# Political Dimension of Climate Change: India's National Interests and Security Concerns

## (An Analytical Study)

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**By**

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# ***CERTIFICATE***

I feel great pleasure in certifying that the thesis entitled "**Political Dimension of Climate Change: India's National interests and Security Concerns** (An Analytical Study)" by Mahendra Kumar Meena under my guidance. He has completed the following requirements as per Ph.D. regulations of the University of Kota.

a) Course work as per the university rules.
b) Residential requirement of the university (200 days)
c) Regularly submitted annual progress reports.
d) Presented his work in the departmental committee.
e) Published/accepted minimum of two research paper in a referred research journal.

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# ABSTRACT

Climate change is a global threat, mainly attributed to the rising GHGs concentration in the atmosphere. Due to the rising GHGs more and more solar radiation traps in atmosphere which is main cause of global warming and that exhibits in cascading effects known as climate change. Since the establishment of climate science, world has been struggling to distribute responsibility of mitigation efforts to avert climate change. In fact, distribution of responsibilities in climate regime is centerpiece of the contentions between global South and the North. The global South has argument that historically developed countries (North) are responsible for anthropogenic GHGs emission, hence they have to take lead in combating climate change. They should also provide financial and technological support to developing countries in their mitigation and adaptation efforts.

On the other developed countries have argument that aggregate GHGs emissions of emerging developing countries have surpassed the developed countries emission hence they should also equally accept legally binding emission reduction targets. This thesis mainly focused on distribution of mitigation responsibility and associated politics. The political dimension of climate change revolves around the efforts of nations to secure maximum emission liberty to ensure their developmental goals and their economic growth. The principle of CBDR-RC is a core equity principle of the UNFCCC and it is a fundamental basis of differentiation among developed and developing countries. Developing nations have been attempting to save the basic differentiating structure of the UNFCCC, but in Paris Agreement, it has been undermined and redefined in the light of different national circumstances.

India is a prominent player of climate regime as it is third largest GHG emitter. But on per capita basis India's is far behind of developed as well as some developing nations. India's interest is to secure maximum emission space and not to take any legally binding emission reduction. However, in its INDC, India offered a

cut of 33-35% to its GDP but that is subject to reciprocal financial assistance from developed countries.

In this thesis, the science of climate change is explained in its simplest form. Further, the history of climate change according to landmark conferences from 1972 to 2015 have been discussed and analyzed in context of their outcomes. The main themes of the thesis have been analyzed in chapter 4, 5 and 6. In chapter 4, the equity principle CBDR and associated politics has been discussed according to respective positions of important countries and groups. In chapter 5, India's foreign climate policy and its basis have been explored. Further, importantly India's national interests have also been explored in this chapter. In chapter 6, security dimension and associated climate change implication have been analyzed in context of India and its neighboring countries.

In whole thesis mainly mitigation politics has been studied but in due context and where it was necessary, other issues such as adaptation, financial and technological transfer have also been analyzed. Chapter 7 of the thesis has presented the conclusions in context of the hypothetical statements, the thesis based on.

# ***Candidate's Declaration***

I hereby, certify that the work, which is being presented in the thesis, entitled "**Political Dimension of Climate Change: India's National interests and Security Concerns** (An Analytical Study)" in partial fulfillment of the requirement for the award of the Degree of Doctor of Philosophy, carried under the supervision of **Dr.Sandeep Singh Chauhan** and submitted to the Department of Political Science in the faculty of social science, Government P.G. College, Baran. This thesis represents my ideas in my own words and where others ideas or words have been included; I have adequately cited and referenced the original sources. The work presented in this thesis has not been submitted elsewhere for the award of any other degree or diploma from any Institution. I also declare that I have adhered to all principles of academic honesty and integrity and have misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will cause for disciplinary action by the university and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Date: Mahendra Kumar Meena

This is certify that above statement made by Mahendra Kumar Meena Registration No. RS736/10 is correct to the best of my knowledge.

Date: Sandeep Singh Chauhan

Research Supervisor

# PREFACE AND ACKNOWLEDGEMENT

The History of mankind's evolution is deeply rooted into the divine relation and interaction of man and nature. The whole architecture of human civilization is resulted due to this interaction. In common parlance, the process of civilization is generally regarded as the process of development, in fact materialistic development. However, Eastern concept of development is fundamentally different than that of Western concept. The industrial revolution which later resulted in capitalist model of development was fueled by the carbon fuels. Abundant use of fossil flues liberated the buried carbon into the atmosphere. Thus, the excessive emission of greenhouse has begun to trap the solar radiations into the atmosphere resulting in global warming.

The rising global average temperature is producing cascading, effects we recognize them as climate change. The issue of climate change was emerged in political arena in 1972 at Stockholm conference as an environmental issue. In 1992, with the formation of the UNFCCC, inter-governmental negotiations have been going on to distribute the mitigation efforts and adaptation cost. The UNFCCC produced the Kyoto Protocol in 1997 which legally binded the developed countries to take mitigation measures to avert climate change. Further negotiations under the auspices of the UNFCCC concluded in Paris Agreement in 2015, which obligates each party to take voluntary measures according to its INDC. The whole history of the UNFCCC negotiations is full of contentions between the global South and the North.

The issue of climate change by its nature is a multidimensional issue involves various aspects. The whole process of negotiations essentially involves various scientific understanding of the climate system which makes it very complex to understand. Additionally, the negotiations involve various national interests of countries that make the climate regime very complex for research. The issue of climate change is a compound of various economic and political interests of countries because mitigation efforts are directly linked with economic interests of nations.

Primary observation of the climate regime is almost difficult for an average researcher. Therefore, for analytical purpose secondary sources are important, however, the climate change is heated topic of discussion and debate in every discourse, finding appropriate and reliable source or material is highly strenuous and time consuming process. Further objectivity of the sourced material is another contentious issue as it is always difficult to determine the degree of objectivity in any study or research. It further becomes difficult in context of issues like climate change where objective approach can significantly deviate due to the nationalistic emotions.

Exploring political dimension of climate change is an unconventional research which essential involves a multidisciplinary approach that make the research lengthy as well as laborious. It is a regime with a clear objective of holding the rise in average global temperature below the $2^0$ C and for this aim reduction in GHG emission is only solution. How the mitigation and adaptation burden will shared among the parties of the UNFCCC is a centerpiece of the contentions. Despite the historical Paris Agreement, various issues are still on negotiation table. Further the US withdrawal from the Paris Agreement is likely to be jeopardizing the climate change regime.

It was not an easy decision to adopt such a complex and unconventional topic for research. This would have been not possible in absence of huge motivational waves from my research guide, Dr. Sandeep Singh Chauhan who constantly rippled me with huge waves of encouragement and motivation. I acknowledge special debt of gratitude to Dr. Sandeep Singh Chauhan who enormously supported me throughout the process of thesis preparation.

I dedicate this research work to my late father Puran Singh and my mother Mukti devi for their great blessing. I am especially grateful to my sister Kamla Meena and my brother in law Mr. Babulal Meena who supported me in this endeavor. I would also like to express my thankful wishes to my brother Jaswant Singh Meena, my uncle J.P Meena, Sunita Meena. I am also thankful to my lovely nieces Dr. Priyanka Meena and Dr. Shweta Meena (Karlos) for their wonderful support. I also

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Mahendra Kumar Meena

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# ABBREVIATIOS

| | |
|---|---|
| AF | Adaptation Fund |
| AOSIS | Alliance of Small Island States |
| AWG-ADP | Ad Hoc Working Group on the Durban Platform |
| AWG-KP | Ad Hoc Working Group on Kyoto Protocol |
| AWG-LCA | Ad Hoc Working Group on Ling Term Cooperative Actions |
| BAP | Bali Action Plan |
| BAPA | Buenos Aires Plan of Action |
| BASIC | Brazil, South Africa, India & China |
| CDM | Clean Development Mechanism |
| CERs | Certified Emission Reductions |
| CNA | Center for Naval Analysis |
| CoP | Conference of Parties |
| CTCN | Climate Technology Centre and Network |
| ECOSOC | United Nations Economic and Social Council |
| EDS | Economic Defense Spending |
| EIT | Economy in Transition |
| ETS | Emission Trading Scheme |
| EU | European Union |
| FAO | Food and Agriculture Organization of the United Nations |
| G-8 | Group of Eight Nations-Canada, France, Germany, Italy, Japan, The United Kingdom, and The United State |
| GATT | General Agreement on Tariff and Trade |

| | |
|---|---|
| GCF | Green Climate Fund |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| GHG | Greenhouse Gases |
| GWP | Global Warming Potential |
| ICA | International Consultancy and Analysis |
| ICA | International Court of Arbitrations |
| ICSU | International Council of Scientific Unions |
| IEA | International Energy Agency |
| INDC | Intended Nationally Determined Contribution |
| IPCC | Inter-governmental Panel on Climate Change |
| IPR | Intellectual Property Rights |
| IR | Infrared Radiation |
| IWT | Indus Water Treaty |
| KP | Kyoto Protocol |
| LDC | Least Developing Countries |
| LDCF | Least Developed Countries Fund |
| LMDC | Like Minded Developing Countries |
| LULUCF | Land Use, Land Use Change, and Forestry |
| MEA | Ministry of External Affairs |
| MEF | Major Economic Forum |
| MoEFCC | Ministry of Environment Forest and Climate Change |
| MoP | Meeting of Parties |
| MRV | Measurable, Reportable, Verifiable |

| | |
|---|---|
| NAMA | Nationally Appropriate Mitigation Actions |
| NAPCC | National Action plan on Climate Change |
| NASA | National Aeronautics and Space Administration |
| NSIDC | National Snow and Ice Data Center |
| OEC | Organization for Economic Co-operation and Sustainable Development |
| OPEC | Oil Producing and Exporting Countries |
| PMCCC | Prime Minister Council on Climate Change |
| SBSTA | Subsidiary Body for Scientific and Technological Advice |
| SCCF | Special Climate Change Fund |
| SIDS | Small Island Developing Countries |
| TEC | Technology Executive Committee |
| TERI | Tata Energy Research Institute |
| UNEP | United Nations Environmental Programme |
| UNFCCC | United Nations Framework Convention on Climate Change |
| UNSC | United Nations Security Council |
| UV | Ultra Violet |
| WIM | Warsaw International Mechanism |
| WMO | World Meteorological Organization |
| WTO | World Trade Organization |

# Chapter 1

## Introduction

# Chapter 1
## Introduction

Human being is a rational animal always pursue for the betterment of life. What constitute the betterment of life? The whole history of humankind is a transcript of exploration voyage for the betterment of life. However, the rational approach of humankind took different perspective of a better life. The East and West moved in different directions in pursuant of elements that constitute the betterment of life. The Western approach moved in materialistic direction while the Eastern approach embraced the spiritual direction. The Western approach developed the materialistic science for the betterment of life while the Eastern approach developed spiritual science and defined the ultimate goal of life as to recognize the supreme sprit and embracement with that supreme spirit after the end of mortal physical life.

The difference in the rational perspective towards the betterment of life determined the difference in the approach towards the 'Nature' and 'Environment'. The Western approach is based on the exploitation and utilization of the Nature to procure materialistic elements because they find betterment of life in physical contentment. In fact, physical contentment could never be achieved as it is a basic human nature that demands more and more. Thus, in pursuant of more and more betterment of life, the Western world brutally exploited the Nature. In contrast, the Eastern approach finds contentment in limiting the physical desires and lives the life in ambient of less and less resources. This led the divine relationship with Nature in Eastern approach.

The difference between materialistic and spiritual approach determined their relationship with nature that manifest in the daily practices of worship and customs. The relationship between mankind and Nature is regarded as a relation of son and mother. In East, especially in India, the flora and fauna are regarded as the members of family and the Earth is called Mother. Famous quote from Vedas says:-

"**Unto Heaven be Peace, Unto the Sky and the Earth be Peace, Peace be unto the Water, Unto the Herbs and Trees be Peace"**[1].

With the evolution of Industrial Revolution in 1760, the Western world saw a massive increased in industrial productivity. The political soil was fertilized by the two rationalists, Hobbes and Lock. The political trumpet was playing on the rhythm of Liberalism in the song of Individualism. In the backdrop of Individualism based liberal environment, an atomistic elite class was taking the rein of state to get freehold licenses to exploit the nature. This wealthy class was living a luxurious life by exploiting the nature and creating abundant wealth. The social, political and economic structures were modulated in the spectrum of Liberalism and Democracy. Thus the compounding of liberal ideologies with industrial revolution established a capitalistic model of development, where matter based development was considered inevitable for the betterment of human life.

The concept of development, itself, was defined as the materialistic development rather than the development of human beings. "The more matter was explored, developed harnessed and transformed into different forms for commodious living, wealth production and inordinate life style of human beings and nations are considered modern, developed and civilized."[2] Thus, capitalist model of development preside on liberalism soon attained the status of beacon and well taken by emerging economies as a guiding principle for their development. It is pertinent to say that the capitalist and communist model were differ in their political, economic and social structure but both the model perceived the development in materialistic context which was based on incessant exploitation of the nature.

The natural resources were abundantly explored and utilized to fuel the materialistic development. The energy requirement for this development was mainly sourced from carbon based fossil fuel that was available in abundant and at a cheaper price. Since the industrial revolution, carbon based western model of developmental has been embraced by the world as the only way to attain the economic growth for

providing the necessary minimum living conditions to their citizens. In brief, it can be said that the temples of development were basically founded by the bricks made of carbon; it is a carbonic civilization that is now suffering from excess of carbon.

The Western model of development has become a global path and every nation of the world has been marching towards the finish line where most of the Western countries have already been reached. The Western world or Northern Countries or more precisely developed nation have made their development by burning excessive fossil fuel that resulted in increased amount of Carbon Dioxide, Carbon Mono Oxide, Nitrous Oxide, Methane and troposphere Ozone. A manmade compound Chlorofluorocarbon, invented in 1890, caused severe damage to the Stratospheric Ozone layer. These CFC and HFC compounds were used under a brand name Freon for the refrigerant purposes. Massive deforestation for developmental purposes also made contribution to the degradation of environment.

