PUNE RESEARCH DISCOVERY ISSN 2455-9202
AN INTERNATIONAL JOURNAL OF ADVANCED STUDIES VOL 2, ISSUE 2

A STUDY ON REMEDIAL MEASURES TO REDUCE GLOBAL WARMING

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ABSTRACT

Global warming is the hottest topic to be spoken by all the Scientits. It happens due to the Greenhouse Effect. This paper spotlights the causes and effects of global warming. It also offers barriers and suggestions to overcome from its effectuations. Wide-scale use of non-renewable energy resources have exponentially increased the levels of pollution. Most countries have adopted potent Renewable Energy Targets for the next 20 years and are planning to go partially or wholly off the grid. This paper makes the readers to know about global warming and to reduce the causes of global warming to make our earth green.

Keywords: *greenhouse effect, greenhouse gas, carbon sequestration, Global Warming etc.*

INTRODUCTION

Global warming refers to an average increase in the earth's temperature, which in turn causes changes in climate. During the past 4.65 billion years of its history, earth has warmed many times. But at present it is facing a rapid warming mainly due to human activities. The average temperature of earth is about 590F (150C). During the last century, this average has risen by about 10F. By the year 2100, it is believed that the rise would be between 2.5 and 10.40F. This will cause dramatic changes such as rise in sea level, changes in rainfall patterns, wide range of impacts on plants, wildlife and humans. It is due to effect of greenhouse gases, such as carbon dioxide emissions from burning fossil fuels or from deforestation, which trap heat that would otherwise escape from Earth. This is a type of greenhouse effect.

WHY IT IS IMPORTANT?

Scientists have warned that if greenhouse gas emissions continue to rise, we will pass the threshold beyond which global warming becomes catastrophic and irreversible. That threshold is estimated as a temperature rise of 2C above pre-industrial levels, and on current emissions trajectories we are heading for a rise of about 5C. That may not sound like much, but the temperature difference between today's world and the last ice age was about 5C, so seemingly small changes in temperature can mean big differences for the Earth.
India's temperature has risen by nearly 0.60 degree Celsius over the last 110 years and extreme events like heat waves have increased in the last 30 years, the Rajya Sabha was informed on Monday.

According to the Indian Meteorological Department (IMD), in line with rising temperatures across the globe, all India mean temperatures have risen nearly 0.60 degree Celsius over the last 110 years. Further IMD studies have highlighted that extreme events like heat waves have risen in the last 30 years.

GREENHOUSE GAS AND EFFECT

The trapping of energy from the Sun by certain gases in the atmosphere leading to the rise in earth's temperature is known as Greenhouse effect. The gases that help capture the heat, called "greenhouse gases," include water vapour, carbon dioxide, methane, nitrous oxide, and a variety of manufactured chemicals. Some are emitted from natural sources; others are anthropogenic, resulting from human activities. These gases absorb and reflect infra-red waves radiated by earth.

Normally all life on earth depends on this greenhouse effect. If it does not exist, earth would be cooled, and ice would cover earth from pole to pole. But if the greenhouse effect becomes strong it could make the earth warmer than usual. Even a little extra warming may cause problems for humans, plants and animals.

Svante Arrhenius (1859-1927) was a Swedish scientist that was the first to claim in 1896 that fossil fuel combustion may eventually result in enhanced global warming. He proposed a relation between atmospheric carbon dioxide concentrations and temperature. He found that the average surface temperature of the earth is about 15^{o}C because of the infrared absorption capacity of water vapour and carbon dioxide. This is called the natural greenhouse effect. Arrhenius suggested a doubling of the CO_2 concentration would lead to a 5^{o}C temperature rise. He and Thomas Chamberlin calculated that human activities could warm the earth by adding carbon dioxide to the atmosphere. This research was a by-product of research of whether carbon dioxide would explain the causes of the great Ice Ages. This was not actually verified until 1987.

