



POLITICIZATION OF GLOBAL WARMING AND ITS MAJOR ISSUES

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The issue of global warming has been at the center stage of International Environment Law and Policy at least since the early 1990's. In recent years it became one of the main environmental issues. Global warming is the greatest crises ever collectively faced by mankind; unlike other crises, it is global in nature and threatens the very survival of human civilization (Agarwal, 2004:1). It has now become a major concern of the governments, international organizations and growing number of people around the world (Barnhill, 2007:376). Global warming is an international issue affecting every nation and country. Global Warming can be defined as a gradual warming of the earth's atmosphere reportedly caused by the burning of fossil fuels and industrial pollutants. 'Global Warming' refers to the increase in the earth's surface temperature due to accumulation gases sometimes referred to as 'green house gases' that trap heat in the earth's atmosphere (Gaan, 2008:73).

The industrial revolution which started in mid-19th century has resulted in severe exploitation of natural resources and degradation of environment by human population, which is presently posing the greatest threat to the globe. (Nandan et al., 2009:362) Earth has experienced both warming and cooling at different phases of its existence. At this juncture global warming has become major concerns. It is assuming ugly and dangerous proportions. (Singh & Kahlon, 2012:22). The global scientific community agrees that human activities are primarily responsible for this deterioration. It is widely accepted that the root cause of climate change is the unrestricted emissions of greenhouse gases into the atmosphere. The burning of fossil fuels is the primary source of greenhouse gas and failure to control these would prove disastrous for humanity. (Nath, 2012:97).

The "Greenhouse effect" is a phrase properly used to describe the increased warming of the earth due to increased levels of carbon dioxide and other atmospheric gases, called greenhouse gases. (O'Brien, 2010:145) In 1980s a series of unusually hot summer gave rise to fears that the Earth's climate was gradually becoming warmer. Some attributed this trend to carbon dioxide emissions from industrial plants, automobiles and the burning of Rain Forest. This trend could lead to droughts, the melting of polar ice caps and rise in sea levels (Keylor, 2010:513). Climate change is a complicated and huge challenge. No country is immune from its adverse effects. Global warming is understood to result from an overall long term increase in retention of Sun's heat around the earth due to blanketing by 'green house gases' especially CO₂ and methane (CH₄). The concentration of these gases has continued to increase. It's mainly caused by anthropogenic emissions; climate change is one of the global environmental problems being faced by humanity (Agarwal, 2004:10). GHGs emissions have grown since pre industrial times, with an increase of 70 percent between 1970 and 2004, with carbon dioxide in particular increasing by 80 percent, especially since 1995 (IPCC, 2007:37). Since around 1990, the Earth's temperature has risen by about 1^o F (0.6 degree). The increase over the last 40 years of the 20th century was almost half of the total rise over a century. The rate of warming was greater than at any period in the preceding 400-600 years. The Intergovernmental Panel on Climate Change



reported in 2001 that regional climate change had already begun to affect many-parts of the world (Barnhill, 2007:377).

James Hansen, a well known NASA scientist, claims that during the ten thousand years between the last ice age to the present interglacial period, with the disintegration of the North American big ice sheet, sea level rose 5 meter every century and 1 m every twenty years for several centuries. Once an ice sheet begins to melt and disintegrate, the situation deteriorates rapidly (Ray, 2011:8).

The main GHGs that exist naturally are carbon dioxide (CO₂) and Methane (CH₄). Thus Greenhouse gas effect is a natural phenomenon and in its absence, the earth mean temperature would be 30⁰C lower than it is, which would mean the end of life on planet an ice covered place (Dutt & Gailoli, 2007:4239). The earth surface is kept warm by heat trapping gases in the atmosphere and it makes our life comfortable and hospitable. When the temperature rises beyond the certain limit people face problems of natural climate variations such as storms, cyclones floods, water scarcity and desertification. (Panda & Jain, 2010:90). The potent warmers of the globe are Carbon Dioxide (CO₂) Methane (CH₄), Nitrous oxide (N₂O), Chlorofluorocarbon (CFSs), Hydrofluorocarbons (HFCs), Sulphur Hexafluoroxide (SFs), Perfluoro Carbons (PFCs) and water vapours. Of all the greenhouse gases, carbon dioxide usually gets top billing because it accounts for 80 percent of total greenhouse emission. (Gore, 2007:23).

➤ **Carbon dioxide (CO₂):-** It is responsible for more than 55 percent of the current global warming from GHGs produced by human activities. Its concentration has increased by more than 30 percent since pre-industrial times, and currently increases by 1 percent every year. The main sources are the burning of fossil, particularly coal and increasing, motor vehicle exhaust. Deforestation and biomass burning contribute 25 percent. CO₂ remains in the atmosphere for around 200 years. (Chhokar, 2008:217)

➤ **Methane (CH₄) :**

It account for 16 percent of the increase in GHGs. It is 20 to 25 times more effective a GHG than CO₂. It can stay in the atmosphere for only 10 to 12 years, primarily a product of microbial fermentative reactions; methane's main natural sources are wetlands and green plants, its concentration has doubled since pre-industrial times. The largest source of methane production is associated with rice cultivation. Paddy fields are estimated to emit between 25 and 75 million tonnes of methane (Wright & Boorse; 2011:466).

➤ **Nitrous Oxide:**

NO₂ accounts for 6 percent of the human input of green house gases. It is released during nylon production, from burning biomass and fossil fuels like coal, from the breakdown of nitrogen fertilizers in the soil, livestock wastes, and nitrate contaminated groundwater. Its life span in the troposphere is 120 to 190 years and it traps about 200 times as much heat per molecule as CO₂. It's concentration growing by 0.25 percent per year (Chhokar, 2008:218).

➤ **Chlorofluorocarbons and Halocarbons :**

Chlorofluorocarbons and halons are man-made chlorinated and brominated compounds which pose danger to the stratospheric ozone layer. CFCs are believed to be responsible for 24 percent of the human contribution of greenhouse gases. They can trap 1,500 to 1,700 times more heat than CO₂ on a molecule for molecule basis and remain in the atmosphere for several



thousand years (Agarwal, 2004:123-27). CFCs and other Halocarbons emission are entirely anthropogenic, long lived and contribute to global warming in the troposphere and ozone destruction in the stratosphere. The main sources are refrigerants, industrial solvents, aerosol propellants and the production of plastic foams.

