Global Warming And Climate Change: India's Initiative

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Introduction:

Global warming is the phenomenon of a gradual increase in the temperature near the earth's surface. This phenomenon has been observed over the past one or two centuries. This change has disturbed the climatic pattern of the earth. However, the concept of global warming is quite controversial but the scientists have provided relevant data in support of the fact that the temperature of the earth is rising constantly.

There are several causes of global warming, which have a negative effect on humans, plants and animals. These causes may be natural or might be the outcome of human activities. In order to curb the issues, it is very important to understand the negative impacts of global warming.

Climate Change is one of the most formidable development challenges faced by humanity today. Its consequences are global and intergenerational. It is primarily caused by the building up of Green House Gases (GHG) in the atmosphere. Global Warming is a specific example of the broader term „Climate Change" and refers to the observed increase in the average temperature of the air near earth"s surface and oceans in recent decades. Scientific studies have shown that the global atmospheric concentrations of carbon dioxide, methane and nitrous oxide which are the most important Green House Gases, have increased markedly as a result of human activities since 1750 and now far exceed preindustrial values The impact of Climate Change tends to be more pronounced for the disadvantaged, making them even more vulnerable to climate risks. Developing countries are especially vulnerable, many with limited capacity to adapt to rising sea levels or recover from associated losses which poses a key threat to Sustainable Development.

Causes of Global Warming : (A) Man-made Causes of Global Warming

1. Green House Gases(GHGs)

a.Carbon dioxide (CO_2)

CO_2 is released through natural processes, such as volcanic eruptions, plant respiration and animals and humans breathing. But the atmospheric CO_2 concentration has increased by 50% since the Industrial Revolution began in the 1800s, due to human activities like the burning of fossil fuels and large-scale deforestation. Due to its abundance, CO_2 is the main contributor to climate change.

b. Methane(CH_4)

Methane is produced naturally through decomposition. But again, human activity has displaced the natural balance. Large amounts of methane are released by cattle farming, landfill waste dumps, rice farming and the traditional production of oil and gas.

c. Nitrous oxide(N_2O)

Nitrous oxide is produced through the large-scale use of commercial and organic fertilisers, fossil-fuel combustion, nitric-acid production and biomass burning.

d.Water vapour

Water vapour is the most abundant greenhouse gas. It increases as the earth's atmosphere warms but unlike CO_2, which can remain in the earth's atmosphere for centuries, water vapour persists for only a few days.

In contrast, the three industrial fluorinated gases – hydrofluorocarbons (HFC), perfluorocarbons (PFC) and sulphur hexafluoride (SF6) – are solely man-made during industrial processes and do not occur in nature. Though they are present in very small concentrations in the atmosphere, they trap heat very effectively, meaning they are extremely potent.SF6, which is used in high-voltage electricity equipment, has a 'Global Warming Potential' 23,000 times greater than CO_2.

2. Deforestation

Plants are the main source of oxygen. They take in carbon dioxide and release oxygen thereby maintaining environmental balance. Forests are being depleted for many domestic and commercial purposes. This has led to an environmental imbalance, thereby giving rise to global warming.

3. Use of Vehicles

The use of vehicles, even for a very short distance results in various gaseous emissions. Vehicles burn fossil fuels which emit a large amount of carbon dioxide and other toxins into the atmosphere resulting in a temperature increase.

4. Chlorofluorocarbon(CFC)

With the excessive use of air conditioners and refrigerators, humans have been adding CFCs into the environment which affects the atmospheric ozone layer. The ozone layer protects the earth surface from the harmful ultraviolet rays emitted by the sun. The CFCs have led to ozone layer depletion making way for the ultraviolet rays, thereby increasing the temperature of the earth.

5. Industrial Development

With the advent of industrialization, the temperature of the earth has been increasing rapidly. The harmful emissions from the factories add to the increasing temperature of the earth. In 2013, the Intergovernmental Panel for Climate Change reported that the increase in the global temperature between 1880 and 2012 has been 0.9 degrees Celsius. The increase is 1.1 degrees Celsius when compared to the pre-industrial mean temperature.

