

Climate change and its impacts: National and International perspective

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ABSTRACT

Climate change is an environmental problem of recent era which has widespread adverse impacts over the earth, environment and its constituents. The untimely changes in the cycles of six major seasons, high rise in the rate of temperature (which is called global warming nowadays), low rate of rainfall and untimely melting of glaciers etc. are the results of climate change. In order to meet with the climatic changes, the world order has taken different palliative and curative measures to save the environment. These measures are called the environmental justice which is the reflection of moral and policy thoughts. The present paper studies the impact of climate change over the environment and its constituents from the national as well as international perspectives and what steps have been taken by the world order to save the planet earth from the adverse effects of climate change. This paper will highlight the policy decisions taken at the international and national level. The conclusion of the problem is that climate change is a serious threat to human being therefore to tackle this problem there must be equal participation of all stakeholders on the basis environmental justice.

"The Earth provides enough to satisfy every man's needs but not every man's greed."

—Mahatma Gandhi

1. Introduction

Climate change is no more an environmental concern. It has emerged as the biggest developmental challenge for the planet. Its economic impacts, particularly on the poor, make it a major governance issue as well.¹ Climate change is one of the complex problems facing mankind today. This is evident from observations of increases in the global average air and ocean temperatures, widespread melting of snow and ice, and the rising global average sea level. It poses a variety of challenges with wide-ranging effects. It is projected to have significant impacts on conditions affecting agriculture, including temperature, precipitation and glacial run-off.² Agriculture is the mainstay of the Indian economy and provides food and livelihood security to a substantial section of our population. Agriculture will be adversely affected not only by an increase or decrease in the overall amounts of rainfall but also by shifts in the timing of the rainfall. Any change in rainfall patterns poses a serious threat to agriculture, and therefore to the economy and food security. The rise in temperatures caused by increasing green house gases is likely to affect crops differently from region to region. Erosion, submergence of shorelines, and salinity of the water-table due to the increased sea levels are the factors that mainly affect agriculture through inundation of low-lying areas. Increased frequencies of drought, floods,

¹Sunita Narain, Prodipto Ghosh, NC Saxena, and Jyoti Parikh and Preeti Soni, *Climate Change Perspectives from India, United Nations Development Programme, India Lasting Solutions for Development Challenges*, 4(Nov 2009).

²SHARAT POORNIMA, *CLIMATE CHANGE IN INDIA: CHALLENGES AND SOLUTIONS*, MAINSTREAM, VOL. LIII No 50 NEW DELHI (DEC. 5, 2015), AVAILABLE ON [HTTP://WWW.MAINSTREAMWEEKLY.NET/ARTICLE6130.HTML](http://www.mainstreamweekly.net/article6130.html)

storms and cyclones are likely to increase the variability of agricultural production.³

Earth's climate is dynamic and always changes through a natural cycle. But the changes occurring today are speeded up because of human activities. Climate change refers to significant variation either in the mean of climate or in its variability persisting for an extended period. These changes have created too many problems at every level. In 21st century, irregular climate changes have been a big challenge for the human race.⁴

2. What is Climate Change?

Climate change is a change in the usual weather found in Earth's climate. As we know weather can change in few hours, but climate change takes place in hundreds or even millions of years.⁵

2.1 Definitions of Climate Change

Modern climate prediction started back in the late 1700s with Thomas Jefferson and continues to be studied around the world today.⁶

According to Article 1 of UNFCCC Climate change means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global

³ Ibid.

⁴D Vijalakshmi, *Climate Change and Environment Impact on Indian Economy*, 42, Regal publication (2013).

⁵Rahul Singh, *Climate Change and Concept of Environmental Justice*, 93, Completion in focus, Arihant Publication (Feb, 2016).

⁶NASA-WHAT'S THE DIFFERENCE BETWEEN WEATHER AND CLIMATE? AVAILABLE ON [HTTPS://WWW.NASA.GOV/MISSION_PAGES/NOAA-N/CLIMATE/CLIMATE_WEATHER.HTML](https://www.nasa.gov/mission_pages/noaa-n/climate/climate_weather.html)

atmosphere and which is in addition to natural climate variability observed over comparable time periods.⁷

"Climate change" in British English "changes in the world's weather, in particular the fact that it is believed to be getting warmer as a result of human activity increasing the level of carbon dioxide in the atmosphere"⁸

"A longterm change in the earth's climate, especially a change due to an increase in the average atmospheric temperature"⁹

Melting glaciers imply that life in the Arctic is affected by climate change.

There is broad-based agreement within the scientific community that climate change is real. The U.S. Environmental Protection Agency, the National Aeronautics and Space Administration, and the National Oceanic and Atmospheric Administration concur that climate change is indeed occurring and is almost certainly due to human activity.¹⁰

In broader sense, climate may be perceived as a part of larger system that includes not only the atmosphere but also hydrosphere (all liquid and frozen surface water), the lithosphere (all solids land surfaces), the biosphere (all living beings) and even extra-terrestrial factors as the sun.¹¹ Increased burning of fossil fuels contributes to climate change.

3. Causes of Climate Change

Environmentalists consider climate change a major problem of the century. The main cause of climate change is concentration of carbon dioxide (burning of fossil fuels, such as oil and coal, which emits greenhouse gases) in the atmosphere.¹² Other human activities, such as agriculture and deforestation, also contribute to the proliferation of greenhouse gases that cause climate change.

While some quantities of these gases are a naturally occurring and critical part of Earth's temperature control system, the atmospheric concentration of CO₂ did not rise above 300 parts per million between the advent of human civilization roughly 10,000 years ago and 1900. Today it is at about 400 ppm, a level not reached in more than 400,000 years.

The main causes of climate change can be categorized into two - Natural causes of climate change and Man-made causes of climate change

3.1 Natural causes of climate change

⁷Nawneet Vibhaw, Environmental Law-An Introduction, Lexis Nexis (2016).

⁸"Climate Change" in British English, available on <http://dictionary.cambridge.org/dictionary/english/climate-change>

⁹ <http://www.dictionary.com/browse/climate-change/>

¹⁰ What is climate change, take part, available on <http://www.takepart.com/flashcards/what-is-climate-change/>

¹¹Veena Kumari, *Impact of Climate Change in the Himalayan Region*, Changing Dimensions Of Legal Horizons Journal, 1. Issue-2, 5 (Nov. 2015).

