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GLOBAL WARMING AND ITS IMPACTS ON INDIA

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ABSTRACT:-

India being an agro based country which mainly depends on monsoon rainfall. A major population is dependent on it. But due to variations seen in monsoon because of change in climate, India is facing a major drawback with respect to drought, floods, cyclones, low productivity etc. so the need arrived for research on the causes of such climate change.

This paper is divided into three parts, (a) Reasons for Global Warming and Climate change, (b) its Impact on India, (c) Government Policies and solutions. The purpose of this paper is to access how greenhouse gases increases the atmospheric temperature which leads to the Global Warming and further analyzing the impacts of climate change caused due to change in concentration of various greenhouse gases on India in respect to climatic disasters, agriculture problem, problem of farmers suicide and finally to provide mitigation measures to combat this global burning issue.

KEYWORDS:-*Global Warming, Climate Change, El-Nino, Drought , Flood, Agriculture, National Action Plan on Climate Change, Greenhouse Gases.*

INTRODUCTION:-

Global Warming is define as an increase in the average temperature of the earth's atmosphere, especially is sustained increase significant enough to cause changes in the Global Climate. About 75% of the solar energy reaching the earth is absorbed by the earth's surface, which leads to an increase in its temperature, the rest of the heat radiates back to the atmosphere. Some of the heat is trapped by greenhouse gases mostly carbon dioxide. A carbon dioxide is released by various human activities, the amounts are rapidly increases. This is causing Global Warming. The average surface temperature is about 15°C. This is 30°C higher than it would be in the absence of

the greenhouse effect. There are various reasons for destruction of this greenhouse effect. The major ones are:-

- **Man-induced deforestation:** Each day our forests are bulldozed for the prospects of farms, factories and buildings. Fuel used for wood and charcoal only adds to polluted gases in the atmosphere. The loss of our forests results in a chain reaction where too much carbon is released into the air, with not enough oxygen to combat it. Deforestation must be stop to protect our atmosphere.
- **Fossil Fuels:** Pollution whether it is vehicular, electrical or industrial is the main contributor to the Global Warming. Every day billions of vehicles release various gases into the atmosphere. Electricity causes pollution in many ways. Over 75% electricity worldwide is produced by burning fossil fuels. Coal is the major fuel that is burn to produce power, which on burning produce carbon dioxide. Industries on the other hand release various gases in to the air like carbon dioxide, methane, nitrous oxide etc.
- **Fertilizers use:** the countless farmlands across the world uses fertilizers. The fertilizers produces nitrous oxide once it absorb the soil. Nitrous oxide is much more dangerous as a greenhouse gas.
- **Over Population:** another cause of Global Warming is over population. Since carbon dioxide contributes to Global Warming, the increase in population makes the problem worse because we breathe out more carbon dioxide in the atmosphere. More people means more demand for food, more demand for cars and more demand for homes and thus more carbon dioxide in the atmosphere is added.
- **Forest fires:** Deforestation by nature is another leading cause of Global Warming. Forest fires emit carbon – filled smoke into the atmosphere, and new forest's growth is slow and more stable enough to produce the much needed oxygen in to the newly, suffocating carbon air.

Impact of Global Warming on the Climate of India:

Being such a huge country, India exhibits a wide diversity of temperatures; from the freezing called winters in the Himalayas to the scorching heat of the Thar Deserts. The climate of India is dominated by the monsoon season which is the most important season of India, providing 80% of the annual rainfall. The season extends from June to September with an average annual rainfall between 750-1500mm across the region. Now a days frequent changes are seen in the rainfall patterns in India due to change in climate because of Global Warming. The effect of Global Warming on the Climate of India has led to climate disasters. India is a

Disaster prone area, with the statistics of fifteen out of twenty eight states being disaster prone, with foods being the most frequent disasters. With the increasing trends of Global Warming predictions of severe climatic events have been made for India. The anticipated variations in precipitation, the melting of glaciers and expending seas are projected to influence the Indian climate, with an increase in incidence of floods, cyclones, droughts etc. Global Warming is also

posing a threat to the foods security situations in India with recurring severe droughts and ravaging floods engulfing the arable land. Rising temperature on the Tibetan Plateau are causing the melting of Himalayan glaciers, reducing the water flow in the rivers on which the livelihoods of thousands of farmers depend. There are various climatic disasters occurring in India, they are:

- **Floods:** India is the most flood distressed state in the world after Bangladesh, accounting for one fifth of the global deaths every year with 30 million people displaced from their homes yearly. Major floods in India are:
 - ***Kedarnath disaster:*** Recent climate change have had significant impact on high mountain glacial environment. Rapid melting of ice and heavy rainfall has resulted in the formation and expansion of moraine– dammed lakes creating a potential danger from dammed lake outburst floods. On 16-17 June 2013, heavy rains together with moraine – dammed lake (Chorabari Lake, also known as Gandhi Sarovar Lake) burst caused flooding of Saraswati and Mandakini rivers in Rudraprayag District of Uttrakhand. There are reports of loss of large number of human lives and damage to the property to the livestock.
 - ***Jammu & Kashmir Flood:***The extreme weather changes caused by Global Warming led to severe rainfall which resulted in causing major flood in the state in September 2014. *“It is a combination of an intense and unprecedented rainfall event combined with mismanagement and lack of preparedness,”*(Sunita Narain, CSE director general, while seeking to remind the government and policy – makers of impact of climate change).
 - ***Chennai Rain:***Torrential rains in Chennai has led to disruption of normal lives and business in December 2015. As per Indian Experts Chennai rain is the result of Global Warming. *“We are now experiencing the full blown impacts of climate change. The extreme rainfalls that Chennai is experiencing is a direct outcome of our ever warming planet,”* (Chandra Bhushan Depty Director General of Delhi – based Centre for Science & Environment).
- **Drought:** Drought is a major problem seen in India which affects the life of many farmers throughout the country. Many states are being hit by drought and the major impact has been in Maharashtra. Recently in Mumbai nearly 90 lakh farmers have been impacted by the drought that has devastated by the Kharif Crop. Maharashtra is already known for its farm crises and reports the highest numbers of farmer’s suicides in the country. The Drought – brought on by a delayed and inadequate monsoon – is set to deepen the distress for its cultivators.
- **Cyclones:** Changing weather phenomena has led to origin of various cyclones in India. Various cyclones hit the coastal areas of India and caused severe damages to individuals, property, livestock, arable land etc.some of the cyclones are:
 - ***Cyclone Nilam:*** on 31st Oct.2012, the coastal town of Mahabalipuram in Tamil Nadu was hit by one of the most severe South Coast cyclones. Many peoples

were killed and property worth rupees 100 Crore were also damaged by the cyclone.

- **Cyclone Phailin:** In October 2013, Odisha has faced the most violent cyclonic storm in the span of only two years. Cyclone Phailin gushed through land, and lakes into the eastern states. The districts of Ganjam alone has faced damage of rupees 3000 crores and 1,154,725 people were evacuated to other place.
- **Cyclone Hudhud:** In 2014, Odisha and Andhra Pradesh faced a severe cyclone Hudhud which damaged the state on an industrial scale. The storm had first hit Vishakhapatnam at 185 km/hour and flooded the naval dockyard. Damaged the airport and washed away a bridge in the city. The storm was so intense that it caused around 70 deaths in Andhra Pradesh alone and damaged around 21,908 crore rupees worth of property.

Cyclone like 'Chapala' and 'Megh' were originated in Arabian Sea in 2015.

- **The El Nino/La Nino – Southern Oscillation (ENSO):** (ENSO is a climate pattern that occurs across the Pacific Ocean roughly every five years. The changes associated with the El Nino persists for about a year. The atmospheric variations associated with the El Nino and LA Nina events are called the Southern Oscillations. Due to global climate change, the number of El Nino events have increased, causing an increase in extreme weather (floods and droughts) in many regions of the world. This also has a strong correlation to the incidence of epidemic diseases. Cycles of malaria in India, Venezuela and Colombia have now been linked to El Nino. Out breaks of Australian encephalitis (a mosquito – transmitted diseases) occur in South – east Australia after heavy rainfall and are associated with La Nina events). The El Nino causes severe drought conditions in India.

Impact of Climate Change in India

Impact of Climate Change on Agriculture and Farmers:

The above such climatic disasters result into the major problem of irregular cropping pattern, irrigation problem, lack of arable land etc. in India. The weather in India these days has become erratic at best and rainfall does not happen at the right time. Moderate rainfall, which is needed so much for proper agriculture, is now becoming a thing of the past and things have reached the extreme. The situation is bad in Central India, which can be regarded as the agricultural heartland of India. In the past few years, the weather patterns have been changing. The situation does not become any better even man there is normal rainfall. 56% of the country depends on snow – fed rivers for its water and in such a situation even marginal fluctuations can have devastating effects. Studies by Indian Agricultural research Institute (IARI) and others indicate greater expected loss in the Rabi Crop. Every 1°C rise in temperature reduces heat production by 4-5 million tones. Other impacts on agricultural and related sectors include lower yields rom dairy cattle and decline

in fish breeding, migration, and harvests. Global reports indicate a loss of 10-40% in crop production by 2100.

In a country like India where agriculture is dependent on its monsoon type of climate is facing a serious drawback in farming due to irregular monsoon patterns and climatic disasters caused by Global Warming. Various species of flora and fauna are destroyed by changing climate patterns. Agriculture in India is a source of livelihood to a major population basically the poor ones. But Global Warming is indirectly affecting the agriculture and farmers. Poor and marginal farmers who cannot bear the crop failure chooses the option of 'suicide'. So it can be said that Global Warming is indirectly responsible for farmer's suicide in India.

