

CLIMATE CHANGE AS A BIGGEST THREAT TO SUSTAINABLE DEVELOPMENT IN INDIA: AN ANALYSIS

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ABSTRACT

A global comparative opinion survey shows that people in India and indeed all countries, have a marked and rising concern about sustainable development and climate change. The challenges are alarming, especially in the context of finding the matching resources of the required magnitude given the economic conditions. Climate science has rightly taken up an important position in the public debate. Even as the science of climate change grapples with uncertainties the world is witnessing more extreme events. The urgency for action is felt more than ever before. In contrast, though the Doha Gateway on climate change agreed upon in December 2012 ensured that there is continuation of a multilateral and rule-based regime to reduce emissions, the emission pledges on the table by the developed country Parties lacked ambition. With rising extreme events, and rising citizen demand, the world has little option but to listen to the voice of evolving science and respond adequately with strategies and policy rooted in the principles of multilateralism with equitable and fair burden sharing.

Historically, the responsibility for greenhouse gas emissions' increase lies largely with the industrialized world, though the developing countries are likely to be the source of an increasing proportion of future emissions. The projected climate change under various scenarios is likely to have implications on food production, water supply, coastal settlements, forest ecosystems, health, energy security, etc. The adaptive capacity of communities likely to be impacted by climate change is low in developing countries. The efforts made by the UNFCCC and the Kyoto Protocol provisions are clearly inadequate to address the climate change challenge. In short, climate change is one of the most important global environmental challenges, with implications for food production, water supply, health, energy, etc. This paper seeks to address the scientific understanding as well as coordinated action requires both at national and global level for addressing climate change in India.

Keywords: climate change, adaptation, mitigation, costs, vulnerability.

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1. INTRODUCTION

Climate change is one of the most important global environmental challenges facing humanity with implications for food production, natural ecosystems, freshwater supply, health, etc. According to the latest scientific assessment, the earth's climate system has demonstrably changed on both global and regional scales since the preindustrial era. Further evidence shows that most of the warming (of 0.1°C per decade) observed over the last 50 years, is attributable to human activities.² The Intergovernmental Panel on Climate Change (IPCC) projects that the global mean temperature may increase between 1.4 and 5.8 degrees Celsius (C) by 2100.³ This unprecedented increase is expected to have severe impacts on the global hydrological system, ecosystems, sea level, crop production and related processes. The impact would be particularly severe in the tropical areas, which mainly consist of developing countries, including India.

One of the most important factors for climate change is the increased concentrations of CO₂ and other greenhouse gases in the environment, which is primarily due to the combustion of fossil fuels and other human activities. Between 1990 and 1999, an estimated 6.3 GtC/year was released due to the combustion of fossil fuels, and another 1.6 GtC/year was released due to the burning of forest vegetation.⁴ Controlling the discharge of greenhouse gases from fossil fuel combustion, land-use change and the burning of vegetation are therefore clear opportunities for reducing greenhouse gas emissions. The better the control in emissions and the earlier they are introduced, the smaller and slower the expected warming and the rise in sea levels.⁵

The climate change issue is part of the bigger challenge of sustainable development. As a result, climate policies can be more efficient when constantly embedded within broader strategies designed to make national and regional development paths more sustainable. The impact of climate variability and change, climate policy responses, and associated socio-economic development will affect the ability of countries to accomplish sustainable development goals.⁶

² Climate Change 2001: Synthesis Report, 2001, Intergovernmental Panel on Climate Change, Geneva, Switzerland.

³ Ibid.

⁴ Climate Change 2001: The Scientific Basis, 2001, Summary for Policy Makers and Technical Summary of the Working Group I Report, Intergovernmental Panel on Climate Change, Geneva, Switzerland.

⁵ Sarkar, A.N., 2009, Global Climate Change & Sustainable Energy Development, Pentagon Press, p. 55.

⁶ Climate Change and Health: Risk and Responses, World Health Organization, <http://www.who.int/globalchange/summary/en/index11.html>, accessed on 10th December, 2014.

⁷ Supra Note 4. See, Loske, R., 1996, Scope of the Report: Setting the Stage: Climate Change and Sustainable Development, Third Assessment Report of Working Group III to Intergovernmental Panel on Climate Change.