¹² Rahul Singh, *Climate Change and Concept of Environmental Justice*, Completion in focus, 93, Arihant Publication (Feb. 2016).

3.1.1 *The Milankovitch Theory* –This explains the 3 cyclical changes in Earth's orbit and tilt that cause the climate fluctuations that occur over tens of thousands of years to hundreds of thousands of years.¹³

3.1.2 *Volcanic activity*- Volcanic eruptions discharge carbon dioxide, but they may also emit aerosols, such as volcanic ash or dust, and sulfur dioxide. Aerosols are liquids and solids that float around in the air. They may also include soot, dust, salt crystals, bacteria, and viruses. Aerosols scatter incoming solar radiation, causing a slight cooling effect. Volcanic aerosols can block a percentage of sunlight and cause a cooling that may last for 1-2years.¹⁴

3.1.3 *Sunspots*- The increase in sunspot activity and a run-up of global temperature on earth are happening convergent and view regulation of carbon emissions as folly with negative ramifications for over economy and tried and true energy infrastructure.¹⁵

3.2 Manmade causes of climate change

3.2.1 *Burning Fossil Fuels*: Burning coal to generate electricity, burning oil to power vehicles and aircraft (vehicle emissions), or burning wood in fires used for cooking or to provide heat, etc. changes the state of stored organic carbon from a liquid (e.g. oil) or solid (e.g. coal/wood) into a gas (carbon dioxide) which is released into the atmosphere.¹⁶

3.2.2 *Deforestation*: Vegetation absorbs carbon dioxide from the atmosphere during the process of photosynthesis, converting this to carbon which is stored within all plants (i.e it is a carbon sink). When vegetation is burned, this organic carbon is released into the atmosphere in the form of carbon dioxide, and in so doing becomes a carbon source rather than a carbon sink.¹⁷

3.2.3 *Urbanization and Industrialization*: The excessive exploitation of resources and nature due to rapid urbanization and industrialization led to climate change.¹⁸

4. Impacts of Climate Change

Climate change is one of the inexorable physical phenomena happening on the earth. The change induced by the humans is leading towards adverse effects, which is now being recognized as an immediate threat to the environment and ecological systems. Many manifestations of the climate induced changes have been reported by the scientific community all across the Globe. Climate change impacts also spans over spatial and temporal scales. These changes will have an adverse impact on the development of the nations and

¹³ Id. at p.94

¹⁴ Ibid.

¹⁵ Rajan Kumar, Environment And Ecology, 120, Arihant Publications India Ltd.

¹⁶ Ibid.

¹⁷ Ibid.

¹⁸ Rajan Kumar, Environment And Ecology, 120, Arihant Publications India Ltd.

human well-being¹⁹. Even small increases in Earth's temperature caused by climate change can have severe effects. The earth's average temperature has gone up 1.4° F over the past century and is expected to rise as much as 11.5° F over the next. That might not seem like a lot, but the average temperature during the last Ice Age was about 4° Flower than it is today.

- Consequences of climate change in brief;
- Global warming
- Acid rain
- Ozone layer depletion
- Nuclear accidents and holocaust
- Waste land reclamation
- Consumerism and waste products

5. Impacts of Climate Change in India

India is the 13th most vulnerable country to climate change .Since more than 60% of Indian agriculture is rain fed and it hosts 33% of the world's poor, climate change will have significant impacts on the food and nutritional security of the country.²⁰

IPCC in its fourth assessment report has highlighted the possible adverse effects due to climate change. It has been reported that ambient air temperature and precipitation will increase in certain parts of the world, while these will decrease in some other parts. It is imperative to assess in detail the various environmental changes and their subsequent consequences on our ecosystem. While most of the climate change studies focus on the climate modeling, impacts on various resources as well as mitigation and adaptation, little attention has been made to understand environmental consequences climate change.²¹

5.1 Effects on Himalayan Glaciers

Climate change, which is a result of global warming, is causing the glacier melt. It is now clear that global warming is occurring due to human activities, primarily the excessive burning of fossil fuels like oil and coal. Himalayan glaciers are a source of fresh water for perennial rivers in India.²² The meltdown of the glaciers (called glacial retreat) is a complex phenomenon and scientists are still trying to understand the process. Excessive meltdown may cause floods initially, but in the long run glacial retreat will reduce the water reaching the rivers. Also, the water from the meltdown is creating large lakes and there is a big risk of these lakes bursting out and causing enormous floods. Each summer, the melt water feeds the rivers and streams of the region. If the glacial retreat continues, at some stage normal glacier melt will not be able to contribute to

¹⁹ J. Sundaresan ,S. Sreekesh ,A.L. Ramanathan, Leonard Sonnenschein and Ram Boojh , *Climate Change And Environment*, Scientific Publishers(India) ,iii, (First ed.2013).

²⁰ Nawneet Vibhaw, *Environmental Law-An Introduction* , 437, Lexis Nexis (2016).

²¹ J. Sundaresan ,S. Sreekesh ,A.L. Ramanathan, Leonard Sonnenschein and Ram Boojh , *Climate Change And Environment*, Scientific Publishers(India) ,iii, (First ed.2013)

²² A.K Thakur and Dalip Kumar, *Dimensions of Climate Change In India-A Development Perspective*, Regal Publications, 163, (2013).

the region's water supply each year. The glacial retreat is adding to the irreparable ecological damage already suffered by the Himalayas. Human activities like forest clearing, road construction, and mountaineering have taken a heavy toll. These in turn have led to soil erosion, landslides, and floods. In addition, there are natural calamities like avalanches and earthquakes. In spite of their scale and grandeur, the Himalayas constitute a fragile ecosystem in delicate balance. That balance may have already been upset, with unpredictable consequences for the entire subcontinent.²³

Recent climate changes have had significant impact on high-mountain glacial environment. Rapid melting of snow/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 and 17 June 2013, heavy rains together with moraine dammed lake (Chorabari Lake) burst caused flooding of Saraswati and Mandakini rivers in Rudraprayag district of Uttarakhand. The bursting of this lake led to its complete draining within 5–10min as reported by the watch and ward staff of the Wadia Institute of Himalayan Geology (WIHG), which were present in WIHG camp at Chorabari Glacier on 16 June and early morning of 17 June 2013. The heavy rainfall together with melting of snow in the surrounding Chorabari Lake washed off both the banks of the Mandakini River causing massive devastation to the Kedarnath town.²⁴