With the end of colonialism era, newly emerged nations also joined the development club. These newly liberated countries had already been brutally exploited by the western powers. With their liberation, they had adopted the same carbon based developmental model to eradicate the extreme poverty and to make a faster economic growth. Two giants, China and India, began their developmental journey with massive industrialization, however, with different socio-political structures. Both the countries were in immense poverty and suffering of poor infrastructure and underdevelopment. Thus, development was the foremost agenda of their national policies to alleviate or eradicate the extreme poverty.

The whole world was marching in a blind race of development without any due respect to the conservation of Nature and environment. The result was obvious, environmental degradation slowly began to appear in severe natural disastrous and calamities. The atmospheric concentration of toxic and harmful gases began to increase over the threshold limit of the atmosphere and slowly the average global mean temperature also started to inch up. The increase in the concentration of toxic

gases-greenhouse gases (GHGs) - has risen substantially that is resulting in rapid increase in the global temperature, called global warming. The scientific community has explicitly proven that global warming is not a myth or hoax; it is real and can be more severe and disastrous for the existence of humankind, if not duly addressed.

Before moving further, it is essential to make clear distinction between global climate change and global warming. Often these words are used interchangeably. But there is substantial difference between these notions. The notion global warming denotes only increase in the earth's mean temperature, observed in the longer time frame, while climate change is a broader notion, comprehensively includes global warming with all its side effects like rise in sea level, change in precipitation, glacier melting, shrinking of polar ice sheets, ocean acidification, change in seasonal variation, change in crop cycle, drought, flood, storm and change in ecosystems. Indeed the list is endless, scientists exploring the other effects which are still in the smoke of vagueness.

In other words, global warming is a symptom of larger issue of climate change. Scientifically, global warming is exclusively attributed to the anthropogenic activates, while climate change can be attributed to both, natural as well as anthropogenic activities. Climate change does not necessarily mean the global warming; it could also refer the global cooling. Until 1970, scientists were in ambiguity regarding the effect of industrialization. They were certain that industrialization could have potential to affect the climate but in which direction? They had two effects, on one side there where green house gases that could trap the heat between the earth and the atmosphere and on the other side there where aerosols that could reflect back the incoming solar radiation.[3]

The ambiguity regarding the direction of climate change was decisively alleviated by the study of National academy of Science. The study concluded that doubling of Carbon Dioxide could raise the earth's mean temperature up to $3^0$C. The study further confirmed that the carbon Dioxide would increase in atmosphere due to

the excessive burning of carbon fuel and that would attribute rapid increase in the global temperature.[4]

By the year 1990, it was confirmed by the scientific community that the earth was warming due to the anthropogenic activities. Human were adding more and more Carbon Dioxide by burning fossil fuels. Now, in contemporary discourse, climate change includes global warming due to the anthropogenic activities. "Regardless of whether climate change is all the side effects of global warming, or that global warming is one symptom of human-caused climate change, the basic phenomenon is same-the buildup of excess heat energy in the Earth system."[5] Although greenhouse effect had been discovered in 1896 by Swedish scientist Savante Arrehenium, he was not certain regarding the direction of climate change.

Until 1972, the issue of climate change had been mostly deliberated in scientific arena. By 1970, scientist had gathered sufficient data to establish the link between environmental degradation and human activities. Excessive emission of Greenhouse gases and deforestation had been identified as two human activities that were causing environmental degradation and climate change. The alarming scientific evidences unleashed the concerning voices around the world, especially in Western world.

The political dimension of climate change regime explicitly unveiled during the United Nation's conference on the Human Environment in 1972 at Stockholm, Sweden. The conference did not use the specific term 'climate change' but it was embodied in the environmental concerns raised by the declaration of the conference. The conference recognized the urgent need of emission reduction to curtail environmental degradation. However, fault line was emerged between developing and developed nations regarding the responsibility of environmental degradation and the burden of mitigation efforts to curb the degradation. The developed world argued in favor of universal mitigation efforts to arrest the environmental degradation, while, paradoxically, developing world perceived the environmental issue as a specific issue

of developed world. They argued that the developed countries were primarily responsible for the degradation; hence they would have to take mitigation and corrective measures.

The developing countries were skeptical about the intentions of developed world. The developing world saw the universal demand for mitigation actions as another form of domination and colonialism. Indian Prime Minister Smt. Indira Gandhi, the only head of state who attended the conference led the foundation stone of common perception of developing countries. She strongly argued that development was the primary pre-condition for the alleviation of wide spread poverty in the developing world. Therefore, any mitigation obligation would be hinder for the developing process in the developing countries. Thus, the energy link between development and climate change made the issue contentious as all countries including developing one were completely depended on fossil fuels for their energy requirements.

Thus, two contesting approaches were emerged during the conference that are basically founded the core of this thesis. After Stockholm conference, the issue of climate change was institutionalized with the establishment of United Nations Environmental program (UNEP) in 1972, subsequently under the joint auspices of the UNEP and the WMO a scientific body, 'Intergovernmental Panel on Climate Change' (IPCC) was formed in 1988 to initiate scientific research on climate change with the involvement of all associated nations. The IPCC published its First Assessment Report (FAR) in 1990 on state of global climate. Under the UN General Assembly the 'Intergovernmental Negotiating Committee' was formed to draft the formulation of a Framework Convention.[6]

The INC drafted the basic principles and structures of the convention and the agreed draft was presented in 1992 at the 'United Nations conference on Environment and Development' (UNCED) popularly known as the 'Earth Summit' in Rio de Janeiro, Brazil. The United Framework Convention (UNFCCC) was kept open for

ratification up to June 1993, as of today it has 197 parties. The convention led the Kyoto Protocol in 1997 and Paris Agreement in 2015 to avert the climate change and its adverse cascading effects.[7]

The issue of climate change is not merely an environmental issue but it involves many other issues in a cascading fashion. Indeed it is a multidimensional global issue which requires a collective, coordinated and honest action to avert change in earth's climate. Since the beginning of climate change regime, the issue of burden sharing has been dominated the regime which essentially involves the equity issue. The developing nations have been strongly vocal regarding their equal entitlement in global common resources. The Earth is a common global resource; therefore, every individual has equal right over the common resources of the earth. The atmosphere is also a common resource and every individual has equal right to use this resource.

Technically, the atmosphere can hold specific amount of carbon so as the average rise in mean global temperature remains under $2^0$C. The developed countries already exhausted the major portion of this limit and very little space is left to accommodate the additional emission. The developing countries have been arguing that developed countries should reduce their luxurious GHGs emission substantially to adjust the development orientated emission of developing countries so that the average rise in global temperature remains under $2^0$C. The developing countries, especially, India has been consistently argued that equal entitlement of atmospheric right should be considered on per capita basis. India's per capita emission is well below of international average and it is minute in comparison of developed countries per capita emission. Further, historically, developed countries have been primarily responsible for the cumulative carbon stock in the atmosphere. Therefore, they must take greater responsibility in addressing the climate change.

Since the beginning of climate change regime, India has been consistently demanded for the equity in terms of equal entitlement of atmospheric right on per

capita basis. During the INC negotiations, India successfully saved its right of development without accepting any mitigation burden. India played an important role in the fostering of basic principles of the UNFCC. During the INC negotiations, India along with China consistently fought for the equity and climate justice. Their efforts resulted in form of a phrase "Common but Differentiated Responsibility and Respective Capability" that enshrined in the convention as a guiding principle for future negotiations.

The application of CBDR-RC was resulted in Kyoto Protocol in 1997. The Kyoto Protocol clearly made distinction between Annex I parties and Non Annex parties. The Annex I parties-developed nations- were under obligation of quantified emission reduction targets, while Non Annex I parties- developing countries- kept free of any mitigation targets. The first phase of Kyoto Protocol expired in 2012, while in second phase; the Protocol lost its credibility because of unwillingness of several developed countries. In subsequent years of Kyoto Protocol, the negotiations have been carried out for a comprehensive legally binding treaty, which are concluded in 'Paris Agreement'.

It is pertinent to mention that during the long journey of climate change regime, the basic and fundamental principles of the UNFCCC have been molded by the global politics of climate change. The top down distribution of responsibilities is now wiped out. Every country is standing on equal foot. The CBDR-RC has also lost its relevancy to a greater extent due to the provision of voluntary contribution in form of "Intended Nationally Determined Contribution". According to Paris Agreement, parties have to offer their voluntary GHG mitigation targets that will be subject to international scrutiny. However, the sum of all submitted INDCs, still falls short of required target to keep the rise in average global temperature below $2^0$C or in best case below $1.5^0$C.

Since the beginning of climate change regime, four issues have been constantly contested between the developed and developing nations namely

mitigation, adaptation financial assistance and technology transfer. Among all four, mitigation has been particularly remained as the focal point of contention between broad grouping of developed and developing countries. As far as this thesis is concern, mitigation issue is predominately analyzed in context of India's national interests and role. However, as the context required, other issues are also duly discussed and analyzed. The issue of climate change is a multidimensional issue; hence the thesis has adopted the multidisciplinary approach to reach the core of issue.

The climate change is a physical phenomenon which is very technical in nature and shared by several disciplines. The various scientific bodies under the UNFCCC have been involved in the regime to provide technical aspects of climate change. The technical negations are mostly carried out in these bodies and then presented to the conference of parties for the policy decisions. In this thesis, the highly technical debate is intentionally omitted as this thesis is only concern with the policy negotiations which are predominately executed by the political leadership. However, scientific aspects of climate change are duly explored in the thesis as they are essential inputs for policy decision. Maximum efforts have been taken to simplify the scientific explanation of climate change.

## **1.1** Main Objectives of the Study

The issue of climate change essentially involves foreign policy to safeguard the national interests during the negotiation. Every country either individually or in group, has been involved in the climate negations to gain maximum to secure their national interests. The contented approach towards the issue of climate change is a fundamental reason behind the politics. As the climate change is directly linked with development and security aspects of a country, it has been explored in said aspects. Further, international climate policy of a country cannot be fundamentally different from the broader foreign policy of that country. Indeed, it is rooted in broader foreign policy and hence reflects the core values, principles and objectives of foreign policy.

Therefore, India's national interests in climate regimes have been explored in due context of broader foreign policy. In brief, main objectives of the study can be summarized as:-

- To understand the science of climate change, greenhouse phenomenon and Earth's energy budget;
- To understand the observed and predicated consequences of climate change;
- To understand and explore the evolution of climate change regime;
- To explore the historical background of regime;
- To understand and explore the evolution of involved organizations, their structures, role and functioning;
- To Explore the negotiation in the INC and to understand the making of the UNFCCC;
- To investigate major issues in climate change regime;
- To understand equity issue and how equity issue dominated the whole regime;
- To understand, explore and analyze the principle of CBDR-RC;
- To analyze how the global politics of climate change evolved around the CBDR-RC;
- To explore and analyze how the politics went through the Cop and MoP;
- To analyze national interests, role and respective position of major players ( the US, the EU, China and India) and how they influencing the climate regime and negotiation process;
- To analyze the role function and interests of different negotiating blocks, G-8, G-77, BASIC, LDC, OPEC, LMDC and AOSIS;
- To explore, evaluate and analyze India's national interests in climate regime;
- To explore analyze and evaluate India's role and position in climate; regime;

- To analyze how India's developmental prospect will be affected by the climate regime;
- To understand the relation between India's broader foreign policy and foreign climate policy;
- To understand the national security concept and how national security is related to climate change;
- To assess and analyze the security implications of climate change; and
- To assess, evaluate, and analyze security implications for India in regional context with special reference to Pakistan, Bangladesh and China.

## **1.2** Review of Literature

Being a multidimensional issue, the climate change has been widely researched, deliberated and published in different disciplines and in different contexts. In fact in political context, most of the literatures have been available in context of Western countries. India oriented literature is not substantially available in comprehensive manner, especially in political context. Further, literature on India's role and position in early history of climate regime is a scare resource, whatever available is also in scattered form. However, there are some prominent scholars who have researched the climate regime in Indian context are explored, reviewed and captured in the present piece of research.

Navroz K. Dubash is a prominent and frontier research scholar who widely explored the issue of climate change in Indian context. He presented a number of research paper and articles on the subject. The book, edited by him "Hand Book of Climate Change and India: Development, Politics and Governance"[8] is a great collection of articles written by prominent scholars. The book comprised of 28 articles on different aspects of climate change. The book is divided in six parts with dedicated chapters. Some chapters are scare pieces of information, for instance 'Global Warming in an Unequal World' by Anil Agarwal and Sunita Narain; 'Present

at the Creation: the Making of the UN Framework Convention on Climate Change' by Chandrasekhar Gupta; 'International Climate Negotiations and India's Role' by Sandeep Sengupta; 'Climate Change Debate: the Rationale of India's Position' by Pradipto Ghosh. In addition to these articles, the book contained with several other articles ranging from equity issue to energy and development.

Anthony Glidden's book "The Politics of Climate Change"[9] is important to understand the Kyoto Protocol and carbon market. The book is written in political and economic perspective rather than science. This book is contained with detail analysis of functioning of the UNFCCC and IPCC and importantly contributed new political ideas to view the global governing system in climate change regime.

Dr. Narottam Gaan's book "Climate Change and International Politics"[10] has captured the science of climate change in a precise manner. The book also listed the various consequences of climate change and their causes. The book provides a window to see the historical development of climate change regime with detail elaboration of various conferences and Kyoto Protocol. It also discusses the international cooperation and constraints along with each climate conference. It also analyzed the inter-linkage of climate change and human security and concluded with the analysis of developmental aspects of climate change.

Dieter Helm and Cameron Hepbum's book "The Economics and Politics of Climate Change"[11] is a critical analysis of major issue of contentions with reference to political and economic interests. This book contains with deep analysis of key players (The US, the EU, China, India, Brazil, Australia etc.) and their policy response towards the climate change regime. This book is importantly conceptualizing the alternative options to resolve various issue of disagreement. It also provides quantified emission targets with time tables that might be compared with current state of regime progression.