2. GREEN HOUSE GAS EMISSION AND ITS IMPACT

Historically, the industrialized countries have been the principal contributors to emissions of CO₂. Research has shown that industrialized countries are responsible for about 83% of the rise in cumulative fossil fuel related CO₂ emissions since 1800.⁷ In the 1990s, they were responsible for about 53% of the 6.3 GtC/year, which was released as CO₂ from fossil fuel combustion. These countries have contributed little to the release of CO₂ from the burning of vegetation, which is mostly due to tropical deforestation during this period. Research has also shown that developing countries accounted for only 37% of cumulative CO₂ emissions from industrial sources and land-use change during the period 1900 to 1999,⁸ whereas industrialized countries accounted for 63%, but because of their higher population and economic growth rates, the fossil fuel CO₂ emissions from developing countries are likely to soon match or exceed those from the industrialized countries.⁹ When fossil fuel CO₂ emissions alone are considered, due to population and economic growth in the upcoming decades, the involvement of developing countries as a group will shortly surpass the industrialized countries. Earlier, the liability for emissions increase lies mostly with the industrialized world, though the developing countries are likely to be the source of an increasing proportion of upcoming increases.

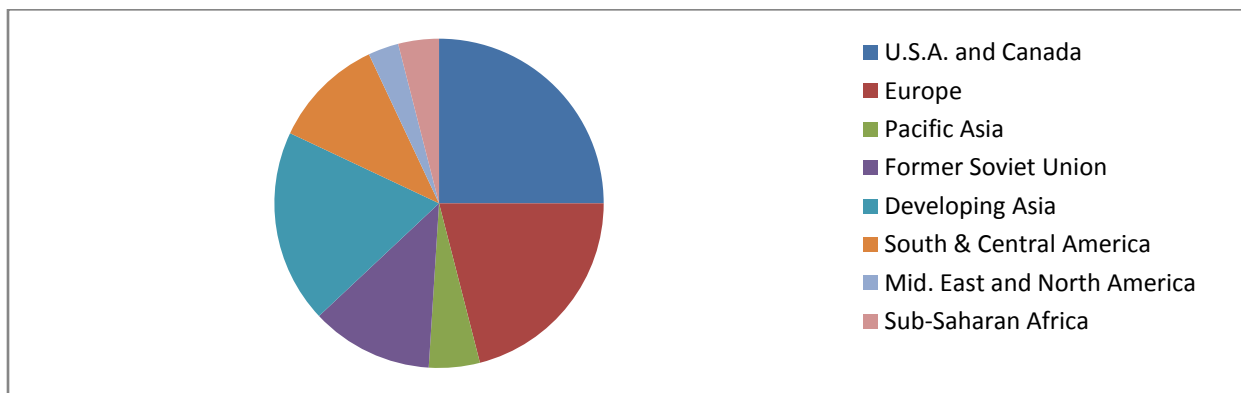


Figure 1. Percentage Cumulative global CO₂ emissions from industrial sources and land-use change during 1900-1999¹⁰.

⁷ Supra Note 4. See, Loske, R., 1996, Scope of the Report: Setting the Stage: Climate Change and Sustainable Development, Third Assessment Report of Working Group III to Intergovernmental Panel on Climate Change.

⁸ See, Figure 1.

⁹ World Resources 2000–2001, 2001, People and Ecosystems: The Fraying Web of Life, World Resources Institute, Oxford University Press, New York, p.55.

¹⁰ Sathaye, Jayant, Shukla, P.R., Ravindranath, N.H., 2006, 'Climate Change, Sustainable Development and India: Global and National Concerns', Current Science, Vol. 90, No. 3, p. 316.

Developing countries are faced with instant concerns that relate to forest and land degradation, freshwater shortage, food security and air and water pollution. Climate change will aggravate the impacts of deforestation and other economic pressures, leading to further water shortages, land degradation and desertification. Increasing global temperatures will result in rising sea levels. Populations that inhabit small islands and low-lying coastal areas are at particular risk of severe social and economic disruptions from sea-level rise and storm surges that could raze cities and disturb large coastal livelihoods.

The extensive withdrawal of glaciers and icecaps in the 21st century will also lead to higher surface temperatures on land and increasing water stress. By 2025, as much as two-thirds of the world population may be subjected to high water stress. Ecological productivity and biodiversity will be changed by climate change and sea-level rise, with an increased risk of loss of some vulnerable species.