5.2 Effect on Indian Monsoon

Human interference have certainly made the Indian monsoon fickle .there is a reason to believe that the tipping point for the Indian monsoon may have already crossed or is imminent. In 2006, there were unprecedented floods in Barmer district of western Rajasthan, where the average annual rain fall is hardly 120 mm.²⁵

5.3 Effect on Agriculture

The climate change could cause irresistible damage to land and water ecosystems and lead to loss of production potential.²⁶

5.4 Effect on Sea Level

The next effect of climate change is rise of sea levels. Though a sea level rise in some Indian coastal cities has been quite mild so far, less than a centimeter a decade, it did not specify its rise in recent years.²⁷

5.5 Effects on Human Health

²³ R. Rajagopalan, *Environmental Studies: From Crises to Cure*, 3rd Edition, 215, *Oxford University Press*(2016)

²⁴Scientific Correspondence, *Kedarnath Disaster; Facts and Plausible Causes*, available on <http://chimalaya.org/2013/07/30/kedarnath-disaster-facts-and-plausible-causes/>

²⁵ D Vijalakshmi, *Climate Change and Environment Impact on Indian Economy* ,49, Regal Publication,(2013)

²⁶ Veena Kumari, *Impact of Climate Change in the Himalayan Region*, *Changing Dimensions Of Legal Horizons Journal*, 1. Issue-2, 5 (Nov. 2015).

²⁷Anubala Kaushik and C.P.Kaushik , *Perspective In Climate Change*,183, 2nded.New Age International Publishers.

It is being reported that at global level, climate change affects human health directly. The Inter-governmental Panel on Climate Change (IPCC) has forecasted and observed various diseases which are caused due to climate change. Climate change, also called global warming, refers to the rise in average surface temperatures on Earth. Climate change affects human health in many ways.²⁸ An overwhelming scientific consensus maintains that climate change is due primarily to the human use of fossil fuels, which releases carbon dioxide and other greenhouse gases into the air. The gases trap heat within the atmosphere, which can have a range of effects on ecosystems, including rising sea levels, severe weather events, and droughts that render landscapes more susceptible to wildfires.²⁹

6. The International Response to Climate Change

"International law stays silent on the responsibility for climate change."

-Stephen Humphrey

6.1 The United Nations' Framework Convention on Climate Change (UNFCCC)

The UNFCCC entered into force on 21 March 1994. The 195 countries that have ratified the Convention are called Parties to the Convention. The UNFCCC is a "Rio Convention", adopted at the "Rio Earth Summit" in 1992.³⁰

The ultimate objective of the Convention is to stabilize Green House Gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." It states that "such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to Climate Change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner."³¹

The Convention puts the onus on developed countries to lead the way. The idea is that, as they are the source of most past and current Green House Gas emissions, industrialized countries are expected to do the most to cut emissions on home ground. They are called Annex I countries and belong to the Organization for Economic Cooperation and Development (OECD). They include 12 countries with "economies in transition" from Central and Eastern Europe. Industrialized nations agree under the Convention to support Climate Change activities in developing countries by providing financial support for action on Climate Change.³²

The Convention takes this into consideration by accepting that the share of Green House Gas emissions produced by developing nations will grow in the coming years. Nonetheless,

²⁸ Vinod Joon and Vaishali Jaiswal, *Impact of Climate Change on Human Health In India: An Overview Health and Population - Perspectives and Issues* 35(1), 12 (2012).

²⁹ Ibid.

³⁰ H .O. Agarwal, *International Law and Human Rights, Central Law Publications*, 19th ed . 667 (2013).

³¹ Ibid.

³² India, Ministry of Finance, *Economic Survey*, 256-57 (2012-13).

in the interests of fulfilling its ultimate goal, it seeks to help such countries limit emissions in ways that will not hinder their economic progress.³³

6.2 The Kyoto Protocol

The Kyoto Protocol is an international agreement linked to the United Nations Framework Convention on Climate Change, which commits its Parties by setting internationally binding emission reduction targets. Recognizing that developed countries are principally responsible for the current high levels of GHG emissions in the atmosphere as a result of more than 150 years of industrial activity, the Protocol places a heavier burden on developed nations under the principle of "common but differentiated responsibilities."³⁴

The Kyoto Protocol was adopted in Kyoto, Japan, on 11 December 1997 and entered into force on 16 February 2005. The detailed rules for the implementation of the Protocol were adopted at COP 7 in Marrakesh, Morocco, in 2001, and are referred to as the "Marrakesh Accords." Its first commitment period started in 2008 and ended in 2012.³⁵

Under the Protocol, countries must meet their targets primarily through national measures. However, the Protocol also offers them an additional means to meet their targets by way of three market-based mechanisms: (i) International Emissions Trading (IET); (ii) Clean Development Mechanism (CDM); and (iii) Joint implementation (JI).³⁶

The mechanisms help to stimulate green investment and help Parties meet their emission targets in a cost-effective way.

In Doha, Qatar, on 8 December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes:

- New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;
- A revised list of Green House Gases (GHG) to be reported on by Parties in the second commitment period; and
- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.
- During the first commitment period, 37 industrialized countries and the European Community committed to reduce GHG emissions to an average of five percent against 1990 levels.

³³ Ibid.

³⁴ Climate Change - India's Perspective, *Parliament Library and Reference, Research, Documentation and Information Service (LARRDIS) Members' Reference Service No. 25 / RN / Ref. / August/ 2013*

³⁵ R .Raj Gopalan , *Environmental Studies from Crises to Cure*, 3rd Ed. *Oxford University Press*, 215 (2016)

³⁶ Ibid.