The Centre of Science and Environment has contributed a lot to the climate change literature. Their publications have been remarkable treasures of the climate discourse. The book "Climate Change Politics and Facts"[12] written by the CSE team is an important effort that presented the fact sheet of emission data of different countries. The presented data is well analyzed through various charts, graphs and tables. In context of presented data, the book also evaluated the division and distribution of mitigation responsibilities in regime.

Anil Agarwal, Anju Sharma, Sunita Narain's book, "Global Environmental Negotiations 1: Green Politics"[13] is first one of the series on 'Global Environmental Negotiations'. The book has detailed description of post Rio development of Protocol and other institutions. It has also analyzed the politics behind the endeavor of saving the earth. This book has been particularly represented the Southern voice of developing countries.

The book "Global Environment Negotiations 2: 2 Poles Apart" is the second one in the series written by Anil Agarwal, Anju Sharma, Sunita Narain. This book has presented the altered scenario of global negotiations after the exit of the US from Kyoto Protocol. The book also describes the reasons behind the US exit from Kyoto Protocol. The book finds that non inclusion of large emerging economies in protocol was the utmost reason behind the US withdrawal. The book critically spotted the role of Southern countries as only reactive. It further describes that the developing countries did not have any concrete proposal for sustainable development; they were barley reactive to the Western proposals.

Damodaran's A.book, "Encicling the Seamless-India, Climate Chage, Global Common"[14] discusses global commons against the complex global political relations. The economic crisis of 2008 is a central theme of the book and dynamics of climate change negotiations are elaborated in context of the economic crisis.

P.K. Gautam's book "Environmental Security: New Challenges and Role of Military"[15] gives an overview regarding the role of military in natural disastrous. It also presents the ecological effects of climate change on military institutions, its operations and its deployment. The book is written in context Indian military and its role in ecological conservation in different ecological regions of India.

Stellina Jolly and Amit Jain's book "Climate Change: Changing Dimensions of Law and Policy"[16] has analyzed the climate change development in legal context. It also presents the legal and constitutional legislation driven by climate change. It also describes the policy framework of different countries for climate response.

"The Politics of Climate Change: Environmental Dynamics in International Affairs"[17] written by G. Harris (Au.) and Paul Harris (Ed.) is an important book on political dimension of climate change. The book clearly establishes the fact that climate change is not merely a technical or scientific issue that has to be resolved by scientists. The book perceived climate change as an important affair in international relations and assesses it's the future implications on interstate relations. The book contains several scholarly chapters from the field of international relation, Political Economy and International Law. The book also evaluates the influence of climate negotiation over domestic politics and vice versa. It also presents the international security implications of climate change.

Paul Harris is a prominent scholar of climate and environmental issues. He has contributed enormously to the climate change literatures. Some of his other books are "Global Ethics and Climate Change", (Edinburgh University Press, 2016)*;* *"*What's Wrong with Climate Politics and How to Fix It" (Polity, 2013); "International Equity and Global Environmental Politics" (Routledge/Ashgate, 2001). Some of his edited books are also important as: "Ethics, Environmental Justice and Climate Change (Edward Elgar, 2016); "Handbook of Global Environmental Politics" **(**Routledge, 2014); "Climate Change and American Foreign Policy**,** (Palgrave Macmillan, 2016).

The book "Security Implications of Climate Change for India"[18] written by IDSA working group is a landmark and solo book which assess the different security implication for India in climate change context. The book importantly describes the security implication of climate change in Indian Subcontinent. It also discusses the possibilities of geopolitical tension on water distribution of rivers of Himalayan region. The book consists of 10 dedicate chapters from prominent scholars of different field. Some of Important chapters are "Climate Change and Security: Exploring the Link" by Arvind Gupta and Sunita Dutta; "Climate change and Migration" by P.K Gautam; "Impacts on India's Bilateral Relations with Neighboring Countries" by Uttam Kumar Sinha, Sreeradha Datta, Sunil Chauhan and P.K. Gautam.

Joyeeta Gupta and J.Gupta's book "The Climate Change Convention and Developing Countries: From Conflict to Consensus"[19] This book primarily captures the consensus issue within some developing countries. How this internal consensus converges, diverge and conflict with international consensus over the issue of climate change is discussed in detail. This book also presents several arguments regarding the conflicting interests of developing and developed countries with regards to international climate negotiations.

Praful Bidwai's book "The Politics of Climate Change and Global Crisis: Mortgaging Our Future"[20] is a gem book which covers almost all aspects of climate change in Indian context. It critically analyses the Indian's international climate policy. It also analyses the evolution and making of Indian foreign climate policy. It also presents coherent evaluation of India's National Action Plan on climate Change. Further, the book also assesses the outline of an equitable deal and discusses other energy options for India. Most importantly, the book unveils the climate politics around the Copenhagen summit held in 2009.

Dr. Alka Gautam's book "Climatology and Oceanography"[21] is demystify the various climate related concepts and also provides a concise information about the concepts of climate and weather.

Diarmuid Torney's book "European Climate Leadership in Question: Policies towards China and India"[22] is an important book which deals with the role of the European Union in climate change regime. Torney begins the introductory chapter with mentioning of Copenhagen last movement saga where merely BASIC and the US leaders had finalized the accord decision. The EU was left out of the discussion. Torney explores the basic political reasons behind the decline of European Climate Leadership. In his rationale search he identifies emergence of Chinese and Indian leadership as an important reason behind the EU decline. Further, he describes the EU's relationship with China and India in context of climate change regime. He dedicates 4th chapter of the book, titled "The Normative gap in European, Chinese, and Indian Climate relation" to explore the relationship equations among three powers in climate regime.

Glenn T. Trewartha's book "Introduction to Weather and Climate",[23] ; H.J. Critchfield's book "General Climatology"[24] and W. G. Kendrew's book "Climate"[25] are particularly important books of classical Climatology. These books are demystifying the various climate concepts with classifications. These books chart the concept of climate and weather in detail with lots of graphs and charts.

In addition to these books there are thousands of articles available in different journals which deal with various aspects of climate change. Some of important research article are listed below.

- Nitin Pal, "Climate Change and National security: Preparing India for New Scenario", Pragati ( April,2008);

- Eui-Seol Chung, Brian Soden, B.J. Sohan, and Lei Shi, "Upper-Tropospheric Moistering in Response to Anthropogenic Warming", John h. Seinfeld (Eds.), PNAS(2014);
- Thomas J. Doherty and Susan Clayton, "The Psychological Impacts of Global Climate Change", American Psychologist(June 2011);
- L. Rajamani, "The Nature, Promise, and Limits of Differential Treatment in the Climate Regime, in Ole Kristian & Fauchald & Jacob Werksman (Eds.), Year Book of International Environmental Law,(2005) ;
- *Dellink, R.,* "Sharing the burden of financing adaptation to climate change", in: Global Environmental Change*"* (2009);
- Lavyna Rajamani, "The Changing Fortune of Differential treatment in the Evolution of International Environmental Law", International Affairs, (2013);
- Jon Hovi, D.F. Sprinz, G.Bang, "Why the US did not become a party to the Kyoto Protocol:German, Norvegin, and US perspectives", European Journal of International relation, (2010);
- Mahajan Niyati, " Judicial Activism for Envronment Protection in India", International Research Journal of Social Sciences, (2015);
- D.E. Nuechteriein, "National Interests and Foreign Policy: A Conceptual framework for Analysis and Decision making", British Journal of International Studies, (1976);
- Raymond Clemencon, "The Bali Road Map" in The Journal of Environment and Development, (March 2008);
- Peter Christoff, "The Bali Road Map: Climate Change , COP13 and Beyond", in Journal Environmental Politics, (2008);
- Antto Viham, "India and the global Climate Governance: Between Principles and Pragmatism", in Journal of Environment and Development, (2010);
- Navroz k.Dubash, "Copenhagen: Climate of Mistrust", EPW, (Dec.2009);

- Varad Pande, "India at Cancun: The Emergence of a Confidential Declaration", EPW, (Jan. 2010);
- Praful Bidwai, "Road to Nowhere", EPW, ( December, 2011);
- Robert L. Carniro, "A Theory of the Origin of the State**" S**cience, (August 1970);
- H. Ullman, "Redefining Security", International Security (1983);
- Anton Grizold, "The concept of National Security in the Contemporary World" in International Journal on World Peace, (September 1994);
- Stephen M. Walt, "The Search for Science of Strategy", International Security, (1987);
- T.Maniruzzaman, "The Security of Small States in the World" in Canderra Papers on Strategy and Defense, (1982);
- Jessica Tuchman Mathews, "Redefining Security" in journal "Foreign Affairs", (1989);
- .Dalby, " Environmental Insecurity: Geopolitics Resource and Conflicts", EPW,(2003); and
- Varchney, Aushutosh, "India, Pakistan, and Kashmir: Antinomies of Nationalism", Asian Survey, (1991).

In addition to these research articles, there are various technical reports from different organizations are also contributed to the climate related literature. Particularly, various IPCC reports are written in a scientific manner and mostly edited by renowned scientists from all over the world. These assessment reports comprised of all aspects of climate change. The IPCC, itself, does not carry any research, all of its reports are based on peer-reviewed or non-peer reviewed sources. Thousands of scientists from various climate research organization and various weather stations voluntary contribute their work. The 'Summary for policy Makers' is generally a concise form of IPCC's reports always presented with detailed reports and which is subject to approval of representatives of various countries, nearly 120 nations.

The First Assessment Report (FAR, 1990) is particularly important to understand the science of climate change. It also served the basis of the UNFCCC negotiations. The Second Assessment Report (SAR, 1995), Third Assessment Report (TAR,2001), Fourth Assessment Report(AR4,2007) and Fifth Assessment Report(AR5, 2014) all these reports are regarded highly authentic and reliable in climate change literature. Despite their authenticity and reliability, they are not easy to get through. They present the climate related data in a very complicated form. Their graphs and charts include multiple types of information that make them very complicate to understand. However, these reports are freely available for download and mostly cited as an authentic source of information.

Various reports and publications from other agencies and organizations also contain valuable information and widely used in climate literature. The Food and Agriculture Organization of UN (FAO), the Environmental Protection Agency ( EPA), The International Energy Agency(IEA). The World Bank, The Energy and Resources Institution (TERI) and the Centre of Science and Environment (CSE) these all are some important organizations publish various research data pertaining to climate change.

There are numbers of PhD thesis and dissertations on various aspects of climate change are presented and published every year. It is pertinent to mention one important thesis which is a landmark research in Indian context is titled “India and the North-South Politics of Global Environment Issues”, University of Oxford, 1994 by Govind Mukund Rajan. It is a valuable piece of work that captures the early history of UNFCCC and analyses India’s role in making of the UNFCCC. Further, Newspaper editorials and articles, web articles, blogs all constitute and contribute to the climate literature.

## **1.3** Hypothetical Statements

This thesis is relies upon following hypothetical statements:-

- Developed countries are historically responsible for climate change.
- Any equitable global climate deal should include CBDR-RC and per capita based carbon budget approach.
- GHGs mitigation actions are related to development.
- Climate change negotiations are conflicts of interests.
- India's associated national interests with climate regime are rightly saved by India's foreign climate policy.
- India's role position and stance in climate change regime has been dynamic and accordingly subject to change in pursuit of its national interests.
- Climate Change consequences have security implications for India in context of neighboring countries, especially Bangladesh, Pakistan and China.

## **1.4** Theoretical Approach and Research Methodology

Research is a primary apparatus for exploration of new knowledge; it is a comprehensive and objective process for discovery of new facts or new interpretation of existing facts. In other words, it is a systematic process of investigation that establishes the cause-effect relationship. It also investigates the variables and their degree of effects on cause-effect relationship. It is well established fact that social phenomenon or events or incidents are attributed to several social causes. However, unlike physical sciences, most of the time they are so subtle and amalgamate in nature that explicit attribution becomes very difficult.

After Second World War failure of social sciences to provide diagnosis and solution to various incidents revealed the fundamental weakness of these disciplines. They were proven impotent due to lack of generalized theoretical framework. The erupted unrest among social scientists resulted in behavioral approach which essentially involves scientific methodology. The Behavioral approach is widely defined by several social scientists.

According to Robert Dahl "it is simply an attempt to make the empirical components of the discipline more scientific as that term is generally understood in empirical science."[26] H. Eulau defines "It specifies as the unit of both theoretical and empirical analysis, the behavior of person and social groups rather than events, structure, institution or ideologies."[27] From the definitions it becomes clear that Behavioruralism studies the process rather than structures and process are sum total of various interactions that carried out by political actors. Specific behavior or action of a political actor (political leadership) is determined by several other factors. Among these factors, finding exact factor and measuring the magnitude of influence of that factor is difficult, especially in social sciences. However, logical analysis and interpretation in the light of available facts can pave the way to reach a decisive conclusion.

The process, circumstances, behavioral observation of political actors and their statements facilitates the possibility to interconnect all factors to reach a logical conclusion. The present thesis attempted to study the role and position of different state actors involved in climate change regime with special reference to India. This thesis is attempted to explore how India's role and position is governed by its national interests. However, national interests are dynamic by nature and subject to change under different circumstances and with the objectives of broader foreign policy.

For the purpose of a theoretical basis, 'regime' concept is frequently used in this thesis in climate change context. The regime perspective facilitates a particular area or spectrum within which various process of interactions take place to resolve a

particular international issue, which requires multilateral cooperative involvement of different state actors. These processes of interactions are governed by the norms, values and principles of the regime within which they take place. Although the regime theory, itself, is controversial in political discourse, but for a theoretical basis, this thesis used the regime concept in accordance of definition given by Stephan Kranser. He defines regime as "set of principles, norms, rules and decision-making procedures around which actor expectations converge in a given issue-area of international relations."[28] Kranser applied his theory to North-South problem in New International Economic Order (NIEO).

There are three basic approaches to regime theory. First, Liberal approach, which believes in interest based co-operations achieved by convergence of expectations. Second, Realist approach which basically believes that regimes just mirror the distribution of power. This approach is based on hegemonic theory of stability that accepts power as an essential factor to secure various interests of a hegemonic state. Further, realist approach contends that hegemonic states use regimes to serve their own economic and security interests. Realist Susan Strange has stated that institutions like World Bank, GATT and IMF serves economic interests of the US which has been regarded as a hegemonic state. Third approach is cognitivist approach alternatively called as knowledge based approach which believes that knowledge is single most effective factor responsible for formation of a regime.