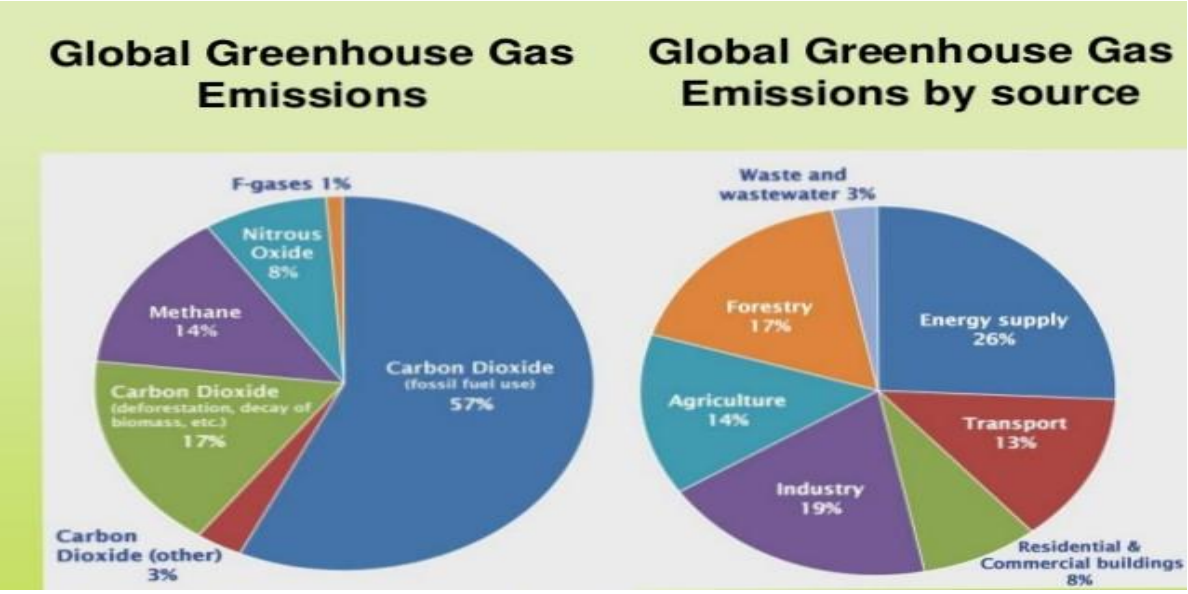
TYPES OF GREENHOUSE GAS:

The most abundant greenhouse gases in Earth's atmosphere are:

- Water vapour (H. 2O)
- Carbon dioxide (CO_2)

- Methane (CH4)
- Nitrous oxide (N. 2O)
- Ozone (O3)
- Chlorofluorocarbons (CFCs)

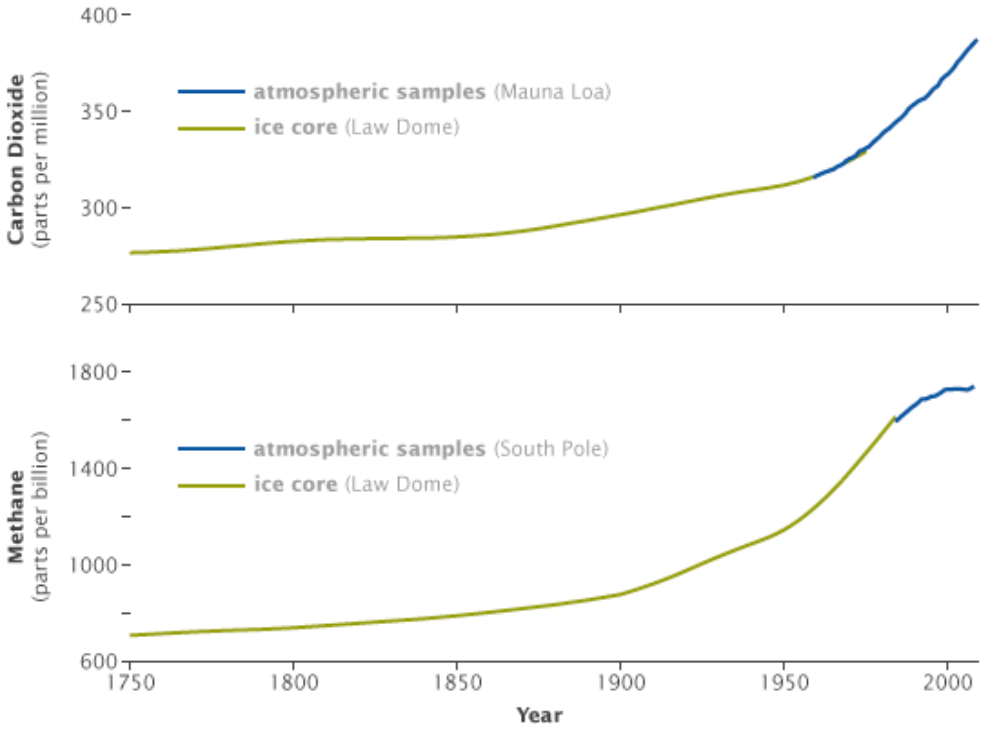
In the environment, greenhouse gases occur (i) naturally or (ii)From human activities.