During the second commitment period, Parties committed to reduce GHG emissions by at least 18 percent below 1990 levels in the eight-year period from 2013 to 2020.³⁷

6.3 The Bali Road Map

The Bali Road Map was adopted at the 13th Conference of the Parties and the 3rd Meeting of the Parties in December 2007 in Bali. The Road Map is a set of forward-looking decisions that represent the work that needs to be done under various negotiating "tracks" that is essential to reaching a secure climate future. The Bali Road Map includes the Bali Action Plan, which charts the course for a new negotiating process designed to tackle Climate Change. The Bali Action Plan is a comprehensive process to enable the full, effective and sustained implementation of the Convention through long-term cooperative action, now, up to and beyond 2012, in order to reach an agreed outcome and adopt a decision. All Parties to the Convention were involved in crafting the Bali Road Map. The COP decided that the process would be conducted under a subsidiary body under the Convention, the Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA). The Bali Action Plan is divided into five main categories: shared vision, mitigation, adaptation, technology and financing.³⁸

6.4 The Copenhagen Accord

The 15th session of the Conference of the Parties to the UNFCCC and the 5th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol took place in Copenhagen, Denmark in 2009. It produced the Copenhagen Accord. The Copenhagen Accord contained several key elements on which there was strong convergence of the views of the Governments. This included the long-term goal of limiting the maximum global average temperature increase to no more than 2 degrees Celsius above pre-industrial levels, subject to a review in 2015. It also included a reference to consider limiting the temperature increase to below 1.5 degrees - a key demand made by vulnerable developing countries. Developed countries promises to fund actions to reduce Green House Gas emissions countries. Developed countries promised to provide US\$30 billion for the period 2010-2012, and to mobilize long-term finance of a further US\$100 billion a year by 2020 from a variety of sources. The work of the two central negotiating groups, the AWG-LCA and the AWG-KP was extended by the COP.³⁹

6.5 The Cancun Agreements

³⁷ Climate Change - India's Perspective, *Parliament Library and Reference, Research, Documentation and Information Service (LARRDIS) Members' Reference Service No. 25 / RN / Ref. / August/ 2013*

³⁸ H.A.C. Prasad and J.S. Kochher , Climate Change and India Some Major Issues and Policy Implications, Working Paper No.2/2009, Department of Economic Affairs ,*Ministry of Finance Government of India*, P.10

³⁹ Climate Change - India's Perspective, *Parliament Library and Reference, Research, Documentation and Information Service (LARRDIS) Members' Reference Service No. 25 / RN / Ref. / August/ 2013*

The Cancun Agreements form the pillars of the largest collective effort the world has ever seen to reduce emissions, in a mutually accountable way, with national plans captured formally at international level under the banner of the UNFCCC. The Cancun Agreements, reached on December 11 in Cancun, Mexico, at the 2010 United Nations Climate Change Conference, represented key steps forward in capturing plans to reduce Green House Gas emissions, and to help developing nations protect themselves from climate impacts and build their own sustainable futures. The main objectives include: (i) Mitigation; (ii) Transparency of actions; (iii) Technology; (iv) Adaptation; (v) Forests; (vii) Capacity building; and (viii) Finance.

The objectives also include setting up the Green Climate Fund to disburse \$100 billion per year by 2020 to developing countries to assist them in mitigating Climate Change and adapting to its impacts.⁴⁰

6.6 The Durban Agreement

The United Nations Climate Change Conference at Durban in 2011 delivered a breakthrough on the international community's response to Climate Change. All Governments committed in Durban to a comprehensive plan that would come closer over time to delivering the ultimate objective of the Climate Change Convention: to stabilize Green House Gas concentrations in the atmosphere at a level that will prevent our dangerous interference with the climate system and at the same time will preserve the right to sustainable development. The developing countries, especially the poorest and most vulnerable, will need much more support to adapt to the change that is already embedded in the global climate system. The Durban outcomes looked to address these challenges in a more connected way by embodying a road map for implementation. On this map, four main areas of coordinated and complementary action and implementation, designed also to build and preserve trust among countries, were agreed viz. (i) Second commitment period of the Kyoto Protocol; (ii) The launch of a new platform of negotiations under the Convention to deliver a new and universal Green House Gas reduction protocol, legal instrument or other outcome with legal force by 2015 for the period beyond 2020; (iii) Conclusion in 2012 of existing broad-based stream of negotiations; and (iv) To scope out and then conduct a fresh global Review of the emerging climate challenge, based on the best available science and data.⁴¹

6.7 The Doha Climate Gateway

At the 2012 UN Climate Change Conference in Doha, Qatar (COP18/ CMP8), and Governments consolidated the gains of the last three years of international Climate Change negotiations and opened a gateway to necessary greater

⁴⁰ Ibid.

⁴¹ Climate Change - India's Perspective, *Parliament Library and Reference, Research, Documentation and Information Service (LARRDIS) Members' Reference Service No. 25 / RN / Ref. / August/ 2013*

ambition and action on all levels. Among the many decisions taken, Governments:

- Strengthened their resolve and set out a timetable to adopt a universal climate agreement by 2015, which will come into effect in 2020.
- Streamlined the negotiations, completing the work under the Bali Action Plan to concentrate on the new work towards a 2015 agreement under a single negotiating stream in the Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP).
- Emphasized the need to increase their ambition to cut Green House Gases (GHGs) and to help vulnerable countries to adapt.
- Launched a new commitment period under the Kyoto Protocol, thereby ensuring that this treaty's important legal and accounting models remain in place and underlining the principle that developed countries lead mandated action to cut Green House Gas emissions.
- Made further progress towards establishing the financial and technology support and new institutions to enable clean energy investments and sustainable growth in developing countries. So that the world has a chance to stay below an agreed maximum 2 degrees Celsius temperature rise, beyond which even more serious Climate Change impacts will occur, the Governments agreed to find ways to scale up efforts before 2020 beyond the existing pledges to curb emissions. Also in Doha, the UN Secretary General Ban Ki-moon announced that he would convene world leaders in 2014 to mobilize political will to help ensure the 2015 deadline is met.⁴²

6.8 The Warsaw Climate Change Conference 2013

The Warsaw Climate Change Conference took place from 11-23 November 2013 in Poland. It included the 19th session of the Conference of the Parties (COP 19) to the UN Framework Convention on Climate Change (UNFCCC) and the ninth session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP 9). The conference also included meetings of three subsidiary bodies: the 39th sessions of the Subsidiary Body for Scientific and Technological Advice (SBSTA 39) and the Subsidiary Body for Implementation (SBI 39), and the third part of the second session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP 2). Marking the second time that UN climate change negotiations have taken place in Poland, the conference drew over 8,300 participants, including 4,022 government officials, 3,695 representatives of UN bodies and agencies, intergovernmental organizations and civil society organizations, and 658 members of the media.⁴³