Even though the capacity to project regional differences in impact is still emerging, the impacts of climate change are expected to be more severe in the tropical regions. This is true for all sectors that are expected to tolerate the brunt of climate change – sea level, water resources, ecosystems, crop production, fisheries, and human health. The people of the developing world are more vulnerable as their infrastructure is not so strong and extensive enough to withstand a deadly impact.

3. CLIMATE CHANGE AND SUSTAINABLE DEVELOPMENT

Sustainable development has become part of all climate change policy discussions at the international level, mainly due to adoption of Agenda 21 and the various Conventions resulting from the UNCED-1992. The generally accepted and used definition as given by the Brundtland Commission¹¹ is ‘development that meets the needs of the present without compromising the ability of future generations to meet their own needs’.¹² Sustainable development has become an integrating concept taking up economic, social and environmental issues. Sustainable development does not prevent the use of exhaustible natural resources but requires that any use be appropriately balanced. This theory is not good enough to many developing countries since it

¹¹ Formally known as the World Commission on Environment and Development (WCED), the Brundtland Commission's mission is to unite countries to pursue sustainable development together.

¹² Our Common Future, 1987, Report of the World Commission on Environment and Development (WCED), Oxford University Press, New York, p. 36.

seems to ignore their aspirations for growth and development. Further, sustainable development cannot be achieved without considerable economic growth in the developing countries.¹³

Three vital components in promoting sustainable development are economic growth, social equity and environmental sustainability. The question often asked is, should the current economic growth be sacrificed for long-term environmental conservation? Policy makers in developing countries often recognize a substitution between economic growth and environmental sustainability. However, there is a growing evidence to show that environmental conservation for sustainability of natural resources is not lavishness but a requisite when considering long-term economic growth and development, particularly in the least developed countries. The decline and degradation of natural resources such as land, soil, forests, biodiversity and groundwater, resulting from current unsustainable use patterns are likely to be aggravated due to climate change in the next 25 to 50 years. Africa, South Asia and some regions of Latin America are already experiencing rigorous land degradation and freshwater scarcity problems.¹⁴

There are many ways to pursue sustainable development strategies that contribute to mitigation of climate change. Such as:

- Adoption of cost-effective energy-efficient technologies in electricity generation, transmission distribution, and end-use can reduce costs and local pollution in addition to reduction of greenhouse gas emissions.
- Shift to renewables, some of which are already cost effective, can enhance sustainable energy supply, reduce local pollution and greenhouse gas emissions.
- Adoption of forest conservation, reforestation, afforestation and sustainable forest management practices can contribute to conservation of biodiversity, watershed protection, rural employment generation and increased incomes to forest dwellers.
- Efficient, fast and reliable public transport systems such as metro-railways can reduce urban congestion, local pollution and greenhouse gas emissions.
- Adoption of participatory approach to forest management, rural energy, irrigation water management and rural development in general can promote sustained development

¹³ Goldemberg, J., Squitieri, R., Stiglitz, J., Amano, A., Shaoxiong, X. and Saha, R., ClimateChange 1995: Economic and Social Dimensions of Climate Change, Contribution of Working Group III to the Second Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, 1996, p.6.

¹⁴ Global Environmental Outlook, 2000, United Nations Environment Program, p. 3.

activities and ensure long-term greenhouse gas emission reduction or carbon sink enhancement.

Several initiatives are being pursued to evaluate and report an entity's progress on sustainable development. An example is the Leadership in Energy and Environmental Design (LEED) – a US Green Building Council organization that uses 69-point criteria to grant a certificate at platinum, gold and other levels to buildings. Criteria include sustainable sites, water efficiency, energy and atmosphere, materials and resource use, indoor environmental quality and innovation and design process. As part of this international process, hundreds of buildings have received certification worldwide, including numerous in India a few of which have received the platinum rating.

Another example is the Global Reporting Initiative (GRI), which is a multi-stakeholder process and an independent institution whose mission is to develop and disseminate globally applicable Sustainability Reporting Guidelines. GRI Started in 1997 and is an official collaborating centre of the United Nations Environment Programme (UNEP) and works in cooperation with UN's Global Compact.

India's ITC Limited, for example, has won a platinum LEED rating for its Gurgaon building, and also reports its sustainable development performance to GRI as a carbon positive corporation, i.e. it sequesters more carbon than it emits.