The most abundant greenhouse gas is carbon dioxide. It reaches the atmosphere due to volcanic eruptions, respiration of animals, burning and decay of organic matter such as plants. Normally carbon-dioxide is removed by the plants by photosynthesis. Carbon-dioxide is also absorbed into ocean water. But humans by their activities increase the release of carbon dioxide into the atmosphere. Such activities include burning of fossil fuels, solid wastes, wood and wood products to drive vehicles, generate electricity etc. At the same time due to deforestation, the number of trees available to absorb carbon-dioxide through photosynthesis has been greatly reduced.

Human activities have caused carbon-dioxide to be released to the atmosphere at rates much faster than that at which earth's natural processes can recycle this gas. There were about 281 molecules of carbon-dioxide per million molecules of air (i.e., parts per million or ppm) in 1750. Today atmospheric carbon-dioxide concentrations are 368 ppm, a 31% increase.

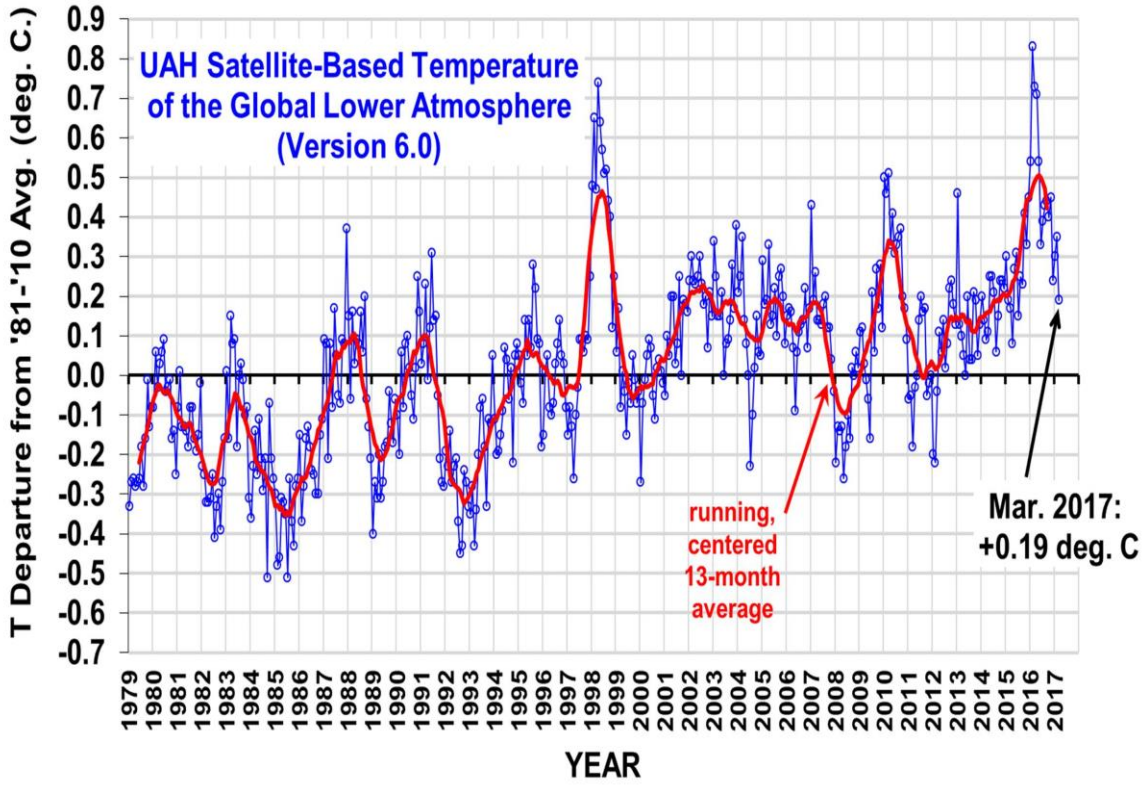
Methane traps 20 times more heat than carbon-dioxide. It is emitted during the production and transport of coal, natural gas and oil. It is also emitted from rotting organic waste in sand fills, by the cows as a by-product of digestion. Since 1750, the amount of methane in the atmosphere has more than doubled. Methane is the primary component of natural gas, a common fuel source. If methane is allowed to leak into the air before being used, from a leaky pipe, for instance, it absorbs the sun's heat, warming the atmosphere.