In context of above description, this thesis adopted the widely accepted definition given by Kransenar. The issue of climate change is a global issue and hence requires global efforts. How these efforts will converge interests of different countries that has to be negotiated. Thus for negotiations a set of norms, principles, rule and decision-making procedure is provided by United Nation Framework on Climate Change (UNFCCC). Therefore, as a theoretical basis of climate regime is adopted in this thesis.

## **1.5** Methodology and Sources of Data

The subject of climate change is a multidimensional and multifold subject. By the nature, subject is interdisciplinary; hence interdisciplinary approach is adopted to make clear and in-depth understanding of the subject. The present thesis is predominately uses analytical and descriptive methodology, however, in due context historical, comparative and interpretative methods are also used. Logical and analytical interpretation in light of available facts and their co relations with the official position of a state is centerpiece of the study. In this thesis, special efforts have been undertaken to find the circumstantial causes for a particular statement or position or stance of a country. This thesis uses official statements and documents which are mostly available in public domain.

Being a global issue, the scope for primary data is very limited. Further direct interaction with global leaders or state agencies which deal with climate policy of a country is difficult. The subject of this thesis requires extensive data of different countries and on a very longer time frame. Since this thesis captured the development of climate regime from 1992 to 2015, only secondary data is viable to support the work. This thesis has used many types of international data for instance, GHG emission data (historical and present), GDP data, Energy data, agriculture data, and irrigation data and so on. Collecting all these data directly is impossible. Therefore, this thesis is predominately based on secondary data.

However, maximum efforts have been taken to ensure the reliability and accuracy of the data. To test the various hypothetical statements, this thesis used both, qualitative and quantitative data. The secondary data is obtained from various sources. Books, journal articles, magazines articles and newspapers are extensively examined to obtain the necessary information. Further, most of the secondary data is sourced from the international database of various organizations. The World Bank, IMF, the UNFCCC, UNO, EPA, IEA, FAO, IISDA, Earth Observatory, CSE, TERI and the IPCC are some of leading organizations that keep huge database of different

information. Further the official websites of different ministries, departments and agencies of different countries are also visited to obtain various official policy statements, documents and survey reports. As this is a digital era, information, book, document, research paper, report or any type of material readily and freely accessible through internet, therefore, internet is widely used to obtain various data. Optimum efforts have been undertaken to provide full citation of referred material including full link of cited material. Predominately MLA format is used for references and given as endnotes. However, in case if the source mandate special type of citation format, same have been incorporated.

## **1.6** Chapter Scheme

This thesis is divided into seven chapters with brief discussion as below:-

### 1.6.1 Chapter 1- Introduction

This Chapter mainly covers introduction of the subject with brief discussion of climate change regime. It also includes Objectives, hypothetical statements, theoretical basis, and methodology and data source. This chapter provides outline of thesis.

### 1.6.2 Chapter 2- The Science of Climate Change: Causes and Consequences

This chapter mainly divided into two parts, first part discusses the science of climate change which includes concept of climate and weather, greenhouse phenomenon, main GHGs, Earth's energy budget, observed change in climate and future projection of climate change. Second part is mainly related to the various consequences of climate change.

### 1.6.3 Chapter 3- Major International Conferences: A Historical Road Map

This chapter mainly deals with the historical evolution of climate change. It discusses that how climate change emerged in political arena. It chanted the sequential development of climate change regime through various conferences. This chapter is basically discusses various conferences with structural approach.

### 1.6.4 Chapter 4- International Politics of Climate Change: Cooperation & Constrains

This chapter deals with the equity issue in climate change regime. The principle of CBDR-RC is guiding principle of climate regime to ensure the equity and climate justice. The chapter elaborates the CBDR-RC and disscussess global cooperation and constrains around the principle. It also describes and analyze the position and perspective of selected major players towards CBDR-RC.

### 1.6.5 Chapter 5- Politics of Climate Change: India's National Interests, Role and Position

This chapter is centerpiece of the thesis. It begins with the philosophical basis of India's foreign policy. The judicial and legislative response to climate change is also included in the chapter. It discusses the concepts of foreign policy and National interest. It also describes India's foreign climate policy in context of India's broad foreign policy along with the policy making process. This chapter identifies the national interests of India in climate change regime and accordingly discusses its role and position.

### 1.6.6 Chapter 6- Climate Change: National Security of India

This chapter defines and elaborates the security concepts with traditional and modern approach. It also discusses the national security in context of climate change. This chapter is basically hypothetical in nature as it attempts to assess the security implications of climate change in context of India's neighboring countries, especially

Pakistan, Bangladesh and China. It is pertinent to mention that only state security in traditional perspective is taken for the assessment rather than human security.

### 1.6.7 Chapter 7- Conclusion

This chapter presents the conclusion of whole study. It mainly includes the outcomes of analytical investigation carried out to test the hypothetical statements.

### 1.6.8 Bibliography

This section lists all the sources examined during the study.

## **1.7** Importance of the Study

Despite the vast climate change literature, a comprehensive and sequential study in Indian perspective is not commonly available. Especially, the political dimension of climate change in Indian context is not substantially studied. However, in scattered forms vast India oriented material is available but it lacks on sequential rhythm. Further, no serious attempts have been found to derive India's national interests in climate regime. Even, security implications of climate change in context of India's neighboring countries are often regarded as a missing link in climate discourse.

Hopefully, the present study will fill the gap narrated above. The issue of climate change is an unconventional subject of research in political discipline, therefore, this study will initiate and motivate other research scholars to undertake such unconventional study to explore new dimension of discipline. Further, this study will promote the study of India's foreign climate policy as an independent subject from broader foreign policy of the country. Security assessment of climate impacts in context of neighboring countries will facilitate policy makers to initiate appropriate measures to neutralize the anticipated security threat.

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# Chapter 2

## The Science of Climate Change: Causes and Consequences

# Chapter 2
## The Science of Climate Change: Causes and Consequences

Climate is most important factor of human environment. From pre historical era to the era of space and nuclear science, every aspect of human life reflects the influence of climate. The evolution of human civilization in different part of the world is unique and this uniqueness is largely attributed to the different climate conditions. The food, culture, tradition, social customs, religious practices, business, trade attire, habitant patterns, in every aspect of human life, climate is an important, foremost and decisive factor.

Climate of a particular place is not a static condition; it is subject to change. However, it takes many years or even a hundreds of years to change the climate by natural causes. The change in climate of a particular place that occurs due to natural phenomenon or factors is often too small and slow. But, the earth is experiencing a rapid change in its climate. Various IPCC reports confirmed that anthropogenic activities are primarily responsible for rapid change in earth's average climate.

To understand the climate change in a comprehensive perspective, it is inevitable to understand the whole system, process and variables that determine the climate conditions. It is further necessary to explore interlink between anthropogenic and natural activities that leads to catastrophic climate change. The IPCC has made it clear that climate change is already occurring in various part of the world and the disastrous form of climate change is immense, if not addressed with honest and collective measures. Urgent mitigation actions are required to curb the change in climate to ensure sustainability of the earth and its natural resources, the human life rely upon.

## **2.1** Defining the Notions: Weather and Climate

In common parlance, the atmospheric conditions are generally expressed by two words, weather and climate. Often, these notions are used interchangeably that create ambiguous approach to understand the concept of climate change in a precise manner. Basically, both notions-weather and climate- are greatly depend on the same elements, but they express different conditions with respect to time and area. It can further be elaborated by some definitions as:-

Trewartha defined, "the weather of any place is the sum total of its atmospheric conditions (temperature, pressure, winds, moisture and precipitation) for a short period of time; it is the momentary state of the atmosphere."[1]

Critchfield defined, "Weather is the day to day state of the atmosphere and pertains to short term change in conditions of heat, moisture and air movement."[2]

Trewartha defined, "Climate is a campsite or generalization of the variety of day to day weather conditions." He further made it clear that "It is not just "average weather," for the variations from the mean, or average, axe as important as the mean itself."[3]

Kenndrew defined "Climate is a composite idea, a generalization of the manifold weather conditions from day to day throughout the year…Certainly no picture of it is all real unless it is painted in all the colors of the manifold variations of the weather."[4]

It is clear that weather is a momentary condition of atmosphere which is subject to change day to day and even, within a day. On flip side, climate is a border notion which denotes the average weather conditions observed for a long period of time. Different climatic and weather conditions are resulted from the different combinations of their elements.

The IPCC conclusively defined climate as "the 'average weather', or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system."[5]

## **2.2** The Elements of Weather and Climate

Weather and climate are combination of several ingredients, called elements- (a) Temperature, (b) Precipitation and humidity, (c) Winds and (d) Air pressure. Among these four elements, temperature and precipitation are significantly in constituting particular weather and climatic condition. The composition of these elements varies in the intensity, amount and areal distribution that give a particular weather and climate.[6]

The climate of a particular place is largely characterized by the difference in the intensity, amount and areal distribution of climatic elements, decisively on temperature and precipitation. These climatic or weather elements are mainly responsible for a particular climate of a place. The variation in amount, intensity and areal distribution of elements is manipulated and controlled by some factors, called 'Climate Controls' These Climate Controls act together in different combination with different intensities and produce variety in weather and climate.[7]

**Box 2.1: Relationship among Controls, elements & Climate**

| Climate Controls | | Climate Elements | | Types & Varieties Weather & Climate |
|---|---|---|---|---|
| 1. Sun or Latitude<br>2. Land & Water<br>3. Winds & Air Masses<br>4. Altitude<br>5. Mountain Barriers<br>6. Semi permanent Low-High Pressure<br>7. Ocean Currents Storms | ⇨ | 1.Temperature Acting<br>2.Precipitation upon<br>and humidity produce<br>3. Air Pressure<br>4. Winds | ⇨ | |

Source: Trewartha, 1943

In classical Climatology, Trewartha explained that various geographical factors (controls) act together to produce various combinations of climate elements; these different combinations of climate elements, usually expressed statically (temperature, humidity, rain, snow, air pressure) labeled as climate (in longer time context) and weather (in momentary context). Climate of a particular place varies, but this variation remains within the long holding variation pattern. In other words climate variation is climate fluctuation, typically occurs on regular basis, mostly on annual or longer basis. However, some time climate exposed to extreme weather events, but they are considered as exceptional events, if not occurring on regular basis. For instance, in India, throughout a year, climate conditions vary on seasonal basis. The IPCC defined climate variation as, "variations in the mean state and other statistics (such as standard deviations, the occurrence of extremes, etc.) of the climate on all temporal and spatial scales beyond that of individual weather events.[8]

Climate change is substantially different from climate variation. According to the IPCC, "Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forcing, or to persistent anthropogenic changes in the composition of the atmosphere or in land use."[9] From both the definitions, given by the IPCC, conclusion can be drawn that climate change is continuous change in climate on long term basis [typically 30 years (WMO)]. It is change in statically properties of climate system that should be persisted for long time (30 year).

It is pertinent to mention here that the UNFCCC Article 1 defined climate change as an alteration in the composition of global atmosphere attributed to direct or indirect human activities. The UNFCCC made distinction between climate change and climate variation, former is attributed to human activities and the later one to natural causes.[10] Thus, climate change needs to be seen in a broader context- as a whole system.

## **2.3** The Climate System

The climate system is a complex chemical, biological and physical process of interactions among or in various factors, called components. The climate of the Earth is greatly depends on the radiative balance. This radiative balance is influenced by natural and anthropogenic activities which results in climate change. In the Second Assessment Report of the IPCC, climate has been defined in a broader sense as "the state of the climate system a whole, including a statical description of its variables." Thus, climate is intersection of various different and distinct parts-generally, called climate component- of climate system.

### **2.3.1** Components of Climate System of the Earth

Andrew and Richard described 6 components of climate system, as: - Atmosphere, Ocean, Terrestrial, Cryosphere, Biosphere and Anthroposphere. In addition to classically defined components, Andrew and Richard proposed a new component 'anthroposphere. They argued that technically, humans are covered under biosphere, but human activities greatly impact the climate system, therefore, need to be seen as a separate component, called anthroposphere.[11]

However, the IPCC in its Second Assessment Report described 5 component of climate system, as:- Atmosphere, Hydrosphere, Cryosphere, Land surface and Biosphere.

#### **2.3.1.1** Atmosphere

An air layer, which surrounds the Earth and extends about 1600 km. from Earth's surface, called 'atmosphere'. Finch and Trewartha write "surrounding the Earth and yet an integrated part of the planet, is a gaseous envelope called the atmosphere which extends to a height of several hundred miles."[12] The air around the Earth is colorless, odorless and tasteless; only experienced by its flow. It is elastic,

compressible and expansible, transparent to various radiations and carries weight to exert pressure on the earth's surface.[13] Atmosphere is further divided into layers according to their respective temperature, as:- troposphere, stratosphere, mesosphere thermosphere and exosphere.

The composition of the atmosphere is considerably changed from the evolution of the Earth. The atmosphere is composed of mainly (i) Gases, (ii) Water Vapor and (iii) Solid particles.

(i)**Gases**: The atmosphere consists of many gases and they found in different concentrations at different heights. The atmospheric proportion of different gases remains comparatively constant up to 50 km. from the surface of the Earth. However, it is subject to change according to the altitudes, seasons and time. The atmospheric concentration of different gases in percentage volume is shown in table 2.1 with their respective chemical symbol.