⁴² Climate Change - India's Perspective, *Parliament Library and Reference, Research, Documentation and Information Service (LARRDIS) Members' Reference Service No. 25 / RN / Ref. / August/ 2013*

⁴³ Summary Of The Warsaw Climate Change Conference, *Earth Negotiations Bulletin A Reporting Service for Environment and*

6.9 Lima conference 2014

The Lima Climate Change Conference convened from 1-14 December 2014, in Lima, Peru. It included the 20th session of the Conference of the Parties (COP 20) to the UN Framework Convention on Climate Change (UNFCCC) and the 10th session of the Conference of the Parties serving as the Meeting of the Parties to the Kyoto Protocol (CMP 10). Three subsidiary bodies (SBs) also met: the 41st sessions of the Subsidiary Body for Scientific and Technological Advice (SBSTA 41) and the Subsidiary Body for Implementation (SBI 41), and the seventh part of the second session of the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP 2-7). The Lima Climate Change Conference brought together over 11,000 participants, including approximately 6,300 government officials, 4,000 representatives from UN bodies and agencies, intergovernmental organizations and civil society organizations, and 900 members of the media. Negotiations in Lima focused on outcomes under the ADP necessary to advance towards an agreement in Paris at COP 21 in 2015, including elaboration of the information, and process, required for submission of intended nationally determined contributions (INDCs) as early as possible in 2015 and progress on elements of a draft negotiating text. Following lengthy negotiations on a draft decision for advancing the Durban Platform for Enhanced Action, COP 20 adopted the 'Lima Call for Climate Action,' which sets in motion the negotiations in the coming year towards a 2015 agreement, the process for submitting and reviewing INDCs, and enhancing pre-2020 ambition. Parties also adopted 19 decisions, 17 under the COP and two under the CMP that, inter alia: help operationalize the Warsaw International Mechanism for Loss and Damage; establish the Lima work programme on gender; and adopt the Lima Declaration on Education and Awareness Raising. The Lima Climate Change Conference was able to lay the groundwork for Paris next year, by capturing progress made in elaborating the elements of a draft negotiating text for the 2015 agreement and adopting a decision on INDCs, including their scope, upfront information, and steps to be taken by the Secretariat after their submission.⁴⁴

6.10 Paris Conference, 2015

The 2015 United Nations Climate Change Conference, COP 21 or CMP 11 was held in Paris, France, from 30 November to 12 December 2015. It was the 21st yearly session of the Conference of the Parties (COP) to the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and the 11th session of the Conference of the Parties (CMP) to the 1997 Kyoto Protocol. The conference negotiated the Paris Agreement, a global agreement on the reduction of climate change, the text of which represented a consensus of the representatives of the 196 parties attending it. The agreement will enter into force when joined by at least 55 countries which together represent at least 55 percent of global greenhouse

Development Negotiations, Volume 12 Number 594 - Tuesday, (26 Nov. 2013) available on <http://enb.iisd.org/vol12/enb12594e.html>

⁴⁴Summary Of The Warsaw Climate Change Conference, *Earth Negotiations Bulletin A Reporting Service for Environment and Development Negotiations*, Volume 12 Number 594 - Tuesday, (26 Nov. 2013) available on <http://enb.iisd.org/vol12/enb12594e.html>

emissions. On 22 April 2016 (Earth Day), 174 countries signed the agreement in New York, and began adopting it within their own legal systems (through ratification, acceptance, approval, or accession).⁴⁵

6.11 The Paris Agreement

143 Parties have ratified of 197 Parties to the Convention on 5 October 2016, the threshold for entry into force of the Paris Agreement was achieved. The Paris Agreement entered into force on 4 November 2016. The first session of the Conference of the Parties serving as the Meeting of the Parties to the Paris Agreement (CMA 1) took place in Marrakech, Morocco from 15-18 November 2016.

The Paris Agreement entered into force on 4 November 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depository.⁴⁶

6.12 International Environmental Organization and agencies⁴⁷

- International Union for Conservation of Nature
- World Wildlife Fund
- United Nations Environment Programme
- International Panel on Climate Change
- International Renewable Energy Agency
- World Nature Organisation (WNO)
- Global Environment Facility
- The Economy of Ecosystem and Biodiversity (TEEB)
- World Meteorological organisation (WMO)
- People for the Ethical Treatment of Animals (PETA)
- Green Peace

7. Climate Change and India's Actions

India's emissions are estimated to be of the order of 1331.6 million tonnes of the carbon dioxide equivalent Green House Gas (GHG) emissions in 2007. The emissions indicate an annual growth of 4.2% from the levels in 1994. Whereas India's CO₂ emissions are only about 4% of total global CO₂ emissions and much less if the historical concentrations are taken into account. Still India has been conscious of the global challenge of Climate Change. In pursuance of the obligations cast on parties to the United Nations Framework Convention on Climate Change (UNFCCC), India has undertaken to communicate information about the implementation of the Convention, taking into account the common but differentiated responsibilities and

respective capabilities and their specific regional and national development priorities, objectives and circumstances.

7.1 Prime Minister's Council on Climate Change

A high Level advisory group on climate change was constituted in June 2007 and reconstituted in November 2014 with the following objectives:

- i. Coordinate national action plans for assessment, adaptation and mitigation of climate change.
- ii. Advise government on pro-active measures that can be taken by India to deal with the challenge of climate change.
- iii. Facilitate inter-ministerial coordination and guide policy in relevant areas.⁴⁸

7.2 National Environment Policy

National Environment Policy, 2006 outlines essential elements of India's response to Climate Change. These, inter-alia, include adherence to principle of common but differentiated responsibility and respective capabilities of different countries, identification of key vulnerabilities of India to Climate Change, in particular impacts on water resources, forests, coastal areas, agriculture and health, assessment of the need for adaptation to Climate Change and encouragement to the Indian Industry to participate in the Clean Development Mechanism (CDM).