Impact on Health:

Changes in climate may alter the distribution of important vector species (for example malarial mosquitoes) and may increase the spread of such diseases to new areas. If there is an increase of 3.8°C in temperature and a 8% increase in relative humidity the transmission windows that is months during which mosquitoes are active, will be open for all the year round in many states of India.

Ozone depletion may lead to various skin diseases like sunburn, tanning, chronic diseases, skin cancer etc.

Mental disorders, mood swings, irritating behavior can prevail in the era of climate change.

Impact on Forests:

Based on future climate projections of Regional Climate Model of the Hadley Center (HadRM3) using A2 and B2 scenarios and the BIOME4 vegetation response model, Rabindranath, show that 77% and 68% of the forest area likely to experience shift in forests types, respectively under the two scenarios, by the end of the century, with consequent changes in forest produce, and in turn, livelihoods based on those products. Correspondingly, the associated biodiversity is likely to be adversely impacted. India's NATCOM I projects an increase in the area under xeric scrubland and xeric woodlands in central India at the cost of dry savannah in these regions.

Impact on Water Resources:

Changes in key climate variables, namely temperature, precipitations, and humidity, may have significant long term implications for the quality and quantity of water. River systems of the Brahmaputra, the Ganga, and the Indus, which benefit from melting snow in the lean season, are likely to be particularly affected by the decrease in snow cover. A decline in total run-off for all river basins, except Narmada and Tapi, is projected in India's NATCOM I. due to sea level rise, fresh water sources near the coastal regions will suffer salt intrusion.

Impacts on Coastal Areas:

A mean sea Level Rise (SLR) of 15-38 cm is projected along India's coast by the mid-21st century and of 46-59 cm by 2100. India's NATCOM I assessed the vulnerability of coastal districts based on physical exposure to SLR, Social exposure based on population affected, and economic impacts. In addition, a projected increase in the intensity of tropical cyclones poses a threat to the heavily populated coastal zones in the country (NATCOM, 2004).

Our Government is working for the mitigation of such a devastating phenomena i.e., Global Warming and has framed various policies on climate change. Such as,

Prime Minister's Council on Climate Change:

India is faced with the challenges of sustaining its rapid economy growth while dealing with the global threat of climate change. Recognizing that climate change is a global challenge, India will engage actively in multi-lateral negotiations in the UNFCCC, in a positive, constructive and forward looking manner. The national action plan for climate change (NAPCCC) will be guided by the following principles:

- Protecting the poor and vulnerable sections of the society through an inclusive and sustainable development strategy, sensitive to climate change.
- Achieving national growth objectives through a qualitative change in directions that enhances ecological sustainability, leading to further mitigation of greenhouse gas emissions.
- Deploying appropriate technologies for both adaptation and mitigation of greenhouse gases emissions extensively as well as at an accelerated pace.

There are eight National Missions which form the core of the National Action Plan, representing multi – pronged, long term and integrated strategies for achieving key goals in context of climate change. These are:

- National Solar Mission
- National Mission for Enhanced Energy Efficiencies
- National Mission on Sustainable Habitat
- National Water Mission
- National Mission for Sustaining the Himalayan Eco System
- National Mission for a Green India
- National for Sustainable Agriculture
- National Mission on Strategic Knowledge for Climate Change

These National Missions will be Institutionalized by respective Ministries and will be organized through inter – sectoral groups which include in addition to related ministries, Ministry of Finance, Experts from Industry, Academia and Civil Society. The institutional structure would vary depending on the task to be addressed by the Mission and will include providing by the opportunity of the best management model.

The United Nations Framework Convention on Climate (UNFCCC): Signed by over 150 countries at the Rio Earth Summit in 1992. The convention took effect in 1994. By 1995 negotiations had started on a protocol. This led to the Kyoto Protocol adopted unanimously in 1997. The main purpose of this protocol was to provide mandatory targets on greenhouse gas emissions for the world's leading economies and further recognized the commitment under the protocol would vary from country to country.

Conclusion:-

From the above discussed matter we came to know that Global Warming is directly or indirectly causing destructions of not only living environment (climate change) but is also the reason of depletion of nation's growth as it hampers agriculture, cause various climatic disasters, forces farmers to suicide, destroys infrastructure, causes health problems and is thus the cause of county's low development.

So there is a need for combating such a global issue and this became achieve through major afforestation programmes, and by changing our living habits – (A.C., Vehicles, Electricity, etc.) which results in emission of greenhouse gases.

Afforestation on major scale can contribute to tackle a problem of Global Warming to a some extent. And this can be done only when, we the human beings treats plants and trees as our children.

**“Vrikshon Ko Paalon
Apne Bachchon Ki Tarah
Apne Bachchon Ke Liye”**

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