**Table 2.1 Average amounts of gases in dry atmosphere (up to 25 km.)**

| Gas | Chemical Symbol | % volume of Dry Air |
|---|---|---|
| Nitrogen | $N_2$ | 78.08 |
| Oxygen | $O_2$ | 20.94 |
| Argon | Ar | 0.93 |
| Carbon Dioxide | $CO_2$ | 0.03 Highly variable |
| Neon | Ne | 0.0018 |
| Helium | He | 0.005 |
| Ozone | $O_3$ | 0.00006 |
| Hydrogen | H | 0.00005 |
| Krypton | Kr | More or less |
| Xenon | Xe | …. |
| Methane | Me | …. |

Source: Charley & Barry, quoted by Dr. Alka Gutam

On the basis of changing atmospheric concentration of these gases, they are mainly divided into two types- Permanent gases and variable gases. Permanent gases mainly include Nitrogen, Oxygen, Argon Hydrogen and Neon. The permanent gases remain constant in their volumes up to 50 km. above the Earth surface. The Variable gases include mainly Carbon Dioxide, Nitrous Oxides, Methane and Ozone. The concentration of these variable gases in atmosphere is subject to change. Among these variable gases, $Co_2$ and $O_3$ are important as $Co_2$ alone, compromised 93.49 % of these Variable gases.[14]

$Co_2$ is highly variable gas as it is emitted during the burning of carbon fuel, woods, volcanic eruption and respiration of animals and humans. It is utilize by vegetations for photosynthesis and thus removed from atmosphere. Hence, forests are regarded as a sink of $Co_2$. Ozone is another variable gas, mostly concentrated at the height of 10-16 km. above the Earth's surface-called 'Ozone Layer'- extends up to 50 km. in upward direction. Nearly 90% of total ozone is concentrated in Ozone Layer (in Stratosphere) and rest is in Troposphere which is adjourning region to the Earth surface.

Both variable gases-$Co_2$ and $O_3$- are important gases in context of Earth's solar budget. Unlike the permanent gases, the variable gases absorb the solar radiation received in atmosphere in form of Ultra violet (UV) and Infrared (IR) radiations. As the concentrated volumes of both the gases vary in atmosphere, they play an important and decisive role in Earth's energy budget. Thus, the average global temperature of the Earth greatly depends on the concentrated quantity of these two gases, especially on $Co_2$. Therefore, the global warming is attributed to the excess concentration of $Co_2$ in the atmosphere.

(ii) **Water Vapor:** Water vapor is highest variable gas of the atmosphere mainly concentrated within the 5 Km. region above the Earth surface. About 90 % of total volume present within 5km of adjourning region near Earth surface at certain temperature and place. Its concentration in the atmosphere ranges from 0-4%

according to the topographic characteristics of a particular place. Water converts into water vapor on heating, thus, water vapor is continuously generated through the evaporation of large water bodies like oceans, rivers, lakes and evaporation of water from soil, plants and animals. However, the atmospheric water vapor is continuously removed by the condensation process and water again returns to the surface of the Earth. It is a two way interactive process between atmosphere and hydrosphere mainly driven by solar radiation (form of heat) originated from the Sun.

At a certain temperature, certain amount of water vapor can be hold by the air which is statically described in term of humidity. Water vapor maintains the humidity in atmosphere which is essential for the all living organisms. Further, water vapor plays an important role in maintaining the Solar Energy budget of the earth. It is found that water vapor also behave like GHGs by absorbing the solar radiations and amplify the GHG effects of $Co_2$.

(iii) **Solid Particles**: The atmosphere contains large numbers of fine solid or semisolid or liquid particles, generally remains invisible from naked eyes, called aerosols. The aerosols include dust particles, smoke particles (carbon), salt particles, pollen particles and organisms like batteries and viruses. Aerosols are mostly concentrated in the lower part of the atmosphere. Depending upon the composition of aerosols, they produce visual effects by making fog that significantly reduces the visibility on the surface of the Earth. Aerosols also facilitate the condensation of water vapor by acting as hygroscopic nuclei for precipitation.

Aerosols play an important role in determining the climate of the Earth. According to the NASA Earth Observatory, Aerosols directly affect the solar radiations by absorbing, scattering and reflecting the solar radiation, depending upon the composition and color of particles. Black Carbon particles, mostly emitted by burning the fossil fuel, are particularly cause of concern. The Carbon particles, due to their black color, absorb the solar radiations and thus, contribute in global warming. In addition to the climatic effects, aerosols also cause various respiratory, cardiac and

eyes diseases in humans.[15] Since the Industrial revolution, fossil fuel based development has been emitting huge quantity of carbon particles in the atmosphere and that is now unfolding as a major cause of climate change.

### **2.3.1.2** Hydrosphere

As a component of the Earth's climate system, hydrosphere denotes all collective mass of water on the Earth. The hydrosphere includes all water of the Earth, weather it is surface water or underground water or water in atmosphere. It also includes all water bodies like oceans, rivers, lakes, wells, aquifers. Around 70.8% of the earth surface is under water only 29.2% is land. The hydrosphere is predominately consists of oceans which play an important role in maintaining the climate of the earth.

Oceans are important part of hydro cycle which is a process of water movement through atmosphere, the surface and oceans. Oceans are responsible for storing and transporting the huge energy received from the Sun in form of solar radiations. They also work as a great sink to hold $Co_2$ in dissolved form in ocean water. Further, the large water quantity of oceans slowly warm and cool, thus act as a temperature regulator of the atmosphere. This low thermal conductivity of ocean water keeps the climate variability under in normal range of variation on the longer time frame.

### **2.3.1.3** The Cryosphere

It is also an important component of earth's climate system which includes ice sheets (Greenland and Antarctica), polar ice caps, continental glaciers, sea ice and ice fields. The Cryosphere plays an important role in maintaining solar radiations due to its high reflectivity and low thermal conductivity. The Cryosphere holds the characteristics of high thermal inertia, thus, responsible for the deep water circulations in oceans.[16]

The Cryosphere is particularly vulnerable to the increasing atmospheric temperature of the Earth. It holds maximum quantity of fresh water in form of ice that could melt down due to the rise in average global temperature of the Earth. It is estimated that Antarctica and Greenland ice sheets hold 99% of fresh water in form of ice. According to the National Snow and Ice Data Center (NSIDC) estimation if the Greenland and the Antarctica ice sheets melted, sea level could rise about 6 meters (20feet) and about 60 meters (200 feet) respectively. Scientists charted significant ice loss in Greenland sheet.[17]

It becomes clear that melting of Cryosphere could drastically raise the sea level and unleash the probability of extinction of small island countries. Further, extinction or shrinking of Cryosphere could reduce the Earth's reflecting capacity of solar radiation that could make the Earth's surface more warm and thus, more atmospheric temperature.

### **2.3.1.4** Land Surface

The characteristics of land surface are important factors that affect the reception and repulsion of solar radiation. The vegetation and soil are two important decisive factors which absorb, reflect and use the solar energy. The vegetation of the land absorbs the solar radiation for photosynthesis process which ultimately uses solar energy to breakdown water. The photosynthesis process uses $Co_2$ and $H_2O$ and finally liberates $O_2$ in the atmosphere. Thus, largely extended forests influence the moisture and temperature of the atmosphere.

Some radiation evaporates water content from soil and leaves of plants. Soil moisture has significant effect on the surface temperature. Further, the topography and vegetation also affect the wind flow over the surface. Both these characteristics of the land affect amount of dust particles in atmosphere which further affect the atmospheric radiation. Thus type of soil, topography and vegetation are important factors of the Land surface which affect climate system.

### **2.3.1.5** Biosphere

The Biosphere can be defined as "a specific envelope of the Earth, comprising totality of all living organisms and that part of planet matter which is in constant material exchange with these organisms."[18] In general, the biosphere includes all spheres of the Earth where life exists. It can be said that from the depth of oceans to the height of the atmosphere, the biosphere exists. However, significant portion of living organisms (humans, animals, plants and microorganisms) is concentrated near the surface of the Earth, within the 10 km sphere. Thus, biosphere overlaps other spheres.

The atmosphere is greatly affected by the biota of the biosphere. The biota of a particular region significantly affects the composition of GHGs. Plants (forests), marine plants, algae and some species of bacteria use the process called photosynthesis to produce their own food by using solar radiations (light energy). During this photosynthesis process, carbon is stored from $Co_2$. Thus, terrestrial and marine, both plants play a crucial role in the carbon cycle. Further, the respiration of plants and the digestion process in living organisms also affect the atmospheric contents of different gases like Methane and Nitrous Oxide.

## **2.3.2** The Interaction among Climate Components

The whole climate system is a sum total of various chemical, physical and biological process which take place among various components and within a single component. "Although the components of climate system are different in their composition, physical and chemical properties, structure and behavior, they are all linked by fluxes of mass, heat and momentum. All subsystems are open and interrelated" [19] Some examples can be elaborated to show the interaction among various components of the climate system.

The atmosphere and hydrosphere are highly linked and interactive to each other. The hydrological cycle is an example of this interaction. In hydrological cycle, the ocean water evaporates due to solar radiation and move up in atmosphere where the aerosols particles facilitate the condensation of water vapor in form of droplets and thus, through raining, the evaporated water brought back to oceans through the river flow.

The Cryosphere, which mainly consists of ice sheets, hinders the energy exchange between the oceans and the atmosphere. It happens mainly in oceans where large ice is present; as the ice reflects back the solar radiation. Another interaction can be cited between the atmosphere and biosphere. It is importantly affects the $Co_2$ concentration in atmosphere. The process of Photosynthesis (plants), respiration and digestion (organisms including humans) in biosphere greatly affect the gaseous composition of the atmosphere.

The Land surface and its soil, vitiation and topography affect the atmosphere. The water content in soil and vegetation affect the moisture level (humidity) in atmosphere. Similarly, the topography of land surface affects the radiative balance through the reflection of the sunlight. Further, the topography affects the wind flow on the surface of the land that affects the amount of dust, mineral and salt particles uptake in atmosphere.

These are only some examples of interactions that take place among various component of climate system. Some are very well discovered and understood, but some occur at subtle levels which are still not fully charted by the scientists. These interactions among various components of climate system are very important to sustain the Earth's climate at stable level or in normal range of variations. Any natural and anthropogenic interference with these interactions could result in progressive climate alteration on longer time scale. Climate change is one of the results of such anthropogenic interference which is mainly attributed to perturbation in energy balance of the Earth.

## **2.4** The Global Energy Balance and Green House Effect

The Sun is the only source of energy in the solar system of the Earth. The climate of the Earth is driven by the energy received on the Earth; the solar energy makes the climate of the earth habitable. The energy from the Sun is emitted in form of electromagnetic radiations which are mainly three types- Infrared, Visible light and Ultraviolet. The maximum portion of solar radiation is received in Visible light and UV radiation (short waves) forms. The Earth's energy balance simply denotes the balance between incoming radiation from the Sun and outgoing balance from the Earth. The average climatic conditions and temperature of the earth are dependent on the Earth's energy balance.

According to the IPCC's Second Assessment Report, "Each square meter of the Earth's spherical surface outside the atmosphere receives an average throughout the year of 342 Watts of solar radiation, 31% of which is immediately reflected back into space by clouds, by the atmosphere, and by the Earth's surface. The remaining 235 Wm−2 is partly absorbed by the atmosphere but most (168 Wm−2) warms the Earth's surface: the land and the ocean. The Earth's surface returns that heat to the atmosphere, partly as infrared radiation, partly as sensible heat and as water vapor which releases its heat when it condenses higher up in the atmosphere."[20]

Certain gases (trace gases) in atmosphere like $Co_2$, Chlorofluorocarbons (CFCs), Methane (CH4), Nitrous oxide ($N_20$), Hydro Fluorocarbons (HFCs), per Fluorocarbons (PFCs) and Sulfur hexafluoride ($SF_6$) and water vapor absorb the Infrared radiation (long waves) but do not absorb Visible light radiation and Ultraviolet radiation (Short waves); Other gases like Oxygen and Nitrogen almost non reactive to any radiation. The Earth radiate its received radiation in form of infrared heat radiation which is absorbed by the trace gases and most of infrared radiation emitted back to the surface of the Earth. However, some portion also emitted to the outer space. Thus, Infrared radiation is trapped between the Earth

surface and the trace gases. This blanketing of radiation is called Green House effect. It is an important phenomenon by which the average global temperature of the Earth remains constant around $15^0$ C (in first IPCC report) and makes the Earth's climate suitable to sustain life.

It is the natural Greenhouse effect that keeps the Earth's surface warm enough to make habitable. These certain trace gases called Green House Gases (GHGs). Without the natural Green House effect, the Earth would have been a frozen planet of $-18^0$C.[21]

Thus, these mechanisms of energy exchange between various components of the climate system maintain a mean global temperature near surface of the earth at $14^0$C (In Third IPCC report). However, it decreases with the height in atmosphere, above the earth's surface. At the top of the troposphere it estimates around $-58^0$C.[22]

## **2.5** Working Mechanism of GHGs

In 1827, a French Mathematician, Joseph Fourier, firstly indicated the greenhouse effect. Fourier attempted to provide explanation to the constant mean temperature of the Earth. Later, his explanation or theory stamped with name 'greenhouse effect'. The greenhouse name was given due to its analogy with a set up of greenhouse, typically made to keep the plants in a warm environment. In a greenhouse setup, the visible light energy enters freely into a house enclosed with glass sheets from all side, except the roof. The freely incoming light energy, thus absorbed by the plants and soil, inside the houses The plants and soil emit the absorbed visible light energy back in form of infrared radiation, which traps inside the glass house and thus, raise inside temperature more than the outside one. Similar process raise the inside temperature of a car, when kept in sunlight with all glass window kept closed. Further, in 1960, John Tyndall found that $Co_2$ and water vapor were important gases that could absorb and emit infrared radiations.

It is already made clear that Sun's radiation (short waves) in visible light easily penetrate into the atmosphere. Around half of total incoming radiation is absorbed by the earth's surface and emitted back in form of infrared radiation that absorbed by the greenhouse gases. The greenhouse gases radiate this absorbed radiation in all directions including towards the Earth's surface. Thus, due to the trapping of this infrared radiation between the Earth's surface and troposphere (lower part of atmosphere) keep the Earth's mean temperature around $15^0$C. However, the outer surface of the troposphere continuously radiates absorbed infrared radiation to the outer space.