➤ **Hydrofluorocarbon Gases :**

HFCs are a man- made alternative for CFCs in refrigerants, as agents used to blow foams or insulation, and as cleaning agents, especially in the manufacture of semiconductors. Their global warming potential is 4,000 to 10,000 times that of CO₂.

➤ **Perfluorocarbons:-** PFCs are replacement gases for CFCs, but they are also a byproduct of aluminium smelting. Small amounts are also produced during the uranium enrichment process. They can trap 6,000 to 10,000 times more heat than CO₂ as GHGs (Chhoker, 2008:219).

➤ **Ozone:** - Ozone is found in small quantities in the air and is formed when other pollutants react in sunlight. O₃ is a greenhouse gas that has 2,000 times the heat-retention property of CO₂. The concentration of ozone in the atmosphere has increased 36 percent since 1750. (Wright & Boorse, 2011:46).

➤ **Carbon Monoxide (CO):**

It does not trap heat directly; it is indirectly responsible for increasing greenhouse warming because it raises the levels of methane and ozone. It also participates in the formation of ozone.

➤ **Sulphur hexafluoride (SF₆) :**

SF₆ is also a man-made gas used as insulating material for high voltage equipment such as circuit-breakers. It can trap 25,000 times more heat than CO₂ (Chhokar et al., 2008:219).

MAJOR ISSUES

Today, the threat of global climate change has been described as the biggest environmental challenge of 21st century. Climate change is an environment and atmospheric phenomenon that is subject to much debate. The global warming controversy is an immense issue that affects the whole world and will require everyone to work together. Climate change is probably the most serious environmental problem that the world faces today. While that threat is long term, the magnitude and rate of these impacts on ecosystem, livelihood, human health and food security, will pose a major challenge for humanity (<http://www.unfccc.int/resources/docs/2009/cop15/eng/107.pdf> on 28 August,2013) Climate change has become binary between the developed vs. developing countries, right from the beginning. The Stockholm conference of 1972 echoed this binary division between developed and developing countries (Kaur, 2011: 22). Global Warming is a highly politicized economic issue. Developing nations contended that the developed nations are in a better position to afford reforms and possess technology; whereas developing nations are not (Mccoll, 2007: 379).

Dealing with climate change is complicated problem affected by social, economic and political factors that vary from country to country. International response to climate change started in late 1950s by a number of American Scientists in the Mauna Loa Mountains of Hawaii, who studied the density of CO₂ in the atmosphere (Raven et al., 2013: 396). The world climate change politics was largely influenced by the industrialized countries of the North, particularly by the United States and EU (Gaan, 2008: 262). Developing countries are not ready to bear the cost of



mitigation as they are of the view that much of the emissions are historically produced by the rich industrialized nations. Since 1950s the 20 percent of the world's population living in highly developed countries have produced 74 percent of the CO₂ emissions. Currently, highly developed countries produce about 10 times more GHGs emissions per person than developing countries (Raven et al, 2013: 396).

Paradox of climate change is that rich industrialized nations account for the overwhelming bulk of the greenhouse gas emissions, whereas the poor developing countries have to pay a heavy price for it. The consequences of future climate change may be felt more severely in developing countries, whose economy is largely dependent on agriculture. The developing countries argue that instead of shifting the responsibility for the environment degradation and climate change on their shoulders, the developed countries should accept the responsibility for the same because it is their production and consumption pattern, which leads not only to the over exploitation of natural resources, but they also emits more GHGs in the atmosphere (Kaur, 2011: 23-24).

Political restrictions of greenhouse emissions have proved to be vital for the fight against global warming. It is no surprise that this environmental issue has become a major concern for the world's governments. Developing countries insists that per-capita emission rates of developing countries are insignificant compared to industrialized countries (O' Brien, 2012: 148-50). The biggest contribution to global warming due to increase in GHGs emissions by the rich industrialized countries; it appears likely that the countries that will be most adversely affected by climate change in the next 100 years are the developing and poor countries that can hardly afford to take measure to combat it. The threat of global climate change and the challenge of how to respond to it is therefore a problem of considerable complicity. It is global issue, as ultimately it will require global collective action of all countries to lessen the threat successfully (Gaan, 2008: 187).

The issue of climate change has grabbed the attention of the world as never with past. The beginning of modern era of International Environment boundary, environmental deterioration is creating political awareness of nation's responsibility. Therefore in this context, major initiative was taken at global level to tackle with the problem of global warming.

1. Stockholm Conference (1972):

The first global efforts to diagnose state of environment took place with the United Nations Conference on Human Environment held in Stockholm from 5-16 June, 1972. The Conference put environment on the international agenda, expressing a serious concern at rapid depletion of the exhaustible natural resources (Maharan, 2013: 60). It produced three major sets of decisions: i.e. the Stockholm Declaration; the Stockholm Action Plan, containing 109 recommendations on international measures against environmental degradation for governments and international organization; and a group of five resolutions calling for a ban on testing nuclear weapons, creating an international environmental databank, addressing actions linked to development and the environment, creating an environmental fund, and establishment of the United Nations Environment Programme as the central node for global environmental cooperation. The conference was attended by only two heads of government, Indian Prime Minister Indira Gandhi and Swedish Prime Minister Olaf Palme (Desai, 2013: 4-5). It was followed by International Environment Workshop in Belgrade (Yugoslavia) in October 1975. In 1974, the international meeting on monitoring was held in Nairobi, Kenya. It approved the Global Environment Monitoring System (GEMS) track environmental changes affecting the ocean and world agricultural supply.



2. First World Climate Conference (1979):

The first world climate conference was held on 12th January to 3rd February 1979 in Geneva, Switzerland. The conference was a series of international meetings, organized by the World Meteorological Organization (WMO), The United Nations Environmental Programme (UNEP), and the International Council of Scientific Unions (ICSU) (Gaan, 2008: 115). It was one of the first major international meeting on climate change, essentially a scientific conference. It was attended by scientists from a wide range of disciplines. In addition to the main plenary sessions, the conference organized four working groups to look into climate data, the identification of climate topics integrated impact studies and research on climate variability and change. The main focus of the conference was on how climate change might impact human activities. The conference led to the establishment of the World Climate Programme and the World Climate Research Programme. It also leads to the creation of the Intergovernmental Panel on Climate Change (IPCC) by WMO and UNEP in 1988 (<http://www.en.wiki.pedia.org/wiki/world-climate-conference> as assessed on 24 July, 2013). The first world climate conference of 1979 took steps to limit Carbon dioxide emissions through energy economic modeling and Ozone depletion research.