Over time, as indicators and measurement tools become available, the pursuit of sustainable development is marching beyond academic discourses, and being put into practice increasingly by institutions and private industry. The trend is likely to strengthen worldwide as nations come to identify the limits on access to and development of natural resources.

4. THE U.N. RESPONSE TO CLIMATE CHANGE

Emissions of greenhouse gases have a global impact. Whether they are emitted in Asia, Africa, Europe, or the Americas, they quickly scatter evenly across the globe. This is one reason why pains to address climate change have been taken through international collaboration and agreement.¹⁵

¹⁵Policy Responses to Climate Change, 2014, World Nuclear Association, <http://www.world-nuclear.org/info/Energy-and-Environment/Policy-Responses-to-Climate-Change/>, accessed on 14th December, 2014.

The principal forum for international action climate change has been the United Nations, which has led to the Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol. However, more recently other international policies have been put in place such as The Bali Road Map, The Copenhagen Accord, The Cancun Agreements, The Durban Agreement etc. the Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol are still been taken as the most important movement to address climate change.

4.1.The Intergovernmental Panel on Climate Change (IPCC)

The Intergovernmental Panel on Climate Change (IPCC) is the foremost international body for the assessment of climate change. It was established in the year of 1988, by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), for the purpose of providing the world with a clear scientific view on the recent state of information and understanding in climate change and its potential environmental and socio-economic impacts.

The IPCC is a scientific body under the guidance and support of the United Nations. It reviews and assesses the latest scientific, technical and socio-economic information produced whole over the world relevant to the knowledge of climate change. It neither conduct any research nor does it monitor climate related data or parameters.

There are worldwide voluntary contributions from thousands of scientists to the work of the IPCC. To ensure the complete assessment of recent information, review is taken as an essential part of the IPCC process. It aims to mirror a range of views and expertise. The Secretariat coordinates all the panel (IPCC) works and liaises with Governments. It is supported by World Meteorological Organization (WMO)¹⁶ and United Nations Environment Programme (UNEP)¹⁷ and hosted at WMO headquarters in Geneva.

¹⁶ The World Meteorological Organization (WMO) is an intergovernmental organization with a membership of 191 Member States and Territories. It came into existence from the International Meteorological Organization (IMO), which was founded in the year of 1873. WMO was established in the year of 1950 and has become the specialized agency of the United Nations (UN) for meteorology of weather and climate, operational hydrology and related geophysical sciences. WMO is a member of the United Nations Development Group. See, *UNDG Members, United Nations Development Group*, <http://www.undg.org/index.cfm?P=13>, last accessed on 30th December, 2014.

¹⁷ The United Nations Environment Programme (UNEP) is an agency of the United Nations (UN) that coordinates its different environmental activities and assists various under-developed and developing countries in implementing environment friendly policies and practices. It was founded in the year of 1972, by Maurice Strong, its first director, as a result of the United Nations Conference on the Human Environment. UNEP has its headquarters in the Gigiri neighborhood of Nairobi, Kenya. UNEP also has six regional offices and various offices in different part of the countries.

The IPCC is an intergovernmental body and open to all member countries of the United Nations (UN) and WMO.¹⁸ Governments partake in the review process and the plenary Sessions, where key decisions about the panel (IPCC) work and programme are taken and reports are received, adopted and approved.¹⁹

Because of its scientific and intergovernmental nature, the Intergovernmental Panel on Climate Change (IPCC) embodies a distinctive opening to provide rigorous and balanced scientific knowledge to decision makers. Governments acknowledge the authority of their scientific content, through the endorsement of the panel (IPCC) reports. The work of the organization is therefore policy-relevant and yet policy-neutral, never policy-prescriptive.²⁰

At the ending of each assessment process the IPCC usually reflects on the report preparation process and draws lessons to update about the IPCC's future work and programmes. At the same time, it also addresses various questions such as mandate of the IPCC Working Groups, structure and scope of future reports, and timing of IPCC products.