## **2.5.1** Greenhouse Effect and Concept of Climate Change

In 1896, Swedish Chemist, Savante Arrehenius indicated that since industrial revolution the $Co_2$ concentration in the atmosphere was increasing and could lead the warming of the Earth. He predicted that if $CO_2$ concentration in the atmosphere doubled, the Earth would be warmer by 5-$6^0$C. He also predicted that increase in temperature would increase water vapor in atmosphere that would further intensify the greenhouse effect.[23] In the IPCC's first report, it was estimated that Carbon Dioxide was responsible for half of the enhanced greenhouse effect in past and would remain in future.[24]

The greenhouse effect itself is not a cause of concern as it was happening since when there was neither sign of the life on the Earth. In other words, naturally occurring greenhouse effect has made the optimum temperature possible on the Earth to support the existence of the life. However, since the industrial revolution, due to the excess burning of fossil fuel and deforestation, abundant amount of greenhouse gases, particularly $CO_2$, have been emitted. Thus, the increased concentration of GHGs in the atmosphere enhanced the net effect of naturally occurring greenhouse process causing more trapping of infrared radiation in the atmosphere. This enhanced greenhouse effect is now causing global warming and making the climate change as an immense disaster.

Before industrial revolution, the GHGs atmospheric concentration had been remained almost constant. But, IPCC's Second Assessment Report measured a substantial increase in the atmospheric GHGs concentration after industrial revolution. These increased concentrations of GHGs were largely attributed to the human activities. Table No.2.2 shows the increase in GHGs concentration after industrial revolution.

**Table 2.2: A Summary of the Key GHGs Affected by Human Activities**

| | $CO_2$ ppmv | $CH_4$ ppbv | $N_2O$ ppbv | CFC11 pptv | HCFC22 pptv | CF4 pptv |
|---|---|---|---|---|---|---|
| Pre-industrial concentration | 280 | 700 | 275 | 0 | 0 | 0 |
| Concentration In 1994 | 358 | 1720 | 312 | 268 | 110 | 72 |
| Rate of concentration change | 1.5ppmv/yr 0.4%/yr | 10 ppbv/yr 0.6%/yr | 0.8 ppbv/yr 0.25%/yr | 0 0%/yr | 5 pptv/yr 5%/yr | 1.2 pptv/yr 2%/yr |
| Atmospheric lifetime (years) | 50-200 | 12 | 120 | 50 | 12 | 50000 |

Source: IPCC, SAR, 1995. 1pptv=1part per trillion (million million) by volume

The table 2.2 does not include the water vapor as a GHG gas, albeit it has a powerful greenhouse effect, because of its high reflection capability almost set off its greenhouse effect. Among all GHGs gases, $Co_2$ particularly considered important in context of climate change. The increased concentration of $Co_2$ is mainly attributed to the human activities because all energy needs for development are greatly depended on use of fossil fuels and carbon is main constituent of fossil fuels.

According to the EPA data, $CO_2$ concentration in atmosphere has been steadily increasing since the industrial revolution. From late 1700 to 2015, is has been increased by an annual of 280ppmv to 401ppmv. Methane has been almost doubled from 700ppbv to approx 1800ppbv in 2014-2015. Nitrous Oxide has also reached to

328 ppbv. Ozone in troposphere, where it behaves like GHG, has increased by 3% between the years 1979 to 2014.[25]

Thus, global warming is an important factor of climate change that resulted due to the enhance greenhouse effect. Among all GHGs, $CO_2$ is mainly regarded as chief GHG that has emitted by human activities. Consequentially, the climate change is attributed to the anthropogenic interference with the atmosphere and whole climate system.

In common parlance and even in scientific literature, ambiguity regarding the concept of climate change is still persists. Traditionally, climate change refers to "any change of the classical 30-year climatology, regardless of its causes". Some time climate change assumed as "mean climate fluctuations of a global nature, caused by natural and anthropogenic activities". The various IPCC reports also interpreted causes of climate change in both the contexts- natural as well as anthropogenic.[26]

Nevertheless, the UNFCCC defined climate change as "a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time period."[27] It becomes clear that the UNFCCC considered only human activities as a main cause of climate change. Furthermore, for mitigation purpose, the UNFCCC considered only those GHGs which are not controlled by Montreal Protocol. The IPCC's Second Assessment Report highlighted this difference. The UNFCCC definition "introduces the concept of the difference climate with the effect of human-induced increase in the concentration of GHGs and that which would be realized without such human interference".[28]

Conclusively, it can be said that the IPCC, being a scientific body, considered both, anthropogenic and natural causes behind the climate change. While, being an international political agreement, the UNFCCC considered and defined the climate change as an anthropogenic interference with climate system.

## **2.6** Causes of Climate Change

The climate of the Earth is determined by various factors, acting interactively. It is basically an interactive process among various components of the climate system expressed in statistical form of temperature, pressure, humidity wind flow, rainfall pattern etc. observed on long term basis. Any interference, weather natural or anthropogenic, that could alter or affect this long term average weather conditions, regarded as the cause of climate change.

It is pertinent to mention here that the UNFCCC and the consecutive Kyoto Protocol (1997) considered only the anthropogenic causes for mitigation purpose. The Convention and the Protocol mainly concentrated on two anthropogenic causes, responsible for climate change as: Excessive emission of GHGs and change of land use (deforestation). Thus, broadly, causes of climate change can be divided in two category- natural causes and anthropogenic causes.

### **2.6.1** Natural causes

Under this category, a number of naturally occurring phenomenon can be mapped as natural causes of climate change. However, these causes are very slow, gradual and subtle and fall beyond of human capabilities of mitigation efforts, therefore don't carry gravity in climate change discourse.

**Volcanoes**: Volcanoes have been present on the Earth surface from millions of years. Some of them are active, some are dormant and some are extinct with the time. During the volcanic eruption, huge volume of ash, water vapor, dust and gases like Sulphur Dioxide and Carbon Dioxide are propelled out by the internal pressure that builds up under the depth of Earth crust. Volcanic eruption also throws out the Magma (molted rock) that called 'Lava' when expelled out from the opening of a volcano at the surface of the Earth.

Theoretically, volcanic eruption has both, cooling and warming effect on the surrounding climate. The Sulphur Dioxide along with dust particles reflects the solar radiation. Therefore, the Earth surface receives lesser radiation that causes the decrease in the temperature. Further, Sulphur Dioxide and water combination form droplets of Sulphuric Acid that cause acid rain. These droplets are good reflector of Sun's visible light and thus, enhance the cooling effect. The cooling effect of volcanic eruption is frequently experienced after a large eruption in different part of the world. However, it does not have long lasting and wide spread effect.

The volcanic eruption also expels chief GHG $Co_2$. According to the British Geological Survey around 300 Mt/year $Co_2$ is released by sub aerial volcanism which is barley 1% of the total anthropogenic $_{Co2}$ that emitted worldwide in a year. Thus, the $Co_2$ emission from volcanic eruption is not considered significant in context of its effect on global warming and climate change.[29]

**The Earth Tilt:** The Earth is tilted at the angle of $23.5^0$ to its orbital path. Due to this tilted angle, the distance between the Sun and the Earth vary during the Earth's revolution around the Sun. This tilt of Earth's axis is responsible for the change in climate conditions during a year, called seasons. Milan Kovitch, A Serbian astrophysicists, had elaborated in his theory that cyclical change in three elements of Earth-Sun geometry affects the incoming solar radiation on the Earth. The Earth's axial tilt, called obliquity, varies in the range of $22.1^0$-$24.5^0$ during a cycle of 40000 years. This change in axial tilt exaggerates the seasonal change in climate. As the tilt angle increases more severe seasons are experienced. Thus, this seasonal severity affects the climate of the Earth.[30]

**Ocean and Ocean Currents:** The climate system has different components, hydrosphere is one of them. This component is predominately consists of oceans and other water bodies. Oceans covers 71% of earth's surface, hence absorb more solar radiation than the atmosphere or the land. Oceans play an important role in climate system. They act as a heat storing bodies and continuously evaporate water into

atmosphere. Thus, this water vapor influences the humidity and temperature of coastal regions. The ocean water has high heat inertia; therefore it tends to warm or cool very slowly as compare to the land surface. This makes difference in temperature of the land and the ocean during day and night that produces wind flow.

Ocean currents are important water streams play important role in the distribution of heat energy absorbed by the oceans. Encyclopedia Britannica defines ocean current as "streams made up of horizontal and vertical components of the circulation system of ocean waters that is produced by solar heating, gravity, wind friction and water density variation in different part of the ocean."[31] These ocean currents, especially in equatorial areas carry warm water from equator to polar areas. Similarly, bring the cold water back to equator regions. Ocean currents thus regulate the climate of the Earth.[32] The 'El Nino' water current affects the Monsoon winds which affect quantity, distribution and pattern of rain in several countries.

### **2.6.2** Anthropogenic Causes

The UNFCCC regarded anthropogenic activities as the main cause of climate change. Historically, Industrial Revolution was a landmark in the History of human civilization, when machines took over the manufacturing system of goods. The Industrial Revolution had begun in 19$^{th}$ century mainly fueled by the extensive use of fossil fuels for the energy requirement. Abundant use of fossil fuels, massive urbanization, brutal exploitation of natural resources and extensive deforestation profoundly affected the delicate balance in the climate system.

All these anthropogenic activities increased the atmospheric concentration of Greenhouse gases to a disastrous level which have been now unfolding as global warming and consequently speaking as climate change. The change in climate is now explicitly visible and widely experienced in different part of the world. Among all causes, GHGs emission is the main cause, considered responsible for the enhanced greenhouse effect and thus for climate change.

Another important factor which has been affecting the climate system is change in land use. The land surface acts as a carbon sink, therefore clearing the land for agriculture, housing and other purposes affect the vegetation and soil composition of the land. Thus, changing the land use is also considered as an anthropogenic activity contributing to climate change.

### **2.6.2.1** Greenhouse Gases and their sources

The Earth has a natural greenhouse effect which keeps the Earth's average temperature around $14^0$-$15^0$ C, making the Earth hospitable. This naturally occurring greenhouse effect is increased by the excessive GHGs mainly originate from anthropogenic activities. The trace gases in atmosphere called GHGs include Carbon Dioxide, Nitrous Oxide, Methane, Chlorofluorocarbon (CFC-12), Hydrofluorocarbon (HFC-23), water vapor ($H_2O$) and Ozone($O_3$) in Troposphere.

The greenhouse effect that a trace gas (GHG) produces is depends on two properties-Global Warming Potential (GWP) and the Life time of a gas. The GWP can be defined as the efficiency of a gas to absorb energy. It is measure of the total energy that a gas absorbs over a particular of time (often taken 100 years). Usually, $CO_2$ is taken as a reference base to measure GWP. The GWP of $CO_2$ is measured 1 to compare GWP of other gases. Life time of gas simply denotes the time period for which a gas remains or stay in the atmosphere.[33]

**Table 2.3: GWP and Atmospheric Lifetime for Major GHGs**

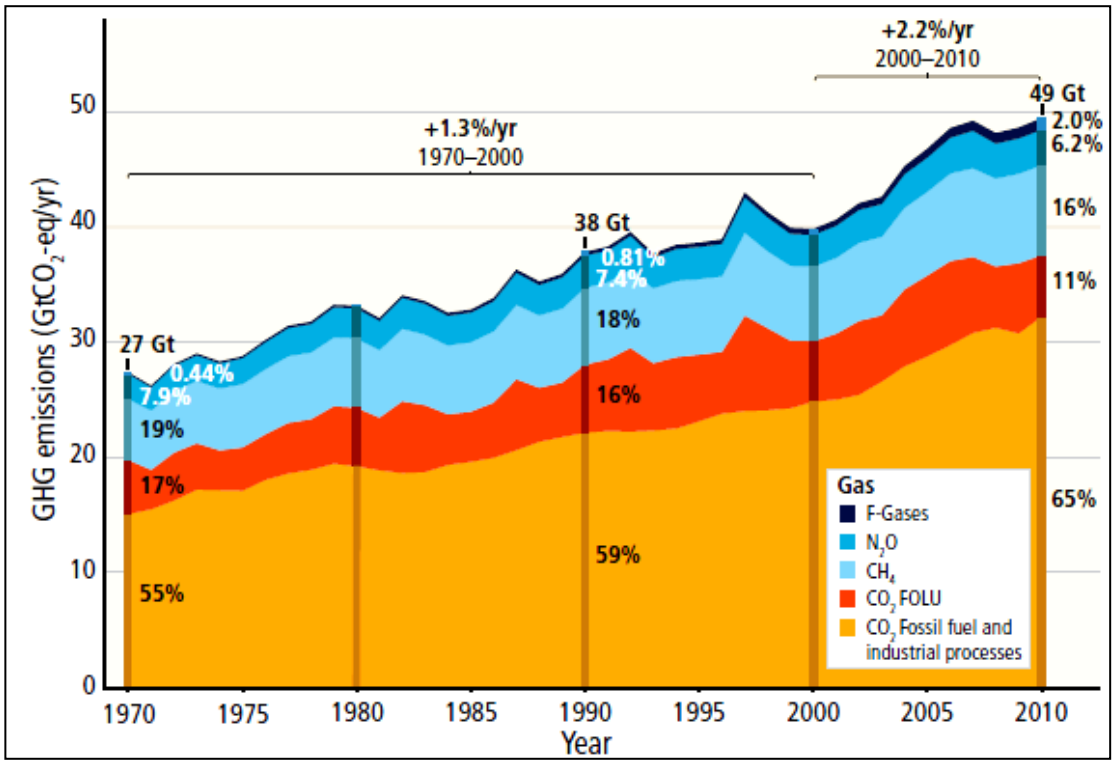
| GHG | Chemical Symbol | GWP (100 Years) | At. Lifetime |
|---|---|---|---|
| Carbon Dioxide | $CO_2$ | 1 | 100 |
| Methane | $CH_4$ | 25 | 12 |
| Nitrous Oxide | $N_2O$ | 298 | 114 |
| Chlorofluorocarbon | CFC-12 | 10900 | 100 |
| Hydroflurocarbon | HFC-23 | 14800 | 270 |

Source: AR4. IPCC, 2007

The Table No 2.3 clearly shows that the $CH_4$, $N_2O$, CFC-12 and HFC-23 have greater GWP than the $CO_2$, however, their atmospheric concentration is very less in comparison of $CO_2$. It is pertinent to mention that CFC-12 and HFC-22 have been banned under the Montreal Protocol (1987); therefore their concentration is not discussed in detail and omitted intentionally.