A number of international conferences were held followed by the International Meteorological Organization 1980, United Nations Environment Programme 1983 and International Council for Scientific Unions 1985. The first joint UNEP/ICSU/WHO meeting of the experts was held in Villach, Austria in November 1980 to assess the role of the Carbon Dioxide (CO₂). The representatives of the three above mentioned organizations met in October 1982 in Geneva, Switzerland (Gaan, 2008: 117).

3. Villach Conference 1985:

The Third Villach Conferences was organized by WMO, UNEP and ICSU in 1985; the invited scientists expressed their consensus about the seriousness of the problem of the enhanced greenhouse effect. The conference also recommended to set up an Advisory Group named as Advisory Group on Green House Gas (AGGG) consisting of six experts to provide regularly up dated evaluations of the greenhouse emissions. It was a major international review of the issue of the scenario for future emissions of all the significant greenhouse gases and not just carbon dioxide alone. As per the decision of the AGGG, two workshops were held in Villach, from 28th September to 22nd October and from 9th November to 13th November in 1987 in Bellagio. The recommendation of the two workshops stressed on immediate steps to limit greenhouse gas emissions, implementation of Montreal Protocol, adoption of new energy and deforestation policies to combat global warming. (Gaan, 2008:217-18).

4. Toronto Conference, 1988:

Attempts to establish international treaties limiting green house gas emissions began in June 1988 at a major scientific conference on global warming held in Toronto, Canada. Scientists recommended a 20 percent reduction in Carbon dioxide emissions by 2005 (Botkin & Keller, 2013: 417). The Toronto conference was a turning point to open the eyes of the governments various countries of the about the threat posed by global warming, which resulted in the growth of United Nations Intergovernmental Panel on Climate Change in 1988.

5. Intergovernmental Panel on Climate Change (IPCC)

In 1988 Intergovernmental Panel for Climate Change (IPCC) was formed to provide scientific information on climate change. It is a scientific body set up by the WMO and UNEP (Panda & Jain, 2010: 92). The IPCC is a scientific body under the auspices of the United



Nations (UN). It reviews and assesses the most recent scientific, technical and socio economic information produced world wide relevant to the understanding of climate change. Thousands of scientists from all over the world contribute to the work of the IPCC on a voluntary basis. The Secretariat Coordinate all the IPCC works and liaises with Governments.

The IPCC an intergovernmental body, currently has 195 countries as its members Governments participate in the review process and the plenary sessions, main decision about the IPCC Work Programme are taken and reports are accepted, adopted and approved. The IPCC is currently organized in three working groups and financially supported by the government of the developed countries.

I. Working Group I: The physical science based group, assesses the scientific aspects of the climate system and climate change. The experts have concluded that the atmospheric concentration of greenhouse gases has increased due to the anthropogenic activities and resulted in the warming of the earth's surface.

II. Working Group II: 2nd group deals with climate change impacts, adaptation and vulnerability. It focuses on consequences of climate change, i.e. impact on biodiversity, agriculture, forestry, water resources, human settlement, oceans and coastal zones.

III. Working Group III: The IPCC's 3rd working group assesses the relevant options for mitigating climate change through limiting or preventing greenhouse gas emissions and enhancing activities that remove them from the atmosphere. The Third Working group also considers the financial and the industrial means of assisting the third world in its response. Each working group has two co-chairs, one representing developed countries and other developing countries. (www.ipcc.ch).

- The First Assessment Report (1990), held human activities responsible for increased concentration of greenhouse gases. Therefore, UN Assembly decided to establish an International Negotiating Committee (INC) to initiate negotiations.
- The 2nd Assessment Report (AR2) 1995, most authoritative assessment of climate change, it predicted that GHG's, continued use would have serious socio-economic and environmental impacts. The Report provided input for Kyoto Protocol negotiations.
- The Third Assessment Report (AR3) 2001, determined that most of the global warming observed during the past 50 years is attributed to human activities and surface temperature is expected to increase by 1.4 – 5.8^oC by 2100.
- The IPCC's Fourth Assessment Report (AR4), 2007, reported that the unequivocal effects of greenhouse gas emissions induced change on the climate system and increase in global average temperature is likely due to the observed increase in anthropogenic greenhouse gas concentrations (The World Bank, 2012: 2).
- The Fifth Assessment Report (AR5) will be forth coming in 2013-2014. It is focused on developing countries while recognizing that developed countries are also vulnerable and at serious risk of major damages from climate change (The World Bank, 2012: 17).

6. United Nations Conference on the Environment and Development (UNCED) (Rio Earth Summit, 1992):

United Nations Conference on the Environment and Development also known as Earth Summit held on June, 1991 in Rio de Janeiro. Where as Stockholm Conference put environment



on the international agenda, the Earth Summit has moved it to the centre stage of economic policy and decision making. The convention aims at major threats to sustainable development. The convention implicitly recognizes the historical responsibility of developed countries for the current levels of anthropogenic emissions of GHGs. It envisages a transfer of technology and financial resources from developed to developing countries, either in the form of grants or loans on concessional terms (Khanna & Prakash, 1993: 92). At the conference two international conventions were signed i.e. Convention of Biodiversity (CBD) and UN Framework Convention on Climate Change (FCCC). In that conference nations had declared target for the reduction of carbon emissions (Cowie, 2009: 400-401).

The UNCED was attended by over 100 Heads of States and Governments. The principle outputs of UNCED were the Rio Declaration on Environment and Development, Agenda 21 Program of Action and the Statement of Forest Principles. Two global treaties, CBD and UN Framework Conventions on Climate Change (UNFCCC), were opened for signature during the Earth Summit Agenda 21 and called for the creation of a Commission of Sustainable Development (CSD) as a functional commission of the UN Economic and Social Council (ECO SOC), to ensure effective follow-up to UNCED (Desai, 2013: 5). If the purpose of the Rio Conference on Environment and Development was a forge to new global partnership between the rich and the poor countries, and to develop a new law of environment and development for the protection of our small planet, which is under serious threat, it achieved neither. The instruments adopted in Rio were not binding in law and were not entailed any legal, political, or even moral obligation. Two global treaties UNFCCC and CBD still needs to go a long way and require huge funding commitments to make them work in any meaningful way (Desai, 2013: 6).

