aerosols in the atmosphere. As an illustration, dust is a result of agriculture.

Burning biomass produces a combination of soot particles and organic droplets. Depending on what is burnt or manufactured throughout the production process, many industrial operations generate a broad variety of aerosols. Moreover, exhaust emissions from different types of transportation create a rich variety of contaminants that are either aerosols straight away or are turned into aerosols by atmospheric chemical processes.[3]

## **GLOBAL CLIMATE CHANGE'S EFFECTS**

Although a variety of categories could be used to discuss the effects of climate change, the scope of this discussion restricts it to only natural and economic effects.

### **1. Effects on nature**

They are already evident, as seen by the rising temperatures, melting polar ice caps, rising sea levels, accelerated desertification, and more rainy winters in Europe. Scientific research has shown that as a result of global warming, Mount Kilimanjaro's snowpack has been steadily declining over time. In 50 years, it's doubtful that this Tanzanian mountain will have any snow on it. It is also found that there are ever more natural calamities. Extreme droughts, floods, and tsunamis happen more frequently now than in the past. There were 13 natural catastrophes globally between 1950 and 1960, compared to 72 between 1990 and 1998. The effects are now undeniably evident, and it is quite probable that they will continue to grow in scope and frequency over time.

**According to the IPCC, there will be many key indicators of climate change including:**

- A increase in global temperatures of between 1.1 and 6.4 degrees Celsius. The precise increase relies on future emissions of greenhouse gases and other pollutants, as well as on the combined action of physical and chemical processes in the atmosphere.
- Certain regions of the world will see a rise in precipitation, while others will become drier.
- Between 18 and 59 centimeters will be added to sea levels throughout the current century. This is due to the retreat of glaciers and polar ice sheets as well as the fact that warmer water takes up more space than colder water. We still don't fully comprehend how the Greenland and Antarctic ice sheets are melting.
- It is anticipated that the Gulf Stream, which carries comparatively warm water from the Caribbean to Europe, would weaken, resulting in a less pronounced rise in temperatures in northwest Europe than elsewhere. But, conventional climate models don't account for a sudden shift in the Gulf Stream.

### **2. Economic repercussions**

Global climate change will have a significant impact on both the economy and living things. The ecology and biological diversity of an area can be significantly impacted by even a minor increase in mean yearly temperature (Pounds & Puschendorf, 2004). The health of people and the stability of ecosystems both greatly depend on biodiversity (Harvard, 2002). Drought, floods, and other climate change consequences will have a significant economic impact. According to some experts, these expenses will eventually account for 5% to 20% of worldwide revenue (Stern, 2006). The costs of the effects of climate change have not yet been accurately estimated by the IPCC. But, it has calculated the price of preventing future change.

In order to accomplish the "Millennium Development Goals," as set forth by the United Nations, it is also crucial to prevent catastrophic climate change.

### **3. Health Impacts of Climate Change**

It is clear that climate change has an influence on human health, it is still difficult to predict the scope and severity of many climate-sensitive health hazards. Yet as science progresses, we can increasingly link an uptick in sickness and death to human-caused global warming and more precisely assess the severity of these health problems.

The susceptibility of populations, their resistance to the current rate of climate change, and the breadth and pace of adaptation will all play a significant role in determining the health implications of climate change in the short- to medium-term. Longer-term outcomes will depend more and more on the degree to which transformative action is done now to decrease emissions and prevent the breaking of hazardous temperature thresholds and possible irreversible tipping points.[4]

## **SOLUTIONS**

- 1. Adaptation:** By adaptation, communities can improve their capacity to deal with an unpredictable future.

Making the proper modifications and alterations is part of adapting to climate change, which comprises minimizing the negative consequences of climate change (or maximizing the good ones) (UNFCCC, 2007). According to the Intergovernmental Panel on Climate Change (IPCC) defines adaptation as "change of natural or human systems in response to present or anticipated climatic stimuli or their impacts, which mitigates harm or exploits favorable opportunities" (IPCC, 2009). The effects of climate change are evident everywhere. The future is shown by rising sea levels, floods, hotter summers, and wetter winters. The main concern is how we should adjust to these changes and how long they will last. Unlike mitigating actions, adaptive solutions do not help to lessen the climatologically issues. Instead, we accept the changes and make the best possible adjustments to the effects. This indicates that extensive infrastructure development will be required, including elevating dikes, upgrading sewage systems, creating more room for water, and other similar actions. We must accept the truth that we will no longer always be protected from flooding and that we must evolve with the times.

- 2. Sources of Alternative Energy:** The risks brought on by global warming are enormous. Overuse of fossil fuels like coal, natural gas, and oil also contributes to it. The use of fossil fuels ought to end right away. The adoption of alternative energy sources is the most important way to stop this catastrophe. Wind, solar, biomass, geothermal, and hydropower are some of them. The best thing about using these sources is how pure they are. They don't emit any pollutants or dangerous gases that can contribute to global warming. They are safe for the environment and don't disturb the natural equilibrium. Most significantly, fossil fuels will eventually run out, and we will eventually need to switch to producing energy from renewable sources.
- 3. Additional Options:** As previously explained, toxic emissions are a significant contributor to global warming. Reducing the use of cars that emit these pollutants is a plausible method to minimize harmful emissions. As many individuals are unwilling to reduce their use of vehicles, this has not had much success. Indeed, some individuals have begun to utilize bicycles and public transportation, while others choose to walk, but these individuals are still rather few in number. It should be remembered that fuel efficiency and pollution levels are the main things to think about while choosing an automobile. To grow a lot of trees, reforestation programs must be launched. Deforestation and forest degradation must be avoided at the federal level. Another option is nuclear power, which emits less pollutant, but it should be utilized cautiously as it might result in catastrophic mishaps. So, if nuclear power is to be made viable, the biggest challenge is to overcome its security, propagation, waste management, and high prices.

## **CONCLUSION**

On the unpleasant reality of global warming and the contribution of humans to it, the scientific community and the environmental community are in agreement. The work under discussion has just scratched the surface of a highly complex area of research in science and engineering. The significant issue of global warming must be addressed with the necessary methods. Animals, plants, and humans are all having difficulties because of this issue. Floods brought on by the melting of the polar ice caps could wreak havoc worldwide. Agriculture and fishing will be completely destroyed by the rise in sea levels. To address these issues, prompt corrective action is required, including but not limited to using renewable energy sources and halting deforestation. To permanently eliminate this risk, creative solutions must be proposed.

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