According to the WMO, in 2016, the atmospheric concentration of $CO_2$ was 403ppmv, increased by 145% from the year 1750. Similarly, atmospheric concentration of $CH_4$ and $N_2O$ were measured 185ppbv and 328ppbv respectively. They also increased by 257% and 122% from the year 1750.[34] According to the IPCC's AR5 GHGs increased substantially over a period of 1970-2010 (Fg.2.1).

**Figure 2.1: Total Annual Anthropogenic GHG Emissions by Gases 1970–2010**




Source:Graph Image,IPCC, AR5.2014

The Figure 2.1 shows that 76% of total GHGs has contributed by alone $CO_2$ which corresponds to nearly 37.24Gt. Figure 2.1 is further interpreted in below sections.

**Carbon Dioxide**: Carbon Dioxide is only a small fraction (0.03%) of total atmospheric gases. Despite the tiny fraction, it is most important greenhouse gas. Some time only $CO_2$ is expressed as the main cause of climate change. Carbon Dioxide molecule is consists of one atom of Carbon and two atoms of Oxygen. The Carbon is $4^{th}$ most abundant element of the Earth and recognized as the backbone of life. It can form many bonds (4/atom). Carbon atoms combined in long chains and rings and thus are basis of living cells. Carbon is mostly stored in rocks, oceans, atmosphere, plants and fossil fuels. The exchange of Carbon between these reservoirs is controlled by the Carbon Cycle which maintains the balance of Carbon in the climate system.[35]

Since the Industrial Revolution, this delicate balance of Carbon in the climate system has been started to decline due to the excessive uploading of $CO_2$ into the atmosphere. The combustion of fossil fuels (coal, oil, wood, gas etc.) have released abundant amount of $CO_2$ into the atmosphere. This rapid increase in concentration of $CO_2$ is further intensified by the deforestation (conversion of forest-land into non-forest land) as vegetations remove $CO_2$ from the atmosphere through the process of Photosynthesis.

It is estimated that in the past century, 30% increased in atmospheric $CO_2$ corresponded to$1^0$ $2^{0\,F}$ increased in average global temperature.[36] According to WMO "over the last-800000 years, pre-industrial atmospheric $CO_2$ content remained below 280ppmv, but it has risen to the 2016 global average of 403 ppmv."[37] The $CO_2$ is emitted from different anthropogenic sources which include burning of fossil fuel, cement industry and flaring.

According to IPCC's $5^{th}$ Assessment Report, during the period of 1970-2010, Carbon Dioxide alone contributed 78% of total GHGs emission mainly originated

from fossil fuels burning and industrial process. In 2010, a total of 49Gt $CO_2$ –eq GHGs were emitted into the atmosphere, $CO_2$ contributed 76% of the total emission which corresponds to 37.24Gt (Fig.2.1). Further, from this 76% nearly 65% was originated from burning of fossil fuels and industrial process; the rest 11% contributed by forestry and other land use change (Fig.2.1).[38]

**Methane:** Methane is another second important greenhouse gas .It is a powerful greenhouse gas with a Global Warming Potential (GWP) of 21, more than 21 times that of $CO_2$, but it has a short life time in the atmosphere nearly 12 year. Most of the atmospheric Methane is removed when it combines with hydroxyl radicals (OH) to form water.

Methane is emitted by both naturally and anthropogenic activities. Naturally, Methane is emitted from wetlands, animal guts, plants, Methane Clathrates and Permafrost. It is also produced by the decomposition of organic matter e.g. in landfills and agriculture. Anthropogenic activities include conversion of forest into agriculture land increases Nitrogen in the soil due to the use of Nitrogen fertilizers. The Nitrogen content of these fertilizers inhabits the Methane oxidation in soil.[39] "Methanotophs are unique bacteria that use Methane as a solo source of carbon and energy from the atmosphere. These bacteria are the only known significant biological sink for atmospheric Methane and play a crucial role in reducing $CH_4$ load up to 15% to the total global $CH_4$ destruction."[40]

Livestock is also considered as a concerning source of Methane. A report from the FAO claimed that Livestock sector is responsible for 18% of GHG emission in $CO_2$ equivalent. The report claimed that "Livestock sector emits 37% of anthropogenic Methane, most of that from enteric fermentation by ruminants."[41] The report predicted that by 2050, global production of meat would be around 465 million tones and milk would be around 1043 million tones. This huge future demand will double the livestock and thus double the Methane concentration in the atmosphere.[42]Methane is also produced during rice cultivation, decomposition of

organic matter in landfills, water treatment process and biomass burning. Methane is also liberated during the processing, storing and transportation of oil and natural gas. Coal mining also liberates the coalbed Methane into the atmosphere.

Atmospheric concentration of Methane is continually rising. In 2010, Methane contributed 16% to the total GHGs emission which corresponds to 7.84 Gt $CO_2$ eq (Fig.2.1). Pre-Industrial atmospheric concentration of Methane was around 700 ppbv that rose to 1720ppbv by 1994 and 1807 ppbv by 2010. In April 2017, it was measured around 1847.8 ppbv and it likely to increase further.[43]

**Nitrous Oxide**: In common parlance, the Nitrous Oxide is popularly known as 'laughter Gas'. It is a third important powerful greenhouse gas chemically consists of two Nitrogen and one Oxygen atoms. Its GWP is around 298 and lifetime in atmosphere is around 114 years. The high GWP and longer lifetime period makes it a potent greenhouse gas. Nitrous Oxide is originates from both natural and anthropogenic sources in the ratio of 60% and 40% respectively.[44]

Nitrous oxide sources include oceans, soils, biomass burning, use of Nitrogen based fertilizers and it also emitted during the process of making Nitric acid. Naturally, microbes in the soil and oceans produce Nitrous Oxide by converting Nitrogen compounds into Nitrous Oxide. Anthropogenic activities mainly include the use of Nitrogen based fertilizers in agriculture. Nitrous Oxide is mainly removed by the plants. They convert $N_2O$ into ammonia which is used by the plants.

Nitrous Oxide contributes nearly 6% to the total GHG emission. The pre-industrial concentration of N2O was 275 ppbv which increased to 312 by 1994 with the rate of 0.8 ppbv per year (Table No.1.2). The N2O concentration was measured around 329ppbv in 2016 and by December 2017 it has been reached to 331.08ppbv.[45]

**Chlorofluorocarbons**: These are artificial compounds produced for industrial use and cooling effects. Due to their heat absorbing capacity they were widely used as

refrigerant agents in appliances like Air Conditioners and Refrigerators. These are highly destructing agents to the Ozone layer and major cause of Ozone depletion. Therefore, internationally, these CFC and HFC are banned by Montreal Protocol in 1987.

**Ozone ($O_3$):** Ozone is a poisons gas mostly concentrated in the Stratosphere as layer; protect the Earth from harmful UV radiations of the Sun. Nearly 90% of total atmospheric Ozone is concentrated in the Stratosphere and the remaining 10% is found in Troposphere, near the earth surface. In both spheres, Ozone works quite paradoxically. In the Stratosphere it works as a protecting shield against the harmful UV rays, while in the Troposphere it works as a potent greenhouse gas.

According to Madronich and Sacha's study, most of the atmospheric ozone is formed in the Stratosphere by a chemical process occurs in the present of UV radiation. In the atmosphere Oxygen (21%) is very stable molecule consists of two Oxygen atoms. In the Stratosphere this stable Oxygen molecule ($O_2$) splits into single Oxygen atom due to the short wave length(less than 242.4 nm) UV radiation. This split usually occurs at the height of 40 Km. above the sea level. This free Oxygen atom combines with the stable $O_2$ to form the Ozone ($O_3$).[46]

In the troposphere, ozone is formed from Nitrogen Oxides ($NO_x$) and volatile organic compounds (VoCs). In urban areas, Nitrogen Oxides mostly emitted by the vehicles, chemical industries and coal fired power plants. These Nitrogen Oxides forms Nitrogen Dioxide ($NO_2$) by oxidation and eventually under the exposure of sunlight $NO_2$ release an Oxygen atom which combines with $O_2$ to form Ozone.[47]

In the Stratosphere destruction of Ozone also occurs at same time as it forms. As the Ozone molecule is less stable, it requires lesser energy to decompose. In presence of UV radiation with slightly longer wavelength (240 to 320nm) the atomic bond in Ozone easily breakdown and releases the Oxygen atom to reinitiate the whole cycle of Ozone formation. Thus, during the split of Oxygen molecule ($O_2 \rightarrow O+O$) and

decomposition of Ozone ($O \rightarrow O_2+O$), most of UV radiation is absorbed and the Earth remains shielded from the dangerous UV radiations.

This equilibrium of Ozone cycle is disturbed when manmade compounds like CFC, HFC and other halogen entered into the Stratosphere. These compounds decompose in UV radiation and release Chlorine (Cl) as a free radical which reacts with $O_3$ and take away one Oxygen atom to form ClO. This ClO further reacts with another molecule of $O_3$ and removes one Oxygen atom. Thus the Cl and ClO destroy the Stratosphere Ozone. The Chlorine as free radical remains around 2 year in the cycle and can destroy about 100000 Ozone molecules.[48] Similar reactions occur with other molecules that contain Bromide.

Ozone in the Troposphere which is nearly 10% of total atmospheric Ozone, acts as a potent greenhouse gas. It causes various health hazards like asthma and other respiratory illness. It is also host the smog formation near the Earth surface. It is difficult to trace the exact concentration of Troposphere Ozone as it has very short lifetime from hours to days only. It is estimated that ozone concentration varies between 8-10 ppm.

**Aerosols:** Aerosols are tiny particles suspended in the air. They play an important role by absorbing reflecting and scattering the solar radiation. Their reactive properties (cooling or warming) with solar radiation are influenced their by their size, color and composition. They can originate from various sources into the atmosphere. Mostly they are divided in three types. Firstly, volcanic aerosols are resulted from the droplets of Sulphuric acid. This type of aerosols can remain for two years in the stratosphere and spread through the winds. They produce cooling effect as they reflect sunlight.

Secondly, Desert particles are generally large in size and often blown up into atmosphere by dust storms. Mostly they settle down if not carried to higher altitudes. Desert particles mostly composed of minerals; therefore they absorb or scatter the

Sun light. By absorbing the sunlight, they can warm the atmosphere and interfere with the formation of clouds. This type of aerosols can increase the light absorbing property of clouds. Thirdly, manmade particles are mainly originated from the anthropogenic activities. This type of particles is generally observed in form of smoke emitted by burning of forests, coal and oils.[49]

Different types of aerosols act differently in the atmosphere. Sulphate and Nitrates particles reflect almost all sunlight and produce the cooling effect, while Black Carbon particles absorb sunlight radiation and produce warming effect. Carbon particles can also cause shading of the Earth surface. Salt particles also reflect most of sunlight, while organic Carbon particles absorb the sunlight radiation and cause warming effect. In addition to the reflecting and absorbing effects, aerosols also affect the albedo of the Earth surface.[50]

Aerosols, like Black Carbon, when gets deposited on the ice sheets, sea ice and glaciers, albedo capability of these ice bodies reduce to a significant level. The Black Carbon particles absorb and retain the heat and promote the speedy melting of these ice bodies. Thus, shrinking of ice covered surfaces cause lower reflection of the Sun radiation and allow direct exposure of oceans water to the sunlight. Consequently, oceans absorb more heat, produce more vapors and eventually, more vapor increase greenhouse effect. Thus, aerosols produce a positive feedback in the climate system. However, atmospheric aerosols reflect the sunlight before it reaches to the Earth surface, thus allow lesser radiation. Conclusively, net effect of aerosols is still dateable and not fully understood.

**Water Vapor:** Water vapor is regarded as a quite potent greenhouse gas. It is undoubtedly accepted fact that water vapor produces tremendous greenhouse effect. However, does it cause global warming? This anomaly attracts much controversy regarding its contribution to the global warming and its effect on the climate of the earth. Water vapor is abundantly present in the atmosphere and determines the moisture level in the air. Water in oceans, rivers plants, soil and in all matters

converts into vapor due the solar radiation. This water vapor enters into the atmosphere and absorbs the infrared radiation emitted back from the earth and thus trapping of radiation causes increase in temperature. This increase in temperature further expands the air capacity to accommodate more water vapor. More water vapor further raises the temperature. Thus, this positive feedback mechanism enhances the greenhouse effect.

Earlier, it was thought that greenhouse effect of water vapor is a natural phenomenon. But, new studies are exploring the connection between human activities and increased amount of water vapor in the atmosphere. one such study has been carried out by 'Rosentiel School of Marine and Atmosphere' Mimi. The study explored the anthropogenic link of water vapor and global warming. Professor Brain Soden, co-author of study, stated that "human activities have increased water vapor in the upper troposphere." The study concluded that increased temperature due to the GHGs tends to increase the water vapor accumulation in the atmosphere. This increased water vapor causes more moisture that blanket and traps additional heat which eventually further raises the temperature.[51]

Thus, water vapor, itself behave like a greenhouse gas, but it does not have that much lifetime in the atmosphere. Its atmospheric concentration is extremely variable; however, in presence of other GHGs, especially, Carbon Dioxide, its high concentration amplifies the greenhouse effect in a positive feedback loop. It is estimated that if GHGs increasing the temperature by $1^0$C, the water vapor can make it double. Professor Dessler indicated that "if earth warms $1.8^0$F, the associated increase in water vapor will trap an extra 2 watts of energy per square meter."[52]

Thus, water vapor adds additional some degree to the temperature which is already elevated by the greenhouse effect attributed to Carbon Dioxide. Dessler presumed that "doubling $CO_2$ in our atmosphere by itself leads to a global warming of $1.2^0$C. However, the strongest climate feedback (water vapor) could increase the eventual warming to $2.0^0$-$4.5^0$C."[53] He further predicated "much of the warming

predicated for the next century comes not from direct warming by $CO_2$ but from feedback."[54] And the water vapor feedback would be an important one.