The north has reached a higher stage of growth and is rich enough to afford cleaner technologies, their current emission levels are decreasing, while those of the developing are peaking. The global south has argued that in order to combat the ill-effects of climate change the south cannot be asked for binding emission cuts forsake growth and thus the onus to mitigate climate change falls on north, which have for centuries been polluting the earth, leading it to reach these dangerous level of pollution. This view was captured by Indira Gandhi. Historically, north responsible for the ill effects of climate change, and the developing South, who need to develop and thus cannot be burdened with mitigating emissions of polluting gases which are intrinsic to growth (Hazarika, 2013: 54-55).

7. United Nations Framework Convention on Climate Change (UNFCCC)

The UNFCCC is an international environment treaty with the aim of achieving prevents interference of dangerous anthropogenic activities with the climate system. The treaty does not set any mandatory limits on green house gas emissions. The treaty is legally non-binding and provides for updates that would set mandatory emission reduction targets. Treaty was evolved as a response to the 1990 IPCC report and was presented for signatures at the United Nations Conference on Environment and Development in Rio de Janeiro- commonly known as “Earth Summit II” in 1992. It entered into force on March 21, 1994. The treaty calls for the participating industrialized nations to voluntarily reduce emissions of CO₂ to 1990 level by 2000. The US and some other industrialized countries also agreed to pursue various voluntary measures to limit their emissions targets of GHG’s to 1990 levels by the year 2000. The convention also contained other binding agreement for all signatories including developing countries (Gupta, 2007: 25).

Furthermore, UNFCCC divided to continue the negotiations by means of a Conference of the Parties (COP) to pursue subsequent action to counter the global warming. The convention calls for appropriate international response in a accordance with each country’s “Common but



differentiated responsibilities”. The UNFCCC provides a broad framework of guiding principle for nations as how to work together to address climate change, because of US opposition, the agreement did not set specific greenhouse gas emission reduction targets for achieving goals. The UNFCCC has divided its member countries into three groups on the basis of their commitment as mentioned in Article 3 (Gaan, 2008: 125-26).

1. **Annex I:** Involves countries which are completely industrialized and also those with their economies in transition. Industrialized Countries OECD and the states of Central and Eastern Europe collectively called Annex I. These agree to take measure “to mitigate climate change, by limiting its anthropogenic emission of greenhouse gases and protecting and enhancing its greenhouse gas sinks and reservoirs”.
2. **Annex II:** Annex II involves industrialized economies but not the ones in transition, Annex II nations are expected to provide financial assistance to developing nations in order to make them capable enough to undertake emission reduction activities under the convention and also assist them in adopting the adversities of the climate change.
3. **Non-Annex III:** The Non-Annex parties are mostly developing nations and have been found to be highly vulnerable to climate change effects for various economic reasons.

Under UNFCCC developed countries are to supply enough funding and technology to developing countries to reduce emission levels. UNFCCC set no immediate restrictions on developing countries, as it serves three purposes: -

- i) It avoids restrictions on their development.
- ii) They can sell emission credits to other nations.
- iii) They get money and technology for low carbon investment from annex II countries (Joshi & Sharma, 2010: 86).

A major step in the fight against global warming took place in Rio de Janeiro at the Earth Summit. It encouraged countries all over the world to help reduce greenhouse emissions (O’Brien, 2012: 149). Global efforts towards achieving climate change protection reached a significant milestone with the adoption of the UNFCCC, under which the United States along with 152 other nations agreed to an ultimate objective of stabilization of GHGs concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system (Gaan, 2008: 188).

8. Conference of Parties (COP-1)

First conference of the parties, which began on 28th March and lasted till 7th April 1995, was held in Berlin, Germany. It was attended by delegates from 117 parties and 53 observer states including 2000 observers and journalists. The Berlin Mandate was adopted as a basic guideline document for drafting an international agreement specially aimed at the prevention of global warming, and called for formal negotiations to begin to develop a protocol with legal binding ‘targets and timetables’ to reduce industrialized countries emissions (Sengupta, 2012: 103). The first COP affirmed the notion of “common but differentiated responsibilities” means all nations have responsibility to address climate changes, but the industrialized countries i.e. United States and European Union dominated the negotiations to protect their interests (<http://www.UNFCCC.int> as assessed on 24 July, 2013).

9. Conference of Parties (COP-2)

The 2nd Conference of Parties was held in Geneva, Switzerland, on 8th to 19th July, 1996. It reviewed and endorsed the finding of the IPCC’s second assessment report and also surveyed progress on the Berlin Mandate. The conference calls for appropriate international response in



accordance with each country's common but differentiated responsibilities and assign the lead to the industrialized countries in combating global climate change. The meeting ended with call for legally binding mid-term targets (Gaan, 2008: 132-35).

10. Conference of Parties (COP-3)

From a climate perspective the next major, step down this road was taken at Kyoto. The world climate change conference was held in Kyoto, Japan in 1997 from 1st to 12th December. It was an international environment treaty for reducing greenhouse gases. 191 countries have signed and ratified the protocol. The United States signed but did not ratify the Protocol and Canada also withdrew from it in 2011. It entered into force in 2005. The Kyoto Protocol set an international target for reduction of emissions by 5 percent of the 1990 level by the end of Protocol's first implementation period of 2008-12 (Cowie, 2009: 401). The Kyoto Protocol suggested that the developed countries should reduce their greenhouse gas emissions by 40 percent by 2020 from the 1990 levels. The US rejected the proposal as it does not include the action plan for the developing countries. India and China had advocated the provisions of the Kyoto protocol by arguing that the per capita emission from the developing countries is far less than as compared to the developed countries (Kondapalli, 2009: 367).

Meeting the new demands of the Kyoto Protocol has proved to be very daunting task for industrialized countries in its second commitment period, because they are deemed responsible for the problem. In Kyoto Protocol, representative from almost 190 countries must agree upon emission restrictions for industrialized nations and initiate a plan to help developing nations (O'Brien, 2012: 149-50). It was described as a first step in the international effort to curb emissions of greenhouse gases and to limit the effects of global climate change. The Kyoto Protocol encompassed many key decisions but the most important was the decision for developed countries to accept reduction commitments that would become legally binding when the protocol ratified (Cowie, 2009: 401).