7.3 The National Action Plan on Climate Change (NAPCC)

Launched in 2008, India's National Action Plan on Climate Change (NAPCC) identifies a number of measures that simultaneously advance the country's development and climate change related objectives of adaptation and mitigation. The implementation of the NAPCC is designed to take place through eight National Missions, which form the core of the National Action Plan and incorporate multi-pronged, long-term and integrated strategies for achieving India's key goals in the context of climate change.⁴⁹

7.4 Jawaharlal Nehru National Solar Mission

To establish India as a global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible.⁵⁰

The Mission has adopted a three phase approach. The first phase (2010-2013) was designed to focus on capturing the low-hanging options in solar thermal; promoting off-grid systems to serve populations without access to commercial energy and modest capacity addition in grid-based systems. In the second (2013-2017) and third (2017-2022) phases, capacity will be

⁴⁵ 2015 United Nations Climate Change Conference available on https://en.wikipedia.org/wiki/2015_United_Nations_Climate_Change_Conference

⁴⁶United Nations Framework Convention on Climate Change ,available on unfccc.int/paris_agreement/items/9485.php

⁴⁷ Rajni Johar Chhatwal, Environmental Sciences A Systematic Approach ,9,UDH Publisher & Distributers (P)Ltd.(2009)

⁴⁸ India's progress in combating climate change briefing paper for UNFCCC COP 20 LIMA,PERU December 2014,*Ministry of Environment, Forests and Climate Change Government of India*, available on http://envfor.nic.in/sites/default/files/press-releases/Indian_Country_Paper_Low_Res.pdf

⁴⁹ Ibid.

⁵⁰ Ibid.

aggressively ramped up to create conditions for scaled-up and competitive solar energy penetration in the country.⁵¹

7.5 National Mission for Enhanced Energy Efficiency

To achieve growth with ecological sustainability by devising cost effective and energy efficient strategies for end-use demand side management.

7.6 National Mission on Sustainable Habitat

To promote sustainability of habitats through improvements in energy efficiency in buildings, urban planning, improved management of solid and liquid waste including recycling and power generation, modal shift towards public transport and conservation. The mission includes timelines for all the strategies and sub-components of each strategy. These range between 2009 to 2017.

7.7 National Water Mission

To conserve water, minimize wastage and ensure equitable distribution both across and within states through integrated water resources development and management.

7.8 National Mission for Sustaining the Himalayan Ecosystem

To evolve management measures for sustaining and safeguarding the Himalayan glaciers and mountain ecosystem and attempt to address key issues namely impacts of climate change on the Himalayan glaciers, biodiversity, wildlife conservation and livelihood of traditional knowledge societies.

7.9 National Mission for a Green India

To use a combination of adaptation and mitigation measures in enhancing carbon sinks in sustainably managed forests and other ecosystems, adaptation of vulnerable species/ecosystems, and adaptation of forest-dependent communities.

7.10 National Mission on Strategic Knowledge for Climate Change

To identify the challenges and the responses to climate change through research and technology development and ensure funding of high quality and focused research into various aspects of climate change.

7.11 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. Shri Girish Sant, Co-Founder of Prayas, Pune and Coordinator of the Energy Group along with representatives of the Ministry of Environment and Forests and the Ministry of Science and Technology had been invited for giving a presentation on "The Road Map for 20-25% Reduction in the emission intensity of Indian GDP by the year 2020 as communicated by Government of India to the UNFCCC". About specific plans of the Government in regard to Climate Change, Shri Sant apprised that Government was doing two major things, one the NAPCC and second the low carbon strategy for inclusive growth.

7.12 Indian Network for Climate Change Assessment (INCCA)

Steps have also been taken to increase capacity at the institutional level for conducting research into Climate Change science and making necessary assessments. The Ministry has already set up a network, namely the Indian Network for Climate Change Assessment (INCCA) comprising of 127 research institutions tasked with undertaking research on the science of Climate Change and its impacts on different sectors of economy across various regions of India. INCCA has helped the Ministry put together its Green House Gas (GHG) Emissions Inventories and in carrying out other scientific assessments at more frequent intervals.

7.13 Twelfth Five-Year Plan and Climate Change

The Government has a domestic mitigation goal of reducing emissions intensity of Gross Domestic Product (GDP) by 20-25% by 2020 in comparison with 2005 level. 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. This domestic goal and the objectives of the National Action Plan on Climate Change are proposed to be achieved through a sustainable development strategy under the Twelfth Five-Year Plan. Several thrust areas have been identified in the Twelfth Five-Year Plan for this purpose and a coordinated initiative to identify Nationally Appropriate Mitigation Actions and implement them towards this end will be taken during the Plan period. At the initiative of the Ministry, Planning Commission has recognized Climate Change as a major area of environmental intervention.⁵²

8. Other National and Sub National Initiatives

In addition to the National Action Plan on Climate Change, the Government of India has taken several other measures to promote sustainable development and address the threat of climate change. These initiatives operate at the national and sub national level and span domains that include climate change research, clean technology research and development, finance, and energy efficiency and renewable energy policy and deployment.

⁵¹ India's progress in combating climate change briefing paper for UNFCCC COP 20 LIMA, PERU December 2014, *Ministry of Environment, Forests and Climate Change Government of India*, available on http://envfor.nic.in/sites/default/files/press-releases/Indian_Country_Paper_Low_Res.pdf

⁵² India's progress in combating climate change briefing paper for UNFCCC COP 20 LIMA, PERU December 2014, *Ministry of Environment, Forests and Climate Change Government of India*, available on http://envfor.nic.in/sites/default/files/press-releases/Indian_Country_Paper_Low_Res.pdf

8.1 National Clean Energy Fund

The Government of India created the National Clean Energy Fund (NCEF) in 2010 for the purpose of financing and promoting clean energy initiatives and funding research in the area of clean energy in the country. The corpus of the fund is built by levying a cess of INR 50 (subsequently increased to INR 100 in 2014) per tonne of coal produced domestically or imported.