Nitrous Oxide traps 300 times more heat than carbon-dioxide. Burning fossil fuels and ploughing farm soils releases nitrous oxide. Since 1750 its level increased by 17%. Hydrocarbons formed from the manufacture of foams, coolants such as chlorofluorocarbons used in refrigerators are the other gases responsible for global warming. Nitrous oxide, also known as "laughing gas," is ranked third behind carbon dioxide and methane in contributing to global warming, and is regulated under the Kyoto Protocols.

Trifluoromethyl sulphur Penta fluoride, CF_3SF_5, is a rare industrial greenhouse gas, first published in 2000 by a group of researchers from Germany, the United Kingdom and the States. Trifluoromethyl sulphur Penta fluoride is considered to be one of the several super greenhouse gases. On a per molecule basis, it is considered to be the most potent greenhouse gas present in Earth's atmosphere. However, the current concentration of Trifluoromethyl sulphur Penta fluoride remains at a level that is unlikely to measurably contribute to earth's warming. The source of the gas is attributed to anthropogenic sources, possibly a by-product of the manufacture of fluorochemicals, originating from reactions of SF_6 with fluoropolymers used in electronic devices and in microchips, or the formation can be associated with high voltage equipment created from SF_6 (a breakdown product of high voltage equipment) reacting with CF_3 to form the CF_3SF_5 molecule. Even though the gas is rare, it traps more effectively than all other greenhouse gases. The saddest part of it is that the industrial source of the gas is not yet identified.

GLOBAL MEAN SURFACE TEMPERATURE:



EFFECTS OF GLOBAL WARMING:

1. Melting of Glaciers:

The melting of glaciers will create plethora of problems for human kind and the animals living on the earth. Due to increased global warming, the level of the sea will rise which will lead to flooding and this will in turn create havoc in human life. Apart from raising the sea levels, it will also endanger of animals and thus will hamper the balance of the ecosystem.
Areas in the Arctic are diminishing away and flowing into major oceans. Rising temperatures create a much-accelerated threat to wildlife and whole ecosystems in these regions. With glaciers melting at vast rates, a chain of events is being set into motion that cannot be reversed.

2. Climate Change:

Irregular weather patterns have already started showing results. Increased precipitation in the form of rain have already been noticed in polar and sub-polar regions. More global warming will lead to more evaporation which will cause more rains. Animals and plants cannot easily adapt to increased rainfall. Plants may die and animals may migrate to other areas, which can cause entire ecosystem out of balance.

3. Droughts:

While it may be flooding in Savannah, severe drought is happening elsewhere in the world. As temperatures warm, the presence of drought has increased in the western U.S. Add on top of that heat waves and no precipitation, whole forests have begun to disappear including tens of millions of trees in Colorado's Rockies.