The Kyoto Protocol was only the first step in the international efforts to reduce greenhouse gas emissions and limit the effects of global climate change. 38 developed countries were included in the agreement. Australia, Iceland and Norway were allowed to increase their emission levels, rest should reduce their emissions. USA insisted that developing countries also must have binding obligations for emission reductions. The three primary objectives of the protocol were: -

- I. Commitment to reduce greenhouse gases that are legally binding for annex 1 countries as well as general commitments for all the member countries. The agreement includes realistic targets with fixed time table to reduce GHGs emission by the world's major industrial nations.
- II. The agreement should include avid flexible market-based approaches to reduce emissions known as the Kyoto mechanism.
- III. The agreement should include meaningful participation of key developing countries and establishing an adaptation fund for climate change (Panda & Jain, 2010: 92-93).

Importantly, the protocol established three 'flexible mechanisms' for achieving mechanism reductions. These three mechanisms are: -

- I. **Joint Implementation:** In Art-6, joint implementation allows annex-I parties to implement projects in the territories of other countries of Annex-I, that reduce emission or increase removals by 'sinks' generation or Emission Reduction Units (ERUs), which can be best used by investing annex-I parties to held to meet their emission target. Joint implementation projects must have the approval of all parties involved and must lead to



emission reduction or removals that are additional to any that would have occurred without the projects. There are two possible procedures for carrying out projects. The first procedure applies when the host party fully meets all the eligibility requirements related to the protocol's methodological and routine obligations. The second procedure applies if the host does not meet all the requirements. For supervision 10 members committee was set up by COP/MOP at its first meeting, to verify the amount of ERUs generated by a project and to also ensure that the baseline and monitoring plan must be devised according to standard criteria with assessment of the project's environmental impacts. (Gaan, 2008: 191-92).

II. Clean Development Mechanism: Under Art-II Clean Development Mechanism (CDM) which means emissions reduction by development countries through investment in technology and infrastructure in less developed countries. Under CDM emission reduction projects in developing countries can earn certified emission reduction credits. These saleable credits can be used by industrialized countries to meet a part of their emission reduction. CDM was expected to promote renewable energy, energy efficiency and low carbon fuel (Dutt & Gaioli, 2007: 4243).

Like JI, the CDM is based on the premise that the countries with high emission reduction costs will have an incentive to pursue projects in lower reduction cost countries. Both mechanisms seek to increase the cost effectiveness of achieving global emission reduction targets with project level emission trading. In principle the governments could package internal project and then arrange the sale of the CDM credits. CDM transactions will occur between Annex-B and Non-Annex-B countries, while JI trading will occur between Annex-B countries. The CDM projects aim at playing a leading role to advance the sustainable development goals of developing countries. The CDM project developers must allocate a portion of the project funds to support climate change mitigation activities in developing countries. But CDM has been a continuous subject of discussion, sometimes characterized as an industrialized country's policy to avoid the onus of carrying out real emission reduction at home, and to take advantage of the inferior negotiating position of developing countries.

Many observers also argue that the CDM could be a powerful tool for funding sustainable development activities in and transferring new technologies to the developing countries. The CDM is the only protocol mechanism that can generate reductions in the near future that will count against the countries failing in Kyoto commitments (Sharma, 2012: 206-208).

Emission Trading:

Under the Article-17, international emission trading provides the means for Annex-B countries to sell "surplus" portions of their emission allocations under the Kyoto protocol. Like other two emission trading programmes, it is not project based mechanism. It enables countries, which achieve greater reductions than needed to meet their own target, to the sell the surplus to other countries (Cowie, 2009: 402).

The most notable criticism of the Kyoto Structure in current time is that, USA, who is responsible for about a quarter of global emissions, withdrawn from it in 2004 on the ground that it would harm its economy. With the end of the first commitment period, Kyoto Protocol is supposed to hold negotiations for the launch of the next phase of the protocol, but this could not be possible without bringing the US into the tent. However, there were growing concerns about the rising emissions in non-binding countries like China, India and other developing world (Pachauri, 2010: V). The Kyoto protocol has come in for its fair share of criticism from all hues



of political spectrum, the negotiations reached an agreement by postponing decisions about the most controversial issues (Keswani et al., 2012: 43).

11. Conference of Parties (COP-4)

The fourth conference of the parties to the UNFCCC was held at Buenos, Aires, Argentina on November 1998. It announced its willingness to adopt a voluntary commitment. This commitment is expressed as a dynamic target based on the relation between emission and GDP (Gupta, 2001: 49). The conference concluded with the adoption of 'Buenos Aires Action Plan', establishing deadlines for finalizing work on the Kyoto Mechanism. The conference's decision outlines a process on how to overcome the barriers to the transfer of environmentally sound technology. (<http://www.unfccc.int/cop4> as assessed on 30th August, 2013). The conference adopted a two year programme to produce recommendations on the flexible mechanisms i.e. emission trading, joint implementation and the clean development mechanism to be adopted at sixth COP.

Finally COP 4 received a little response from developing countries to facilitate implementation of Kyoto Protocol mechanisms, but the aim of the conference was to demonstrate co-operation on environment and development problems and international solutions to mitigate the threat of climate change but failed to secure the collaboration of the nations to combat global climate change. Not much came out of the meeting apart from a Buenos Aires Plan of Action, which listed what is needed to be done (Gupta, 2001: 49).

12. Conference of Parties (COP-5)

The Fifth Conference of parties to the UNFCCC held in Bonn, Germany from October 25th to November 5th in 1999. The Bonn conference considered many things to address the climate change but achieved a very insignificant outcome to settle certain problems. Under the convention developing countries believe it is unfair on part of developed countries to ask them to make voluntary commitments to reduce emissions. Major issues relating to global climate change remained unsolved. The issues like development, transfer of technology, financial mechanisms were considered separately in the conference (<http://www.unfccc.int/cop5> as assessed on 30 August, 2013).

13. Conference of Parties (COP-6)

The sixth conference of parties to United Nation Framework Convention on Climate Change was held in The Hague, Netherlands from 13th to 25th November, 2000. Many important issues were raised and the negotiations resulted in an agreement over several key issues such as detailed rules for attaining Kyoto targets were finally accepted; the conferences also agreed to grant credit for the activities that absorb carbon from the atmosphere, including forest and cropland management re-vegetation, with no limits on the amount of credits a country could claim for sink activities (<http://www.unfccc.int/cop6> as assessed on 24 August, 2013). The Hague Conference collapsed due to the US demand for carbon sinks as part of the agreement, which received enormous criticism. The umbrella group, consisting of the US, Japan, Canada, Australia and New Zealand had huge differences with the EU and developing countries on many issues (<http://www.globalissues.org> as assessed on 22 August, 2013).