8.2 The Xth BASIC Ministerial Meeting on Climate Change

The year 2012 was also marked by several parallel international initiatives on Climate Change. India organized the Xth BASIC Ministerial Meeting on Climate Change in New Delhi during 13-14 February, 2012 to facilitate exchange of views on outcomes of the Durban Conference and evolution of common BASIC position on key issues in Climate Change. Besides the BASIC countries comprising of Brazil, South Africa, India and China, representatives of Swaziland, Singapore and Qatar were also invited to the meeting. During the year three more meetings of the BASIC group were held in different locations in South Africa, Brazil and China. India also participated in the meetings of the Major Economies Forum and the organized by the United States of America (USA) and the Petersberg Dialogue initiated by Germany. At the sub-regional level, India partnered with Bhutan, Nepal and Bangladesh for cooperation to address adverse effects of Climate Change through adaptation actions in the four thematic areas of Food, Water, Energy and Biodiversity.

8.3 Renewable Energy Procurement Obligation (RPO) has been the major driving force in India to promote the renewable energy sector. However, the NAPCC has not set any target for RPO. The Mission Document on Jawaharlal Nehru National Solar Mission has indicated that RPO is the key driver for promoting solar power. Further, the National Tariff Policy (NTP) 2006 was amended in 2011 to prescribe that solar-specific RPO be increased from a minimum of 0.25% in 2012 to 3% in 2022. The Government closely works with its partner countries in the international negotiations on Climate Change. Negotiations in this regard are being conducted under the auspices of United Nations Framework Convention on Climate Change (UNFCCC).

At the Doha Conference, India pursued the strategy of working together with the Group of 77 & China in order to protect the overall interests of developing countries. During the Conference, India raised the issues of equity in Climate Change related actions and commitments, technology-related Intellectual Property Rights (IPRs) and unilateral measures taken by some countries in the name of Climate Change and succeeded in having these issues included in the ongoing work of various bodies of the Convention. India successfully defended the nature of its voluntary domestic goal of reducing emissions intensity of its Gross Domestic Product (GDP) by 20-25% by 2020 in comparison with 2005 level and ensured that agriculture, a sensitive sector of our economy, was not included

in the mitigation work programme proposed to be launched at the global level.⁵³

9. Remarkable principles and doctrines propounded by the Indian judiciary:

9.1 Doctrine of Absolute Liability

THE BHOPAL CASE: Union Carbide Corporation v. Union of India⁵⁴

In this case, the court held that, where an enterprise is occupied with an inherently dangerous or a hazardous activity and harm results to anybody by virtue of a mishap in the operation of such dangerous or naturally unsafe movement coming about, for instance, in getaway of poisonous gas, the enterprise is strictly and completely obligated to repay every one of the individuals who are influenced by the accident and such risk is not subject to any exemptions. Accordingly, Supreme Court created another trend of Absolute Liability without any exemption.

9.2 Polluter Pays Principles

Polluter Pays Principle has become a very popular concept lately. 'If you make a mess, it's your duty to clean it up' - this is the fundamental basis of this slogan. It should be mentioned that in environment law, the 'polluter pays principle' does not allude to "fault." Instead, it supports a remedial methodology which is concerned with repairing natural harm. It's a rule in international environmental law where the polluting party pays for the harm or damage done to the natural environment. Vellore Citizen's Welfare Forum v. Union of India⁵⁵, The Supreme Court has declared that the polluter pays principle is an essential feature of the sustainable development.

9.3 Precautionary Principle

The Supreme Court of India, in Vellore Citizens Forum Case, developed the following three concepts for the precautionary principle:

- Environmental measures must anticipate, prevent and attack the causes of environmental degradation
- Lack of scientific certainty should not be used as a reason for postponing measures
- Onus of proof is on the actor to show that his action is benign

9.4 Public Trust Doctrine

⁵³ India's progress in combating climate change briefing paper for UNFCCC COP 20 LIMA, PERU December 2014, Ministry of Environment, Forests and Climate Change Government of India, available on http://envfor.nic.in/sites/default/files/press-releases/Indian_Country_Paper_Low_Res.pdf

⁵⁴ AIR 1990 SC 273

⁵⁵ AIR 1996 SCC 212

The Public Trust Doctrine primarily rests on the principle that certain resources like air, water, sea and the forests have such a great importance to people as a whole that it would be wholly unjustified to make them a subject of private ownership.

M.C.Mehta v. Kamal Nath and Others⁵⁶, the public trust doctrine, as discussed by court in this judgment is a part of the law of the land.

9.5 Doctrine of Sustainable Development

The World commission on Environment and Development (WCED) in its report prominently known as the 'Brundtland Report' named after the Chairman of the Commission Ms. GH Brundtland highlights the concept of sustainable development. As per Brundtland Report, Sustainable development signifies "development that meets the needs of the present without compromising the ability of the future generations to meet their own needs"⁵⁷. There is a need for the courts to strike a balance between development and environment.

In Rural Litigation and Entitlement Kendra v. State of UP⁵⁸, the court for the first time dealt with the issue relating to the environment and development; and held that, it is always to be remembered that these are the permanent assets of mankind and or not intended to be exhausted in one generation.

In Vellore Citizen's Welfare Forum⁵⁹, the Supreme Court observed that sustainable development has come to be accepted as a viable concept to eradicate poverty and improve the quality of human life while living within the carrying capacity of the supporting eco- system.

10. The Constitutional aspects on Environmental Law

The Indian Constitution is amongst the few in the world that contains specific provisions on environment protection. The chapters directive principles of state policy and the fundamental duties are explicitly enunciated the nation commitment to protect and improve the environment. It was the first time when responsibility of protection of the environment imposed upon the states through Constitution (Forty Second Amendment) Act, 1976.

Article 48-A⁶⁰ the provision reads as follows: "The State shall endeavor to protect and improve the environment and to safeguard the forest and wildlife of the country."The Amendment also inserted Part VI-A (Fundamental duty) in the Constitution, which reads as follows:

Article 51-A (g)⁶¹ "It shall be duty of every citizen of India to protect and improve the natural environment including forests, lakes,, and wildlife and to have compassion for living creature."

⁵⁶ (1997)1 SCC 388.

⁵⁷ S. Shantha kumar, Environmental Law An Introduction, Chennai: Surya Publication,122 -123 (2001).

⁵⁸ AIR 1987 SC 1037

⁵⁹ AIR 1996 5 SCC 647

⁶⁰ Article 48-A of Indian constitution

⁶¹ Article 51-A (g) of Indian constitution

In *Sachidanand Pandey v. State of West Bengal*⁶², the Supreme Court observed "whenever a problem of ecology is brought before the court, the court is bound to bear in mind Article 48- A and Article 51-A (g).