Large scale evaporation will be the major cause of droughts in many places particularly Africa. Although, it is reeling under the huge pressure of water crisis, increased global warming would further make the situation worse and will cause malnutrition.

4. Diseases:

As the temperature becomes warmer, it can affect the health of humans and the diseases they are exposed to. With the increase in the rainfall, water borne diseases are likely to spread like malaria. The earth will become warmer and as a result heat waves are likely to increase that can cause a major blow to the people.

5. Hurricanes Frequency:

As the temperature of the oceans rises, hurricanes and other storms are likely to become stronger. With the increase in the global warming, the water in the ocean warms up and it heats up the surrounding air, creating hurricanes.

6. Rise of Sea Levels:

The melting of polar ice-caps and less water evaporating into the atmosphere are causing increased sea levels. Quaint coastal towns and cities near the U.S. east coast and Gulf of Mexico are just a few areas where devastating flood damage is starting to make its mark in history.

7. Agriculture:

Global warming can affect agriculture. Although the results are not visible yet, but it may show its effects in years to come. As the global temperature will increase, plants will find it harder to survive and will die. Plants are the major source of food for human beings and as a result food shortage may occur. The shortage of the food may lead to war and conflicts in some countries.

8. Heat Waves:

If you thought last summer's headlines of record changing temperature was mind blowing, just wait. Because of greenhouse gases and other causes, unexpected streaks of severe weather are just the tips of the iceberg in global warming. Heat waves cause dangerously hot weather and in recent years, more deaths have occurred due to heat waves than in the last sixty years.

9. Frequent Wildfires:

While wildfires are a natural occurrence, with the added carbon dioxide in the air, and hotter summers, the evidence speaks for itself. More frequent wildfires continue to surface in vast amounts each year. The rate at which they burn is longer than the last, and with the release of carbon dioxide into the air, not only are people's lives in danger, but wildlife severely suffers. Each time a wildfire burns, the less oxygen there is to combat the dangerous amounts of carbon dioxide being released into the atmosphere.

10. Severe Precipitation:

Not only is there insurmountable scientific evidence that global warming is increasing, certain types of events, including extreme precipitation is on the rise. Global warming also creates conditions that can lead to more powerful hurricanes and summer storms. Cities and towns on the coast, where sea levels are already rising, face even more challenges as precipitation poses severe flooding.

11. Longer/Shorter Seasons:

Are you a lover of fall? Maybe spring is your favourite season. Whatever weather and climate you enjoy, it could be happening sooner and shorter, or later and longer. Global warming affects show spring is occurring 10 days sooner than it has in the past. While it may be nice to go from snow pants to shorts sooner, this could cause flooding from reservoirs filling too soon, and droughts were there's not enough precipitation to provide adequate nourishment for crops.

12. Crops:

If seasons are changing, weather patterns are going berserk, and flooding is occurring due to rising sea levels, our crops are barely getting a fighting chance. Once the food processing industry goes haywire, the economy will really start getting interesting. The price of staple crops could sky rocket causing major inflation and more economic woes.

13. Oceans:

It's reported that coral reefs are continuing to see diminished presence in the ocean due to global warming. Temperature changes affect more than what's happening on our lands. Once coral reefs are affected, entire ecosystems that thrive become obsolete.

14. Food Chain:

Change the time and seasons and birds are flying south for winter sooner, hibernation takes longer, and a whole series of events is set in motion for complete collapse of animal life. The entire food chain could be disrupted and enormous consequences could follow.

15. Health Risks:

As more carbon dioxide is trapped in the atmosphere, breathable air becomes harder to come by. If global warming continues, the U.S.is looking at 60 billion dollars to combat respiratory diseases and symptoms.

16. Animal Extinction:

Nature's best is beautifully displayed in every nook of planet earth-the majestic lion, to the humble deer. Imagine whole populations where animals can no longer thrive. With such a vast eruption in the animal kingdom, our own world becomes in danger.

17. Quality of Life:

If doing simple things like taking a walk outside or working in your garden, become unenjoyable due to severe heat waves, think of the quality of life on a much larger scale. With rising global temperature, even the smallest things we took for granite will be sorely missed.