14. Conference of Parties (COP-7)

The Seventh Conference of United Nation Framework Convention on Climate Change was held at the Palisades Congress, Marrakech, Morocco from October 29th to November 10th, 2001. The rules for implementing the Kyoto Protocol were formally adopted at the conference, in the form of the 'Marrakech Accord', that was one of the major successes in the history of



climate change politics. Another important achievement of the conference was adoption of decision on women participation in the representation of parties. The role of the seventh conference of the parties was a milestone in the process of climate change negotiations (Sengupta, 2012:103). The parties in the conferences rendered their full support without any difference of opinion in order to contribute to worldwide efforts to counter the adverse effects of climate change.

Conference decided to implement the Buenos Aires Plan of Action and Adaption of Bonn agreement decisions. The parties to UNFCCC agreed to a long list of ways to meet the Kyoto commitments. The parties were urged to increase funding for the Global Environment Facility, as well as for additional aid to poor countries. The date of the World Summit on Sustainable Development i.e. August-September 2002 was set as a target to bring the Protocol into force (<http://www.unfccc.int/cop7> as assessed on 24 August, 2013).

15. World Summit on Sustainable Development (Rio + 10, 2002)

The World Summit on Sustainable Development (WSSD) informally nicknamed Rio+10 was held in Johannesburg from 26th August to 4th September 2002. The need to enhance the integration of sustainable development in the activities of all relevant United Nation's agencies, programme and funds was highlighted. The discussion also encompassed the role of institutions in stepping up efforts to bridge the gap between the international financial institution and the multilateral development banks and the rest of the UN system. Major outcome of that conference includes the Johannesburg Declaration and almost 300 international partnership initiatives meant to help achieve the Millennium Development Goals (<http://www.un.org/en/sustainable> as assessed on 2nd September, 2013).

The WSSD negotiated and adopted two main documents first the Johannesburg plan of implementation (JPOI); and the Johannesburg Declaration on Sustainable Development. The JPOI is designed as a framework for action to implement the commitments agreed at UNCED and includes chapters on poverty eradication, consumption and production, the natural resource base, health, Small Island Developing States (SIDS), Africa, other regional initiatives, means of implementation (MoI). This plan advanced the developing country developmental concerns more clearly than its predecessor conference in Stockholm and Rio, but could not bring about any substantial progress in bridging the north-south divide (Desai, 2013:6).

16. Conference of Parties (COP-8)

The Eighth conference of the parties to UNFCCC held in New Delhi, India from October 23rd to 1st November 2002. The Delhi Ministerial Declaration on Climate Change and Sustainable Development was adopted at the conference. The main focus of the conference was shifted away from mitigating greenhouse gas emissions and climate change towards adaptation. Urgent actions should be taken to enable the least developed and small island countries, those are most vulnerable to adapt to the climate change impacts and early actions are required to develop cleaner and affordable technologies. The declaration was adopted by consensus but the European Union, Japan and Canada expressed disappointment whereas the US and developing countries expressed their strong support for the declaration (Gaan, 2008: 162-63).

17. Conference of Parties (COP-9)

The Ninth Conference of the parties to the UN Framework Convention on Climate Change was held in Milan from December 1st to 12th, 2003. The COP 9 agreed that the adaptation fund established at COP 7 (2001) be used to support developing countries in their mission of better adaptation to climate change. It was observed that more than half of the



member states would miss their emission targets set by the protocol for 2008-12 (Britannica Book of the Year, 2005: 192-93).

18. Conference of Parties (COP)-10

The 10th conference of parties to the UNFCCC, held in Buenos Aires from Dec 6th to 17th 2004, was attended by representative from about 200 countries. The aim of the Buenos Aires conference was to open discussions about post Kyoto mechanisms for allocation of emission periods ending in 2012 (Britannica Book of the Year, 2006: 192). From Delhi Conference of the parties to Buenos Aires the negotiation process succeeded in finding a solution to the many technical and political issues that remained unresolved and adopted decisions that incorporated in implementing the Kyoto Protocol. Climate change is a global problem, requiring action from the entire world community. The tenth conference of parties / COP 10 provided an opportunity for the delegates to construct policy and co-operation among countries to reduce greenhouse gas emission to tackle the problem of global warming (Gaan, 2008: 178-79).

19. Conference of Parties (COP-11)/Meeting of Parties (MOP)-1

The 11th conference of the parties to UN Framework Convention on Climate Change and first meeting of the parties (MOP-1) to the Kyoto Protocol took place in Montreal, Canada from 28th November to 10th December 2005. It marked the entry of Kyoto Protocol in force. This automatically triggered a process to initiate discussions on the emission reduction commitments that developed countries that had ratified the protocol, need to adopt in their 'second' commitment period beyond 2012. COP-11 also initiated a parallel 'dialogue' process to discuss other options that could 'enhance' the implementation of the UNFCCC and deliver 'long term cooperative action' on climate change. It will certainly develop mutual understanding among the countries to evoke international response to counter the future challenge. The conference also set effective policies that would determine future course of international action to address the climate change challenges (Sengupta. 2012: 103).

20. Conference of Parties (COP-12)/Meeting of Parties (MOP-2)

Twelfth Conference of parties to the UNFCCC was held from 6th - 17th November, 2006 in Nairobi, Kenya where the parties adopted a five-year plan of work to support climate change adaptation by developing countries and agreed on the procedures for Adaptation Fund. They also agreed to improve the project for clean development mechanism. At COP 12 for the first time ever, WMO made a statement on the "Role of WMO and National Metrological and Hydrological Services (NMHSs) in the implementation of the UNFCCC and most especially the Subsidiary Body for Scientific and Technological Advice (SBSTA), five year programme of work on impacts, vulnerability and Adaptation to climate change". The government negotiators at the UN Framework Convention on Climate Change in Nairobi continued two processes launched last year in Montreal to consider next steps in the international climate efforts, and track to review Kyoto Protocol.