11. The National Green Tribunal Act, 2010

In India the higher judiciary is loaded with excessive weight with a large backlog of cases. It may be appreciated that in order to have effective prevention of environmental pollution and environmental complaints should be decided in an efficient manner which is not possible in the present context of judicial administration. Therefore urgent need was felt for an alternative forum so that environmental cases were resolved without much delay. India's Environmental Court as a result of the need repeatedly express by the Constitutional Courts on the need to have a specialized judicial bodies to deal with complex environment questions. The trigger for setting up of Environmental Courts was through the Supreme Court of India which in its judgment highlighted the difficulties faced by Judges in adjudicating on Environment.⁶³

The Supreme Court in *M. C. Mehta v. Union of India*⁶⁴ observed that "Environment Court⁶⁵" must be established for expeditious disposal of environmental cases and reiterated it time and again. As a sequel to it the National Environment Tribunal Act, 1995 and National Environment Appellate Authority Act, 1997 were passed by the Indian Parliament.

The Supreme Court of India in its judgment referred the needs for establishment of environmental court which would have the benefit of expert advice from environmental scientist and technically qualified persons as a part of judicial process, after an elaborate discussion of the views of jurists in various countries.⁶⁶ The Supreme Court has also opined that as environment cases involve assessment of scientific data it would be desirable to have the setting up of "environmental courts on a regional basic with a professional judge and two experts keeping in view the expertise required for such adjudication"⁶⁷

In Indian Council for *Enviro-Legal Action v. Union of India*⁶⁸, the Supreme Court observed that environmental Court having Civil and Criminal jurisdiction must be established to deal with the environmental issues in a speedy manner.

In *Charanlal Sahu v. Union of India*⁶⁹ the court opined that "under the existing civil law damages are determined by the civil Courts, after a long drawn litigation, which destroys the very purpose of awarding damages so in order to meet the situation, to avoid delay and to ensure immediate relief to the victims, the

⁶² AIR 1987 SC 965

⁶³ Jayashree Khandare, "Role of National Green Tribunal in Protection Environment" Paripex - Indian Journal of Research, 4. Issue : 12 (Dec. 2015)

⁶⁴ AIR 1987 SC 965-967

⁶⁵ Jayashree Khandare, "Role of National Green Tribunal in Protection Environment" Paripex - Indian Journal of Research, 4. Issue : 12 (Dec. 2015)

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ 1996(3) SCC 212

⁶⁹ (1990) 1 SCC 613

law should provide for constitution of tribunal regulated by special procedure for determining compensation to victims of industrial disaster or accident, appeal against which may lie to this Court on the limited ground of questions of law only after depositing the amount determined by the tribunal.”

Law commission was guided by the model of environmental court established in New Zealand and the Land and Environmental Court of New South Wales and also the observations of the Supreme Court in four judgments, namely, *M.C. Mehta v. Union of India*⁷⁰, *Indian Council for Environmental – Legal Action v. Union of India*⁷¹, *A.P. Pollution Control Board v. Nayudu*⁷².

The Commission also considered the reference made in the Nayudu case to the idea of a “multi-faceted” Environmental Court with judicial and technical/scientific inputs as formulated by Lord Woolf in England recently and to Environmental Court legislations as they exist in Australia, New Zealand and other countries. The report also adopted the practice of the Environmental Courts in Australia and New Zealand which function as appellate Courts against orders passed under the corresponding Water Acts, Air Acts and Noise Acts and various Environmental related Acts and also have original jurisdiction. They have all the powers of a Civil Court. Some have even powers of a Criminal Court.⁷³

The act was also a response to implement the apex court’s pronouncement that the right to healthy environment is a part of the right to life under Article 21 of the Indian Constitution.

The NGT is a specialized forum for effective and speedy disposal of cases pertaining to environment protection and conservation of forests.⁷⁴ The NGT was first established with the Principal Bench in Delhi, later followed by four zonal benches in Chennai, Pune, Bhopal and Kolkata. The preamble of the Act declared that the NGT had been set up to carry out, inter alia, the constitutional obligations under Article 21.⁷⁵ Unlike the NEAA, the NGT was granted wide ranging powers allowing it to adjudicate cases of protection of the environment, natural resources and the legal rights of people being affected under a number of existing laws such as the Water (Prevention and Control of Pollution) Act, 1974, the Air (Prevention and Control of Pollution) Act, 1981, the wide-ranging Environment Protection Act, 1986 and the Biological Diversity Act, 2002. The NGT was envisaged by its enactors as a specialized environmental body, consisting of judicial members as well as expert members, who have the necessary proficiency to deal with issues of environmental importance.

⁷⁰ AIR 1987 SC 965-967

⁷¹ 1996(3) SCC 212

⁷² 1999 (2) SCC 718

⁷³ A. P. Pollution Control Board v. M. V. Nayudu, 2001 (2) SCC 62

⁷⁴ Praveen Bhargav, Everything you need to know about the National Green Tribunal (NGT), available on <http://www.conservationindia.org/resources/ngt>

⁷⁵The Preamble, the National Green Tribunal Act, 2010: “AND WHEREAS in the judicial Pronouncement in India, the right to healthy environment has been construed as a part of the right to life under Article 21 of the Constitution.”

12. Conclusion

In summing up we can say that the problem of climate change became big issue not only on national level but, it is a global issue. Human-induced climate change has contributed to changing patterns of extreme weather across the globe, from longer and hotter heat waves to heavier rains. From a broad perspective, all weather events are now connected to climate change. While natural variability continues to play a key role in extreme weather, climate change has shifted the odds and changed the natural limits, making certain types of extreme weather more frequent and more intense. We need to strengthen our local environmental agencies that regulate urban construction, waste management, and protect our water sources. We need to take part and try to stop global warming and other effects on climate change. If the earth’s temperatures continue to rise in the future, living things on earth would become extinct due to the high temperatures. If humans contribute to control global warming, this world would be cooler and the high temperatures we currently have would decrease. If everybody as one take stand and try to end most of the climate changes that are occurring, this world would be a safer place to live on.