At its 37th Session²¹ the Panel initiated a discussion about future work of the IPCC. In preparation of the Session governments of different countries were invited to submit their preliminary views on various topics and questions that should be addressed with respect to the future work of the IPCC. The Panel in this Session decided to set up a Task Group to help the IPCC to continue to improve its operation and products. The Task Group will develop number of options and recommendations for consideration by the Panel on future works of the IPCC, the appropriate structure and modus operandi for the production of these IPCC products and ways to ensure enhancement of the participation and contribution of developing countries in the future work of the IPCC.²²

The process is expected to be completed at the 41st Session of the IPCC²³ when the Panel will have to agree on size, structure and composition of the next IPCC Bureau.

¹⁸ Currently 195 countries are members of the IPCC.

¹⁹ The IPCC Bureau Members, including the Chair, are also elected during the plenary Sessions.

²⁰ Organization, Intergovernmental Panel on Climate Change, <http://www.ipcc.ch/organization/organization.shtml>, accessed on 27th December, 2014.

²¹ Held at Batumi, Georgia, on 14-18 October 2013.

²² The Task Group will draw on multiple sources, including input and submissions from scientists, governments, observer organizations and other relevant stakeholders. See, Future work of IPCC, Intergovernmental Panel on Climate Change, <http://www.ipcc.ch/apps/future/>, accessed on 29th December, 2014.

²³ The 41st Session of the Intergovernmental Panel on Climate Change will meet in the first half of 2015. See, Climate Change Policy and Practice, International Institute for Sustainable Development, <http://climate-iiisd.org/events/ipcc-41/>, last accessed on 30th Decemebr, 2014.

4.2.The United Nations Framework Convention on Climate Change (UNFCCC)

The Convention entered into force on 21 March 1994. The Convention on Climate Change sets an overall framework for intergovernmental efforts to embark upon the challenge posed by climate change. It recognizes that the climate system is a shared resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases.²⁴

The Convention enjoys near worldwide membership. Under the Convention, the duties which are imposed upon the government of different countries are:

- gather and share information on greenhouse gas emissions, national policies and best practices
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries
- cooperate in preparing for adaptation to the impacts of climate change

4.3.The Kyoto Protocol

The Kyoto Protocol is an international agreement which obliges its Parties to set internationally binding emission reduction targets. It was adopted in Kyoto, Japan, on 11 December, 1997 and entered into force on 16 February, 2005.²⁵

Recognizing that developed countries are primarily responsible for the present high levels of green house gas emissions in the atmosphere due to more than 150 years of industrial activity, the Protocol sets a heavier burden on developed nations under the principle of "common but differentiated responsibilities."²⁶

In Doha, Qatar, on 8 December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. The amendment includes²⁷:

- New commitments for Annex I Parties to the Kyoto Protocol were established. These parties agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;

²⁴ The United Nations Framework Convention on Climate Change, United Nation, http://unfccc.int/essential_background/convention/items/2627.php, accessed on 14th December, 2014.

²⁵ Koyoto Protocol, The United Nations Framework Convention on Climate Change, http://unfccc.int/key_documents/kyoto_protocol/items/6445.php, accessed on 14th December, 2014.

²⁶ Article 10 of the Kyoto Protocol.

²⁷ Koyoto Protocol, The United Nations Framework Convention on Climate Change, http://unfccc.int/kyoto_protocol/items/2830.php, accessed on 14th December, 2014.

- A revised list of greenhouse gases to be reported on by parties in the second commitment period; and
- Amendments to several articles of the Kyoto Protocol were done.²⁸

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. 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; however, the composition of Parties in the second commitment period is different from the first.²⁹

4.4.The Bali Road Map

The Bali Road Map was adopted by the UN at the 13th Conference and the 3rd Meeting of the Parties in December 2007 in Bali. The Road Map is a set of innovative decisions that represent the work that needs to be done for reaching a protected climate future.

The Bali Road Map includes the Bali Action Plan, which contain modern designed to tackle climate change.³⁰ The Bali Action Plan is divided into five major categories, i.e., shared vision³¹, mitigation, adaptation, technology and financing. The Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA)³² subsequently divides the work streams into components under those five parts.

The Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) negotiations would be working in parallel group, which was established in 2005 in Montreal. Until COP17³³ in Durban, the main focus of the negotiations under the Kyoto Protocol had been to make a decision what to do when its first commitment period expired in the year of 2012. A decision was reached in Durban to march towards second commitment

²⁸ These amendments specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.