21. Conference of Parties (COP)-13/Meeting of Parties (MOP-3)

The 13th annual conference of the parties to the UN Framework Convention on Climate Change was held in Bali Indonesia, from 3rd to 15th December. About 10,000 delegates participated in the event, it also called meeting of the parties to the Kyoto Protocol. One important event during the conference was Australia's ratification of the Kyoto Protocol. There were major issues on the agenda e.g., increasing the consequences of climate change, the clean development mechanism (CDM) of the Kyoto Protocol includes incentives for afforestation and reforestation, and no compensation exists for the protection of existing forests. The two main



agreement of COP-13 the Bali Action Plan (BAP) and the deal on the protection of forests in developing countries (Dutt & Gaioli, 2008: 11). The main focus of Bali was reaching an agreement for the period post-201 and reducing emission from deforestation in developing countries, known by the acronym REDD. After a slow start the CDM provides incentives for qualifying afforestation and reforestation projects; It was proposed to have some form of compensation for these countries to reduce their rate of deforestation. The Bali Action Plan has earned the nickname “Bali Road Map”. Bali has included no quantitative commitments on emission reduction for any country. By recognizing that climate change is real and something must be done about it, the document made little progress in this road. No compensation exists for the protection of existing forests (Dutt & Gaioli, 2008: 12-13).

22. Conference of Parties (COP-14)/Meeting of Parties (MOP-4)

The 14th conference of parties to UN Framework Convention on Climate Change was held in December, 2008 in Poznan, Poland. The delegates at the conference agreed for financing of funds to help poorest nations to combat with the effects of climate change. Negotiation on a successor to the Kyoto protocol was the primary focus of the conference (Keswani et al., 2012: 45). It also launched the Adaptation Fund under the Kyoto Protocol. The fund was to be filled by a 2 percent levy on projects under the clean development mechanism. It identified divergent views on key issues related to increasing the level of available funding for adaptation and improvement to the planned development mechanism. Significant outcome of the cop was the government’s approval that the first draft of a concrete negotiating text for a global climate change deal would be made available at the UNFCCC gathering in June of 2009 with the targets to adopted at COP 15th in Copenhagen (<http://UNFCCC.int/meeting/Poznan-Dec-2013/meeting/6314.php> as assessed on 23 July, 2013).

23. Conference of Parties (COP-15)/Meeting of Parties (MOP-5)

The 15th conference of the parties to the UN Framework Convention on Climate Change known as the ‘Copenhagen Summit’ was held at Copenhagen, Denmark, from 7th to 18th December 2009 and 192 countries took part in it. The first commitment period of the Kyoto Protocol expires in the year 2012; hence the COP 15 aimed at reaching an ambitious agreement for the post 2012 period (Joshi & Sharma, 2010: 86). US President Barack Obama held bilateral talk with delegates from China, India, Brazil and South Africa at the Copenhagen conference. The talks resulted in the non-binding Copenhagen Accord, a declaration that was “noted” by other parties to the convention. It stated that reduction in GHGs emissions were required to ensure that global temperature should not rise by more than 2°C but it purposed no reduction targets (Britannica Book of the Year, 2011: 235). Unfortunately, the parties failed to deliver any internationally binding agreement to reduce the greenhouses gas emissions worldwide and to fill the vacuum created by Kyoto Protocol. (Ranjan, 2010: 360).

The Copenhagen Accord does not mention any figures of the emission reduction that the developed countries are to undertake post 2012 period. This failure at attaining reduction commitments is the biggest drawback of the document and of the whole conference (Khor, 2010: 12).The conference had only lead to confusion over the goals; The summit did not project prominently the differences between UNFCCC categorized brackets of Annex I, Annex II countries and Non-Annex or the developing nations. It failed miserably to reach strict levels of commitments regarding emission control, the reasons to which rests in their vested interests and contesting opinions which scored over a common global cause (Joshi & Kalindi, 2010:87).



24. Conference of Parties (COP-16)/Meeting of Parties (MOP-6)

The 16th session the Conference of Parties to the UN Framework Convention on Climate Change was held in Cancun, Mexico from 29th November to 10th December 2010. The conference calls on rich countries to reduce their greenhouse gas emissions as agreed in Copenhagen accord and for developing countries to come forward and to plan to reduce their emissions level. 'Cancun Agreements' was adopted at COP16. Climate finance is central to the agenda of the Cancun meeting. It provides the basis for the most comprehensive and far-reaching international response to climate change (<http://www.unfccc.int/meetings/cancun-nov-2010/meeting/6266/php/view/decisions.php> as assessed on 2 August, 2013). The conference freed the industrialized countries from greenhouse gas emissions obligations as they did not have to legally commit to cut emission. Instead of binding targets, it proposed voluntary pledges by the countries, the agreement legalize voluntary pledge and review scheme that allow countries to set their own targets. (Dutta, 2011: 29). The Cancun Summit has proved to be a major setback to the developing countries because of various reasons. First, no specific targets have been set for the industrialized countries based on their responsibility to the problem. Instead what it endorses are the voluntary pledges made by the industrialized countries. Second, the distinction between the developed and developing countries has been removed as there will be universal agreement for all. Third, the deal requires that a developing country's actions must be internationally reported, measured and verified (Kaur, 2011: 26).

25. Conference of Parties (COP)-17/Meeting of Parties (MOP)-7

The Seventeenth Conference of parties of the United Nations Framework Convention on Climate Change (UNFCCC), concluded in Durban on January 10, 2012. The world hailed it as the beginning of a new era in international climate policy. The Durban Platform work will begin immediately under a new group called Ad hoc Working Group on the Durban Platform on Enhanced Action. This platform will negotiate a legally binding global agreement involving the world's major emitters by 2015. The first outcome of the conference is that developing economies- such as India, Brazil, South Africa, and China- will also make legally binding commitments for emission reductions under the new Durban platform. The Durban conference agrees to launch "a process to develop a protocol, another legal instrument or an agreed outcome with legal force". It agrees that this new agreement or outcome can be implemented from 2020. The document recognized the need to limit global warming below 2⁰C above the pre-industrial level. The Durban do not propose additional action before 2020 (Panda, 2012: 24-25).