18. Economic Collapse:

Who knows how badly the economy could get with decreased vitality of crops, productions, and manufacturing items. Without having nature on our side, the food industry will fall apart. Without the resources to feed the world, manufacturing will collapse. Hunger will be our biggest battle.

19. Air Quality:

As more chain of events are set in motion, air quality will continue to get worse. As bad as it is now in some areas in the world, multiply that by a million.

20. Decreased Population:

If global warming goes unchecked, it's estimated the world's human population would decrease by 75 percent. With the increasing severity of storms, floods, earthquakes, and wildfires, natural disasters would diminish half of the earth's population. Another 25 percent would succumb to air related illnesses, starvation, and poverty.

21. Human Extinction:

What little would remain of the earth as we know it, would be a sliver. The rest of the human population would have to find and implement alternative energy on a consistent and regulated basis. It's hard to imagine, but each of these events affects another event. Pretty soon, the domino effect will reach home. There's plenty that can be done to guarantee these effects won't become earth's ultimate fate

22. Going off the Grid:

If you can't stand to go without power during a thunderstorm, imagine our whole electrical infrastructure going off the grid. With the current threat of increasing storms and violent aftermaths of hurricanes and tropical storms, it would only take a few hits to crumble our electrical system.

23. Fresh Water:

Our fresh water supply will great diminish with global warming. With the demise of coral reefs and the ecosystems therein, less fresh water will flow into lakes and tributaries.

24. Disappearing Countries:

Countries like Greenland are deteriorating at a highly-elevated rate. Beautiful cities, even continents could one day be part of a vast sea.

RECENT CLIMATIC DISASTER DUE TO GLOBAL WARMING IN INDIA:

FLOOD IN INDIA:

India is the most flood distressed state in the world after Bangladesh. Approximately 40 million hectares of the land has the possibility to floods, with 8 million hectares affected by it. It takes place unpredictably every year at one place or other. Most possible states of India are Uttar Pradesh, Bihar, Assam, West Bengal, Gujarat, Orissa, Andhra Pradesh, Madhya Pradesh, Maharashtra, Punjab and Jammu & Kashmir.

The top floods in India's history

1. 1987 Bihar Flood: The flood of 1987 in Bihar was so destructive that it left a total of 1400 people and more than 5000 animal dead. A total of 67,881+680.86 lac INR was the damage to the state; affecting more than 29 million people. After this flood, the River Koshi has been named as" Sorrow of Bihar" (Bihar kashok).
2. 2008 Bihar floods: The 2008 Bihar floods are considered as one of the most disastrous floods in the state's history. The flood affected more than 2 million people. The flooded and affected areas were Supaul, Araria, Madhepura, Saharsa, Champaran and Purnea.

EFFORTS TO CONTROL GLOBAL WARMING:

Two major ways are there to control global warming:

1. To keep the carbon-dioxide out of the atmosphere by storing the gas or its carbon component somewhere else, a strategy called carbon sequestration.
2. To reduce the production of greenhouse gases.

CARBON SEQUESTRATION:

Carbon sequestration is the process involved in carbon capture and the long-term storage of atmospheric carbon dioxide. Carbon sequestration involves long-term storage of carbon dioxide or other forms of carbon to either mitigate or defer global warming and avoid dangerous climate change. It has been proposed as a way to slow the atmospheric and marine accumulation of greenhouse gases, which are released by burning fossil fuels.

The simple technique is to preserve trees and plants more. Trees, take up carbon-dioxide, break it down in photosynthesis, and store carbon in new wood. It need massive reforestation. Carbon-dioxide can also be sequestrated directly into deep ocean water or into oil wells or some aquifer form which it cannot escape.

Usage of alternate fuels such as nuclear energy, solar power, wind power and hydrogen fuel cells which emit no greenhouse gases are being considered.

CONCLUSION:

It might be observed that our earth is facing a sever increase in temperature which can cause several disasters to all living things. This shows that global warming is a major challenge for our global society. To overcome this condition, first, there must be an international political solution. Second, funding for developing cheap and clean energy production must be increased, as all economic development is based on increasing energy usage.

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