²⁹ *Supra Note 17.*

³⁰ The Bali Action Plan is a broad process to make possible the effective and sustained implementation of the Convention through long-term cooperative action in order to reach an agreed outcome and adopt a decision.

³¹ The shared vision refers to a long-term vision for action on climate change that includes a long-term goal for emission reductions.

³² The Ad Hoc Working Group on Long-term Cooperative Action under the Convention (AWG-LCA) was initially established as a subsidiary body under the Convention to conduct a broad process to enable the effective and sustained implementation of the Convention through long-term cooperative action, in order to reach an decided outcome to be presented to the Conference of the Parties (COP) for adoption.

³³ Seventeenth session of the Conference of the Parties (COP 17) took place from 28 November to 9 December 2011 in Durban, South Africa.

period in the year of 2013, with Annex I parties submitting their quantified emission reduction targets in May 2012, to be adopted at COP18³⁴ in Qatar in December 2012.

4.5.Copenhagen Accord

Copenhagen Accord was produced from 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 2009.³⁵

The Copenhagen Accord contained numerous key elements on which there was tough union of the views of the Governments. This included the long-term goal of restraining the highest worldwide average temperature does not increase more than 2 degrees Celsius above pre-industrial levels. This is subjected to a review to be in 2015.³⁶ Developed countries have promises to fund different actions of the UN to reduce Green House Gas emissions and to adapt the inevitable effects of climate change in developing countries.³⁷

4.6.The Cancun Agreements

The Cancun Agreements are set of major decisions taken by the international community to attend to the long-term challenge of climate change collectively and to take material action to speed up the global response.

The agreements were concluded in 2010 in Cancun, Mexico, at the United Nations Climate

³⁴ The eighteenth session of the Conference of the Parties (COP 18) took place from Monday, 26 November to Friday, 7 December 2012 at the Qatar National Convention Centre in Doha, Qatar.

³⁵ The chapeau of the Copenhagen Accord lists the following 114 Parties agreeing to the Accord: Albania, Algeria, Armenia, Australia, Austria, Bahamas, Bangladesh, Belarus, Belgium, Benin, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Cambodia, Canada, Central African Republic, Chile, China, Colombia, Congo, Costa Rica, Côte d'Ivoire, Croatia, Cyprus, Czech Republic, Democratic Republic of Congo, Denmark, Djibouti, Eritrea, Estonia, Ethiopia, European Union, Fiji, Finland, France, Gabon, Georgia, Germany, Ghana, Greece, Guatemala, Guinea, Guyana, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Kiribati, Lao People's Democratic Republic, Latvia, Lesotho, Liechtenstein, Lithuania, Luxemburg, Madagascar, Malawi, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mexico, Monaco, Mongolia, Montenegro, Morocco, Namibia, Nepal, Netherlands, New Zealand, Norway, Palau, Panama, Papua New Guinea, Peru, Poland, Portugal, Republic of Korea, Republic of Moldova, Romania, Russian Federation, Rwanda, Samoa, San Marino, Senegal, Serbia, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sweden, Swaziland, Switzerland, The Former Yugoslav Republic of Macedonia, Tonga, Trinidad and Tobago, Tunisia, United Arab Emirates, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania, United States of America, Uruguay, Zambia.

³⁶ It also included a suggestion to think about limiting the temperature increase to below 1.5 degrees - a key demand made by vulnerable developing countries.

³⁷ Developed countries promised to pay 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 variety of sources. See, Copenhagen Accord, United Nations Framework Convention on Climate Change, http://unfccc.int/meetings/copenhagen_dec_2009/items/5262.php, accessed on 30th December, 2014.

Change Conference. The agreements represent key steps forward in making plans to reduce greenhouse gas emissions and to help developing countries in protecting themselves from the impact of climate change and build their own sustainable futures. Main objectives of the agreements are:

1. To launch comprehensive and objectives for decreasing greenhouse gas emissions over time to keep the global average temperature rise below two degrTo encourage the participation of all nations in decreasing these emissions, in accordance with each nation's different responsibilities and capabilities to do so
2. To ensure the international transparency of the actions which are taken by nations and ensure that global progress towards the long-term goal is reviewed in a timely way
3. To activate the development and transfer of clean technology to enhance efforts to address climate change
4. To activate and provide funds in the short and long term to enable developing countries to take better and valuable action
5. To help the different vulnerable people in the world to adapt to the unavoidable impacts of climate change
6. To look after and save the world's forests, which are the major repositories of carbon
7. To build up worldwide capacity, especially in under-developed and developing countries, to meet the overall challenge
8. To set up efficient institutions and systems which will ensure that these objectives are successfully implemented³⁸

4.7.The Durban Agreement

The United Nations Climate Change Conference in 2011 in Durban was a turning point in the climate change negotiations. All governments, in Durban, clearly recognized the necessity of a comprehensive plan that would come closer over time to delivering the ultimate objective of the Climate Change Convention, i.e., to stabilize greenhouse 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.