6. Agriculture

Various farming activities produce carbon dioxide and methane gas. These add to the greenhouse gases in the atmosphere and increase the temperature of the earth.

7. Overpopulation

An increase in population means more people breathing. This leads to an increase in the level of carbon dioxide, the primary gas causing global warming, in the atmosphere.

(B) Natural Causes of Global Warming

1.Volcanoes

Volcanoes are one of the largest natural contributors to global warming. The ash and smoke emitted during volcanic eruptions goes out into the atmosphere and affects the climate.

2.Water Vapour

Water vapour is a kind of greenhouse gas. Due to the increase in the earth's temperature, more water gets evaporated from the water bodies and stays in the atmosphere adding to global warming.

3.Melting Permafrost

P2ermafrost is frozen soil that has environmental gases trapped in it for several years and is present below Earth's surface. It is present in glaciers. As the permafrost melts, it releases the gases back into the atmosphere, increasing Earth's temperature.

4.Forest Blazes

Forest blazes or forest fires emit a large amount of carbon-containing smoke. These gases are released into the atmosphere and increase the earth's temperature resulting in global warming.

Effects of Global Warming:

1.Rise in Temperature

Global warming has led to an incredible increase in earth's temperature. Since 1880, the earth's temperature has increased by ~1 degrees. This has resulted in an increase in the melting of glaciers, which have led to an increase in the sea level. This could have devastating effects on coastal regions.

2. Threats to the Ecosystem

Global warming has affected the coral reefs that can lead to the loss of plant and animal lives. Increase in global temperatures has made the fragility of coral reefs even worse.

3. Climate Change

Global warming has led to a change in climatic conditions. There are droughts at some places and floods at some. This climatic imbalance is the result of global warming.

4. Spread of Diseases

Global warming leads to a change in the patterns of heat and humidity. This has led to the movement of mosquitoes that carry and spread diseases.

5. High Mortality Rates

Due to an increase in floods, tsunamis and other natural calamities, the average death toll usually increases. Also, such events can bring about the spread of diseases that can hamper human life.

6. Loss of Natural Habitat

A global shift in the climate leads to the loss of habitats of several plants and animals. In this case, the animals need to migrate from their natural habitat and many of them even become extinct. This is yet another major impact of global warming on biodiversity.

Initiatives for Addressing Climate Change:

The National Action Plan on Climate Change Recognizing the challenges of Climate Change, the Government of India had released on 30 June 2008 the National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation. The Plan identifies eight core "National Missions" viz. National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a "Green India", National Mission for Sustainable Agriculture, National Mission on Strategic Knowledge for Climate Change.

1. National Solar Mission: The NAPCC aims to promote the development and use of solar energy for power generation and other uses, with the ultimate objective of making solar competitive with fossil-based energy options. It also includes the establishment of a solar research center, increased international collaboration on technology development, strengthening of domestic manufacturing capacity, and increased government funding and international support.

2. National Mission for Enhanced Energy Efficiency: The NAPCC recommends mandating specific energy consumption decreases in large energy-consuming industries, with a system for companies to trade energy-saving certificates, financing for public–private partnerships to reduce energy consumption through demand-side management programs in the municipal, buildings, and agricultural sectors, and energy incentives, including reduced taxes on energy-efficient appliances.

3. National Mission on Sustainable Habitat: The NAPCC also aims at promoting energy efficiency as a core component of urban planning by extending the existing Energy Conservation Building Code, strengthening the enforcement of automotive fuel economy standards, and using pricing measures to encourage the purchase of efficient vehicles and incentives for the use of public transportation. The NAPCC also emphasizes on waste management and recycling.

4. National Water Mission: The NAPCC sets a goal of a 20% improvement in water use efficiency through pricing and other measures to deal with water scarcity as a result of climate change.

5. National Mission for Sustaining the Himalayan Ecosystem: This particular mission sets the goal to prevent melting of the Himalayan glaciers and to protect biodiversity in the Himalayan region.

6. Green India Mission: The NAPCC also aims at afforestation of 6 million hectares of degraded forest lands and expanding forest cover from 23 to 33% of India's territory.