The second important outcome of the conference, the countries agreed to the 'Durban Platform for Enhanced Action' which made no distinction between developed and developing nations. It launched a new process to develop a 'protocol', another legal instrument or an agreed outcome with legal force by 2015, which is to be 'applicable to all parties' and enter into force from 2020 (Hazarika, 2013: 57). The third most important decision at the conference is the progress on the front of the Green Climate Fund established to help the developing countries to fight global warming. The main aim of the fund is to finance adaptation and mitigation projects in the developing countries and to deal with the risks of the climate change (Panda, 2012: 26). Another decision taken was related to deforestation, to establish a system that would allow payments to countries that reduce carbon emission by preventing deforestation, which accounts for 15 percent of global emission (Hazarika, 2013: 57). The Durban conference have failed because of the most urgent issue, to move initiates faster and deeper GHGs emission cuts, did not receive much attention. The issue of equity in sharing of the burden of emission reductions



was sidelined and Green Climate Fund found a place but without any fund. The climate negotiators failed to recognize that climate change will not wait for the next negotiation to become operational (Panda, 2012: 24).

26. The United Nations Conference on Sustainable Development (UNCSD) (Rio + 20), 2012

Earth summit 2012 was the third International Conference on Sustainable Development aimed at reconciling the economic and environmental goals of the global community. The United Nations Conference on Sustainable Development was held in Rio de Janeiro (Brazil) from 13-22 June, 2012. The government delegations concluded negotiations on the Rio outcome document, titled The Future We Want. Representatives from 191 UN member states and observers, including 79 heads of state or government, addressed the general debate and approximately 44,000 people attended the official meetings, a Rio+20 partnerships forum, sustainable development dialogues. Participants at Rio +20 were encouraged to make voluntary commitments for actions to implement the conference's goals, with financial commitments from governments, the private sector, civil society and other groups.

Ironically, this marathon Rio + 20 processes brought to the fore almost same issues that had bedeviled the Stockholm conference 40 years ago. Since Stockholm Conference, four decades of strong environmental movement, we do not see much headway in bridging the global rich-poor divide. This is especially so in respect to two issues, the first is climate change for which, at least for the historical contribution of greenhouse gases the industrialized countries are mainly responsible. Developing states still continue to blame the industrialized north for pursuing a policy of eco-imperialism by restraining exercise of their sovereignty over natural resources, adoption of industrialization for their salvation as they perceive it. Today the north-south divide hampers international environmental and developmental cooperation almost as seriously (Desai, 2013:6- 8).

27. Conference of Parties (COP-18)/Meeting of Parties (MOP-8)

The 18th session of the conference of parties was held in Doha, Qatar from 26 November to 8th December, 2012. It can be described as a climate summit of "low ambition". The developed countries commitments on low levels in two crucial areas: the emission cuts and provision of climate financing for developing countries. The main decision taken during Doha conference was on the Kyoto protocol's second period in which some developed countries committed to cut their emissions of greenhouse gases for the period 2013-20; The most important result in Doha was the formal adoption of the Kyoto protocol's second period from 2013 to 2020 to follow immediately after the first period expires on 31 December, 2012. The original members Canada, Russia, Japan and New Zealand having decided to leave the Kyoto Protocol or to remain but not to participate in a second period, only the European Union and the European countries, Australia and other few countries totaling 35 developed countries and countries in transition are left to make legally binding commitment in the second period. The developing countries were adamant that Annex/I countries that are no more party to the Kyoto Protocol should not be allowed to make use of the protocol's "flexibility mechanisms" that enabled countries to offset their domestic emission reduction commitments by paying other countries to do the mitigation on their behalf, through the use of clean development mechanism. But some developed countries wanted this flexible mechanism to be open to these parties. The Doha conference also adopted a set of decisions under its Ad hoc working Group on Long-term



Cooperative Action (AWG-LCA), which was formed to negotiate on the Bali Action Plan. A positive decision made in Doha was to prepare by next year's conference to set up an "international mechanism" to help developing countries deal with loss and damage caused by climate change (Khor, 2013: 18-20).

A major criticism of the Doha decisions is the very unsatisfactory results on the issue of financial resources for developing countries; The developed nations were in no mood to give any numbers nor even any qualitative commitments The decision on finance only "encourages" developed countries to provide at least as much as they had in the 2010-12 period. This "encouragement" is thus for only \$10 billion a year in aggregate. Like other previous conference at Doha, several outstanding issues of interest were remaining unresolved at the end of the conference (Khor, 2013: 18-19)

28. Conference of Parties (COP 19) / Meeting of Parties (MOP 9)

The 19th session of the conference of parties was hosted by Warsaw, Poland from 11th to 22nd November, 2013. At the conference, governments have agreed on a set of decisions to reduce greenhouse gas emission from deforestation and the degradation of forests. Detailed work on the so called "Warsaw international mechanism for loss and damage" will begin next year. The conference also decided to establish an international mechanism to provide most vulnerable population with better protection against loss and damage caused by extreme weather events and slow onset events such as rising sea levels. The Warsaw meeting also resulted in concrete announcements of forthcoming contributions of public climate finance to support developing nation action, including from Norway, the UK, EU, US, Japan, Sweden, Germany, Finland and Republic of Korea. Conference also requested developed countries to prepare biennial submissions on their updated strategies and approaches for scaling up finance between 2014 and 2020. Reducing Emissions from Deforestation and Forest Degradation (REDD+) adopted at Warsaw conference (<http://www.cop19.gov.pl> as assessed on 3rd December, 2013).

CONCLUSION

What we face today is a climate crisis that has arisen due to the relentless build up of planet's warming due to greenhouse gases in the atmosphere. Now a day's climate change has become one of the main environmental issues which attract widespread attention. It is no longer a matter of concern for scientists but has become global concern. The earth's surface is kept warm by heat trapping gases, but when the temperature rises beyond a certain limit, it becomes a threat to the humanity. The threat of a possible warming of the global climate due to the enhanced greenhouse effect has raised genuine fears of disaster, caused by the inundation of low-lying coastal areas. Climatic impacts as well as increased deforestation, soil deterioration, desertification etc effect whole community. A rapid rise in earth's temperature leads to species losing their endemic habitats and loss of biodiversity and it almost affect all the aspects of the terrestrial ecosystems. Rapidly increasing global temperature results in shortages of water, food grains, collapse of ecosystem and frequent disasters and migration. The large number of initiatives have been envisaged for tackling this growing menace i.e. the Stockholm conference, first world climate change conference and Toronto conference on climate change attract the attention of people and leaders of the world to rising earth temperature. In 1988, Intergovernmental Panel on Climate Change was formed to provide decision makers and others objective sources of scientific information on climate change. In order to meet immense global environmental challenges all states, both the industrial and the developing world, need to cooperate with each other as closely as possible because the earth is our only abode.



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