³⁸ The Cancun Agreements, United Nations Framework Convention on Climate Change, <http://cancun.unfccc.int/cancun-agreements/main-objectives-of-the-agreements/#c33>, accessed on 30th December, 2014.

4.7.1. Road Map for Implementation

The Durban Agreements looked to address these challenges in a more associated way by embodying a road map for implementation over a longer time horizon than has commonly been the case in the history of the Convention. On this road map, four key areas of coordinated and complementary action and implementation, designed also to build and preserve trust among countries were agreed, i.e.,

1. Second commitment period of the Kyoto Protocol: The continuation of the present international legal system through a second commitment period of the Kyoto Protocol, under which developed countries commit to cut the greenhouse gas emission and which enshrines accessible accounting rules and models of international cooperation that may inform future efforts.
2. Launch of new platform of negotiations: The initiate of a new platform of negotiations under the Convention to deliver a new and worldwide greenhouse gas reduction protocol, legal instrument by 2015 for the period beyond 2020.
3. Conclusion in 2012 of existing broad-based stream of negotiations: A decision to wrap up within 2012 the work of the existing broad-based stream of negotiations that includes all member states under the Convention.³⁹
4. Global Review: To conduct a global Review of the emerging climate challenge, based on the best available scientific data.⁴⁰

4.8.The Doha Climate Gateway

At the UN Climate Change Conference in 2012 in Doha, Qatar, governments collected and gathered the achievement of the last three years of international climate change negotiations and opened a gateway to necessary greater ambition and action on all levels. In

³⁹ This includes work to make existing national emission reduction or emission limitation plans more transparent. It also encompasses the launch and long-term implementation of the comprehensive global support network that will deliver funding and technology to help developing countries build their own clean energy futures and construct societies and economies which are resilient to climate change.

⁴⁰ Durban: Towards full implementation of the UN Climate Change Conference, United Nations Framework Convention on Climate Change, http://unfccc.int/key_steps/durban_outcomes/items/6825.php, accessed on 25th December, 2014.

Doha Climate Gateway governments decided to:

1. Set out a time table to adopt a worldwide climate agreement by 2015, which will come into effect in 2020.
2. Emphasized the necessity to increase their goal to reduce greenhouse gases and to assist developing countries to adapt its impact.
3. Launch a new commitment period under the Kyoto Protocol, thereby ensuring that this treaty's important commitment remain in place and underlining the principle that developed countries lead mandated action to reduce greenhouse gas emissions.
4. The governments made further progress towards establishing the new institutions to enable clean energy investments and sustainable growth in developing countries.⁴¹

5. INDIA'S RESPONSE TO CLIMATE CHANGE

In pursuance of the duties thrown 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 respective capabilities and their specific regional and national development priorities, objectives and circumstances.⁴² India has submitted the First and Second National Communication (NATCOM) to the UNFCCC in 2004 and 2012 respectively.⁴³ India's strategy for addressing Climate Change is reflected in numerous of its social and economic development programmes, few of them are mentioned below.

5.1.National Environment Policy

National Environment Policy 2006 is a response to our national commitment to a clean environment, mandated in Articles 48 A and 51 A (g) of the Indian Constitution and strengthened by judicial interpretation of Article 21.

It is recognized that the conservation of environment is not the sole responsibility of the state. It is the responsibility of every citizen and thus a character of partnership is to be realized

⁴¹ The Doha Climate Gateway, United Nations Framework Convention on Climate Change, <http://unfccc.int/keysteps/dohaclimategateway/items/7389.php>, accessed on 27th December, 2014.

⁴² India, Ministry of Environment and Forest, Annual Report, 2012-2013, p. 349.