7. National Mission for Sustainable Agriculture: The NAPCC aims to support climate adaptation in agriculture through the development of climate-resilient crops, expansion of weather insurance mechanisms, and agricultural practices.

8. National Mission on Strategic Knowledge for Climate Change: To gain a better understanding of climate science, impacts, and challenges, the plan envisions a new Climate Science Research Fund, improved climate modeling, and increased international collaboration. It also encourages private sector initiatives to develop adaptation and mitigation technologies through venture capital funds.

All National Missions were approved by the Prime Minister's Council on Climate Change and are at different stages of implementation. The Missions are under constant review of the Council. The Government has set up the "Executive Committee on Climate Change" to monitor the implementation of the eight National Mission under the NAPCC. The research on adaptation and mitigation covers crops, livestock, fisheries and natural resource management. Further, the Government is now revisiting all National Missions under NAPCC in the light of new scientific information (IPCC AR5) and technological advances.

State Action Plan on Climate Change:

In August 2009, the State Governments were called upon to prepare their own State Action Plans on Climate Change (SAPCC) consistent with strategies in the National Action Plan on Climate Change (NAPCC). The SAPCCs have both adaptation and mitigation component to address climate change impacts. So far, 31 States/Union Territories, namely, Andaman and Nicobar, Andhra Pradesh including Telangana, Arunachal Pradesh, Assam, Bihar, Chandigarh, Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Lakshadweep, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Puducherry, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttarakhand, and West Bengal have prepared their State Action Plans on Climate Change22 . A combined budgetary requirement of around INR 11,33,692 crore has been estimated for implementation of the 31 SAPCCs23 . Of these, the 23 SAPCCs received from States/Union Territories, viz., Andaman and Nicobar Islands, Andhra Pradesh including Telangana, Arunanchal Pradesh, Chhatisgarh, Haryana, Himachal Pradesh, Jammu and Kashmir, Jharkhand, Karnataka, Kerala, Lakshadweep, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Puducherry, Rajasthan, Sikkim, Tripura and West Bengal have been endorsed by the National Steering Committee on Climate Change.

Climate Change Action Programme:

A new Central-sector Scheme titled „Climate Change Action Programme (CCAP)" has been approved during the Twelfth Five Year Plan. The objective of the scheme is to build and support capacity at the central and the state levels for assessing Climate Change impacts and formulating and implementing adequate response measures. Various other science initiatives are planned by the Ministry as part of the Climate Change Action Programme. These include National Carbonaceous Aerosols Programme (NCAP),

Long Term Ecological Observatories (LTEO), and Coordinated Studies on Climate Change for North East Region (CSCCNER). The NCAP is a major activity involving multi-institutional and multi-agency study launched in 2011. In this initiative, the Ministry of Environment, Forests and Climate Change will collaborate with the Ministry of Earth Sciences, the Indian Space Research Organization, the Ministry of Science and Technology and other associated agencies to enhance the understanding of the role of Black Carbon in Climatic Change through monitoring and assess the impacts of black carbon through various modeling techniques

Indian Network for Climate Change Assessment

The Indian Network for Climate Change Assessment (INCCA) was launched on 14 October 2009 to enhance knowledge about the impacts of Climate Change at the national and subnational level. The INCCA has been designed to assess the drivers and implications of Climate Change through scientific research; prepare Climate Change assessments once every two years and build capacity towards management of Climate Change related risks and opportunities, etc.

Clean Development Mechanism

The Clean Development Mechanism (CDM) defined in Article 12 of the Kyoto Protocol, allows a country with an emission-reduction or emission-limitation commitment to implement an emission-reduction project in developing countries, such projects can earn Certified Emission-Reduction (CER) credits, each equivalent to one tonne of CO2. India has been a significant gainer from the Clean Development Mechanism (CDM). As on 1 December 2014, 1541 of the total 7589 projects registered by the CDM Executive Board are from India, which is the second highest in the world with China leading with 3763 registered projects. Certified Emission-Reductions (CERs) issued to Indian Projects are 191 million units.