⁴³ Submitted National Communications from non-Annex I Parties, The United Nations Framework Convention on Climate Change, http://unfccc.int/national_reports/non-annex_i_natcom/submitted_natcom/items/653.php, accessed on 15th December, 2014.

through the environment management of the country. The principles followed in the policy are:⁴⁴

- a) Human Beings are at the Centre of Sustainable Development.
- b) In order to achieve sustainable development, right to development must be read with duty to conserve environmental, so as to meet the needs of present and future generations.
- c) Where there are probable threats of serious damage to prime environmental resources, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to stop environmental degradation.
- d) In different public actions for environmental conservation, economic efficiency would be sought to be realized.

5.2.National Action Plan on Climate Change

Emphasizing the paramount priority of maintaining high economic growth rates to lift up living standards, than Prime Minister Mr. Manmohan Singh, on June 30, 2008, released India's first National Action Plan on Climate Change (NAPCC) outlining existing and future policies and programs addressing climate mitigation and adaptation.⁴⁵ The plan identifies eight core "national missions" viz. National Solar Mission, National Mission for Enhanced Energy Efficiency, National Mission on Sustainable Habitat, National Water Mission, National Mission for Sustaining the Himalayan Ecosystem, National Mission for a "Green India", National Mission for Sustainable Agriculture, National Mission on Strategic Knowledge for Climate Change. These plans shall be running through 2017 and directs ministries to submit detailed implementation plans to the Prime Minister's Council on Climate Change⁴⁶ by December 2008.⁴⁷

5.3.Twelfth Five-Year Plan and Climate Change Action Programme

⁴⁴ National Environment Policy 2006, 2011, India's Daily E-Magazine of GK and Current Affairs, <http://www.gktoday.in/national-environment-policy-2006/>, accessed on 15th December, 2011.

⁴⁵ Government of India, 2008, National Action Plan on Climate Change, Center for Climate and Energy Solutions, <http://www.c2es.org/docUploads/India%20National%20Action%20Plan%20on%20Climate%20ChangeSummary.pdf>, accessed on 15th December, 2014.

⁴⁶ The Prime Minister's Council on Climate Change constituted by The Prime Minister, Dr. Manmohan Singh in the year of 2007. The Council will coordinate national action plans for assessment, adaptation and mitigation of climate change. It will advise government on pro-active measures that can be taken by India to deal with the challenge of climate change. It will also facilitate inter-ministerial coordination and guide policy in relevant areas.

⁴⁷ *Supra Note 25.*

India's commitment to the National Action Plan on Climate Change is proposed to be achieved through a sustainable development strategy under the Twelfth Five-Year Plan. Several thrust areas have been recognized 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.

Climate Change Action Programme (CCAP) a new Scheme has been approved by the Planning Commission for implementation during the 12th Five year Plan. The scheme aims at promoting scientific research, information and assessment of the incident of Climate Change, building an institutional and analytical capacity for research and studies in the area of Climate Change, and supporting domestic actions to address Climate Change through specific programmes and actions at the both national and state level. The scheme comprises of eight activities, of which, three relate to scientific studies on climate change, two to institution and capacity building and three others to domestic and international actions.⁴⁸

6. CONCLUSION

The key environmental challenges in India have been sharper in the past two decades. Climate change is impacting the natural ecosystems and is expected to have substantial undesirable effects in India, primarily on agriculture on which 58% of the population still depends for livelihood, water storage in the Himalayan glaciers which are the source of major rivers and groundwater recharge, sea-level rise, and threats to a long coastline and habitations. Climate change will also cause increased occurrence of tremendous events such as floods and droughts. These in turn will impact India's food and water security problem.

Many uncertainties continue to limit the ability to detect, attribute and understand the current climate change and to project what future climate changes may be, particularly at the regional level. Thus, India has a significant stake in scientific advancement as well as an international understanding to promote mitigation and adaptation. This requires improved scientific understanding, capacity building, networking and broad consultation processes. Some of the critical scientific issues that need to be addressed are:

- a) Improved understanding of the exposure, sensitivity, adaptability and vulnerability of

⁴⁸ *Supra Note 22*, p. 351.

- physical, ecological and social systems to climate change at regional and local level
- b) Evaluation of climate mitigation options in the context of development, sustainability and equity at regional, national and global level in different sectors

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