India's Low Carbon Strategy

A lower emissions pathway entails deployment of energy-efficient technologies, increased use of renewable alternatives for power production, sustainable waste management and conservation of forests. The energy intensity of India‟s output has shown a declining trend owing to improvements in energy efficiency, autonomous technological changes and economical use of energy. The cumulative cost of Low Carbon Strategies between 2010 and 2030 have been estimated at around US$834 billion at 2011 prices.

Auto Fuel Vision and Policy 2025

In December 2012, the Government of India had constituted an Expert Committee for drafting the Auto Fuel Vision and Policy-2025 for the country to recommend a roadmap for improving Auto Fuel Quality in India till 2025.

Cooperation with Bilateral and Multilateral donors on Climate Change

The Ministry has been implementing several projects with the assistance of Bilateral and Multilateral Funding Agencies such as German Agency for International Cooperation (GIZ), KfW (German Government – owned Development Bank), World Bank, United States Agency for International Development (USAID) and Asian Development Bank (ADB). GIZ has been supporting the Ministry under Advisory Services in Environmental Management (ASEM) programme for a CDM Cell and an adaptation project. The World Bank has sanctioned a US $ 400 million project for Climate Change and Sustainable Development in Himachal Pradesh. A project with World Bank on „Partnership for Market Readiness‟ is

also being implemented. The Global Environment Facility (GEF) has also approved a number of activities in relation to Climate Change during the fifth cycle of funding (2013-17).

Cooperation with other countries

India has been closely coordinating with members of G77, China, BASIC (Brazil, South Africa, India and China) and Like Minded Developing Countries (LMDCs). India hosted the 14th BASIC Ministerial Meeting on climate change in Chennai, on 15 to 16 February 2013. At the regional level, India partnered with Bhutan, Nepal and Bangladesh to address adverse effects of Climate Change through adaptation actions in the four thematic areas of Food, Water, Energy and Bi Parliamentary Forum on Global Warming and Climate Change The Forum was constituted for the first time in 2008 and since then has been involving parliamentarians to interact with specialists working on Global Warming and Climate Change. The Members of the Forum have been taking a lot of interest in the meetings by participating in the discussions. Presentations on various subjects relating to Climate Change like: Impact of Climate Change on Agriculture; Population, Resources & Biodiversity with reference to Climate Change; Technology and Climate Change; National Solar Mission and related initiatives under the National Action Plan on Climate Change; National Mission on Sustainable Habitat; Renewable Energy – New Challenges and Priorities; Climate Science – Recent Findings and Innovative Response to Climate Change; and Learning from Climate change Act in the United Kingdom, etc. have taken place. These give insight into different perspective on the issue of Climate Change and mitigation methods. Ms. Baroness Bryony Worthington, Opposition Spokesperson on Energy/Climate Change in the House of Lords, British Parliament was invited to share her views on the subject – „Learning from Climate Change Act in the United Kingdom". UK framed Climate Change Act 2008 to meet the challenges posed by Climate Change and Global Warming. The act mainly envisages Carbon target and budgeting, the establishment of Independent Committee on Climate Change to advise the Government, trading schemes, adaptation to Climate Change and waste reduction scheme and their impact thereon. In the context of India, she responded that green growth and energy security need to be in focus areas for India.

CONCLUSION

India is extremely vulnerable to the impacts of Climate Change and significant measures are needed to build climate resilience and assist communities with adaptation. Several programmes are already underway in many parts of India, often in partnership with local financial institutions and grassroots Non-governmental Organisations (NGOs) that are working with local communities on project implementation. Through its Corporate Social Responsibility programmes and other initiatives, Indian industry is also promoting sustainable livelihoods and infrastructure development across the country. Recognizing the important role that non-state actors must play in shaping India"s response to Climate Change, the Government of India is taking steps to make this an inclusive and consultative process and invites the participation of all communities, NGOs and Industry. Steps have been taken to finalize India"s Intended Nationally Determined Contributions (INDC) on mitigation, adaptation, finance, technology and capacity building (to be submitted before COP-21, December 2015). The comprehensive INDC would also project the requirement of support in terms of finance and technology transfers, etc. The Contributions will also take into account India"s domestic obligations of addressing the basic development needs in terms of achieving minimum standards of living for its entire population.

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