**Land Use change:** Land use change includes clearing or cutting the forest or vegetation of the land. This is an important anthropogenic activity which affects the climate of the earth in many ways. The forest land is mostly cleared for farmland, grazing, logging, human settlements, rail-road tracks, industries or other purposes. During and after the industrial revolution, land use change has been occurred rapidly. The land use change is mainly attributed to the vast increase in population of the Earth. Rapid growth in population needs more resources for their livelihood which is resulting in deforestation. Growing demands for agriculture, dairy products and housing lands are primary reasons responsible for deforestation. The land use change can affect the climate system in many ways, as:-

- Plants use $CO_2$ and liberate $O_2$ during the photosynthesis process that effectively removes CO2 from the atmosphere. Thus, forests act as a great sink to hold Carbon. Therefore, decreasing forests lead to increase in atmospheric $CO_2$.
- Deforestation can increase the earth's albedo, especially in snow covered regions.
- Alteration in evaporation rate, especially in tropical area.
- Deforestation produces woods that used as source of energy. On burning the fuel wood, Carbon is emitted into the atmosphere.
- Logging produces huge amount of biomass that produces Methane during decomposition.
- Deforestation affects the biodiversity and ecological balance and the hydrological cycle.
- Deforestation significantly decreases moisture content from soil and atmosphere. It also aggravates soil erosion.
- Deforestation aggravates floods, droughts and landslides.

- Deforestation affects the rain quantity, pattern and distribution.
- Deforestation increases energy absorption by earth surface.
- Deforestation increases desertification and decreases ground water table.

Thus, land use change is primarily associated with the deforestation that affects the climate system.

## **2.7** Observed Climate Change

Due to the various anthropogenic activities, the GHGs level in the atmosphere is continuously rising. According to the IPCC, in 2011, cumulative anthropogenic $CO_2$ emission to the atmosphere were 2040±310Gt$CO_2$, about 40% i.e. 880±35 have remained in the atmosphere. The climate change has already started to exhibit its effect on various geophysical factors. According to the IPCC AR5, during the period of 1880-2012, a combined average of land and surface shows a warming of $0.85^0$C. Since the Industrial Revolution, the ocean acidification is increased by 26% due to the excessive intake of $CO_2$. It is also observed that during the period of 1992-2011, important ice sheets of the earth-Greenland and Antarctic-have been shrinking. The Arctic sea ice is also decreased in the range between 3.5 to 4.1 % per decade. The IPCC also charted the sea level rise. In between 1901-2010, the global mean sea level increased by 0.19 meter.[55]

There are number of geophysical changes can be presented to show the climate change effects. It is highly likely that if anthropogenic causes are not mitigated through appropriate measures, climate change would be a great disaster for the earth. To consider appropriate mitigation efforts, it is essential to have a precise future projection of global warming. Global warming is a result of interactions that are too complex, interdependent and involves various component of the climate system. In climate science various models are used to make future projection of global warming. Most of the time, they present different outcomes according to the data used as inputs. Optimally, precise prediction of climate change can only possible

when every aspect of climate change is clearly defined and thus incorporated in the methodology. The IPCC, a scientific body of the UNFCCC has been working throughout the history of the climate regime to develop such a comprehensive model. In AR5, the IPCC used such model developed by the involvement of several research institutions.

## **2.8** Future Projection of Global Warming

In Fifth Assessment Report, the IPCC adopted the Representative Concentration Path Ways (RCP), a scenario based approach to predict increase in global mean temperature. The RCP scenarios are developed by incorporating various factors that can affect the future climate change. These factors include mainly, Future GHGs emission, level of technologies, energy consumption pattern, population growth, land use change and economic scenario (regional and global). These scenarios are developed by four different modeling groups, belong to different research institutes. These scenarios are developed on the basis of available peered review climate literatures. The RCP concept is based on the Radiative forcing of a factor.

The AR5, defined the Radiative force as "net change in the energy balance of the Earth system due to some imposed perturbation. It is usually expressed in watts per square meter averaged over a particular period of time and quantifies the energy imbalance that occurs when the imposed change takes place."[56]

**Table 2.4: RCP Scenarios and Associated GHGs Concentration in 2050&2100**

| RCP Scenarios | $CO_2$ ppm | | $CH_4$ ppb | | $N_2O$ ppb | | RF $W/m^{2World}$ | |
|---|---|---|---|---|---|---|---|---|
| | 2050 | 2100 | 2050 | 2100 | 2050 | 2100 | 2050 | 2100 |
| RCP2.6 IMAGE | 442 | 420 | 1451 | 1253 | 341 | 344 | 2.99 | 2.71 |
| RCP4.5MINICAM | 486 | 538 | 1833 | 1576 | 350 | 372 | 3.76 | 4.3 |
| RCP 6AIM | 477 | 669 | 1894 | 1649 | 354 | 406 | 3.5 | 5.4 |
| RCP 8.5MESSAGE | 540 | 935 | 2739 | 3750 | 367 | 435 | 4.7 | 8.3 |

Source: Database Version2.0.4, www.iisaac.at/web-apps/tnt/RcpDb, 15.04.2010

In Table No. 2.4 four RCP are shown with their associated GHGs concentration in year 2050 and 2100. The RCP 2.6 is best the case scenario in which GHG concentration is predicated to decrease by the year 2100 due to mitigation measures. While, the RCP8.5 is a worst case scenario in which GHG concentration is predicated to rise to a disastrous level in absence of any mitigation measure. The RCP4.5 and RCP 6 are intermediate scenarios in which GHG concentration is predicated to rise due to moderate mitigation measures. The rise in global temperature and sea level associated with the specific RCP scenario are shown in the table No2.5

**Table 2.5: RCPs & Associated Increase in Temperature and Sea Level**

| Scenario | Temperature increase to 2081-2100 relative to the 1850-1900 baseline | | Global mean sea level rise for 2081-2100 relative to 1986-2005 | |
|---|---|---|---|---|
| | Average | Likely range | Average | Likely range |
| RCP2.6 | 1.6°C | 0.9-2.3°C | 0.40m | 0.26-0.55m |
| RCP4.5 | 2.4°C | 1.7-3.2°C | 0.47m | 0.32-0.63m |
| RCP6.0 | 2.8°C | 2.0-3.7°C | 0.48m | 0.33-0.63m |
| RCP8.5 | 4.3°C | 3.2-5.4°C | 0.63m | 0.45-0.82m |

Source: RCP Fact Sheet, Department of Environment, Australia Government.

As it can be seen from Table No.2.5 that different scenario can lead to a temperature rise in the range between $0.9^0$C to$5.4^0$C and sea level rise between 0.26 to 0.82 m. It is all depends on how the 'Paris Agreement 2015' will be executed. The Paris Agreement set the temperature peaking target under $2^0$C and preferably under $1.5^0$C by the year 2100. The RCP2.6 is seems to be difficult to achieve as in July 2018 $CO_2$ concentration reached up to 408 ppm and showing the positive trend. The US withdrawal from Paris agreement makes the target almost impossible to achieve. However, the global mean temperature could stabilize between $1.7^0$C to$3.7^0$C if moderate to strong mitigation actions were taken. In worst case scenario, RCP8.5, if

the world moves without any GHG mitigation measures, the global mean average temperature could reach to $5.4^0$C or even over $6^0$C and if this happens, the climate change will appeared in its brutal form. The consequences of climate change will be in uncharted zone and it is anticipated that the global governance system will be thrown into fire; that would be a disastrous situation.

## **2.9** The Consequences of Climate Change

Climate change has widespread and multidimensional consequences. They are not confined to national territories; irrespective of their contribution to the problem, every country has to cope with the adverse effect of climate change. The science of climate change has already confirmed that the earth is witnessing physical and biological changes that can further aggravate in absence of collective international mitigation efforts to curb the GHGs emission. Climate change is not just about temperature or rainfall change, it is indeed a process of interdependent consequential socio-economic effects that can have unprecedented effects. Its effects are highly inter-connected and interdependent; one effect can stimulate another several effect. Therefore, the climate change regime essentially involves the concept of adaptation which is simply related to the building of necessary capabilities to cope with the adverse consequences of climate change.

There are various consequences estimated in the climate change discourse, some of them are already exhibiting and some can be visible in future. Although exact and precise estimation of climate change effects are still under massive research, but from the observed physical changes in earth's climate, a number of multidimensional consequences can be presumed. These consequences are not about the physical changes that may occur or occurring in weather condition, but these are essentially about their impacts that can profoundly affect the socio-economic, political and security system of the globe. Some important consequences that are highly likely to affect the global society attempted to map in following sections.

### **2.9.1** Agriculture and Food Security

Agriculture sector is foremost sector among various sectors that can be regarded as highly vulnerable to the adverse effects of climate change. Especially in those areas which are still rely on rain water. Most of the rain dependent agriculture areas are located in developing countries, where agriculture is a primary source of livelihood. According to the FAO estimation, in 2050 the global demand of food and livestock will be 60 % higher than it was in 2006. It is very unlikely that this huge demand will be met amidst of climate change effects.[57]

The ILO database shows that the employment in agriculture sector is constantly falling; in 1991, agriculture sector produced 43.28% of total world employment which is decreased to 26.47% by 2017. However, it is still substantially high in developing countries for instance in Bangladesh 39% of total employment is coming from agriculture sector, similarly, according to 2017's ILO data, in Ethiopia, India and Pakistan, it was 68%, 43% and 42% respectively.[58] In most of the developing countries, agriculture is still the largest employment sector. Climate change can seriously lead to decline in agriculture production that could throw millions of people below poverty line, especially in developing countries.

Climate change can affect the agriculture sector in many ways. According to FAO's 2016 report, "Higher temperature, more frequent extreme weathers, change in rain fall pattern, water shortage, soil erosion, disruption of ecosystem and loss of biodiversity- could seriously compromise agriculture's ability to feed the most vulnerable, impeding progress towards the eradication of hunger, malnutrition and poverty."[59] Climate change can affect all four dimensions of food security- availability, accessibility, utilization and food system stability. Declining agriculture production could further unleash many socio-economic issues.

Frequent failure of crops and declining yield can put farmers and associated people under tremendous distress situations that can further manifest in various

psychological disorders. Farmer suicides, especially in India, have been linked directly and indirectly to the agro-economic problems. According to the web article published on Times of India's website, central Government of India reported 12000 farmer suicides per year since 2013.[60] Several studies have found that these suicides are attributed to vicious cycle of 'crop failure-debt-poverty-psychological distresses'. Many studies explored the attribution of climate change to these suicides, albeit criticized. A report submitted by the TISS to Mumbai High Court confirmed that among all other reasons, Failure of crops due to irregular rain and lack of irrigation system trap farmers in cyclical phenomenon of indebtness that leads to distress and suicides.[61]

In another latest research carried out by Tamma A.Carleton, she found that "by 2013, temperature trends are responsible for over 4000 additional deaths annually across the India, accounting for 3% of annual suicides. Across all states and all years since 1980, a cumulative total of 59300 suicides can be attributed to warming."[62] She pointed out that most of the suicide cases of farmers were related to the crop failure due to rise in temperature. However, the report has highly criticized by several Indian scientists for attributing the temperature rise as only reason behind farmer suicides. From these studies one fact clearly emerges that climate change is certainly affecting the crop cycle and its yields. In future climate change effects could be more disastrous for agriculture sector and therefore for farmers.

### **2.9.2** Fisheries and Aquaculture

Fisheries production and capturing is an important source of livelihood of billions of people around the world. Especially, coastal and island countries are highly dependent on fisheries and aquaculture industries for their nation income. According to FAO, on global scale nearly 243.5 million people are directly and indirectly dependent on fisheries and aquaculture for their livelihoods. Aquatic foods are good source of animal proteins; nearly 20% of protein intake of 1.5 billion people

is sourced from aquatic foods. Thus, this sector is important in securing economic and food security of many countries, especially island countries.[63]

This sector is highly vulnerable to the climate change effects as fisheries industry is mainly ocean based and oceans are expected to be affected by the change in climate. Climate change can affect the fisheries industry in two ways-affecting the ecosystem and affecting the livelihood depends on fisheries industry. It is estimated that several biological and physical in climate can alter the distribution of marine and freshwater species. Climate change induced ocean acidification, warming of ocean water and increase carbon intake can displace the water species and even their reproduction cycle could be affected. This can result in decreased production of aquatic food. Similarly the quality of aquatic food can also be toxic due to the excessive deposition of carbon, lead and other toxic elements in oceans' water.

Warming of ocean water can lead the displacement or migration of fisheries towards cooler regions in oceans apart from populated coastal regions where livelihood is extremely relies on fisheries production. Aquatic stock in rivers and lakes can also be affected due to the floods, change in water flow and change in river banks. Another area that could be affected by climate change is livelihood of coastal areas. Due to the climate change the sea level can rise and submerge the nearby coastal areas and beautiful beach. Thus, the infrastructure, human settlements and various associated industries like shipping and port can be affected and people dependent on these industries for their livelihoods would likely to get worst hit.

Owing to decrease in aquatic stock production, the probability of rise in socio-economic issues is very likely in the societies depending mostly on fisheries sector. Less availability of aquatic stock can unleash competition, clashes and conflicts among coastal societies. Thus, owing to the loss or decrease in earning of coastal people, inter or intra state migration could also be possible and that could further break out in new sets of social, economic, cultural, ethnic or even political issues.

### **2.9.3** Marine and Coastal Resources

The marine and coastal resources are at the greater risk owning to the anticipated sea level rise that can occur due to the melting of polar ice sheets and glaciers. The IPCC predicated that by the end of century the sea level can rise by 0.8 to 0.9 meter. It is well charted fact that higher sea level will provide high base to tides and storms that can erode the coastline and submerge more lands into sea water. Tropical coral, which is an important part of marine ecosystem, would also be affected by the increase in ocean temperature. Further, coral reefs are also vulnerable to the rising sea temperature. Rising temperature, ocean acidification, high storms, change in ocean circulation pattern all of these combine effects could drastically affect the functions of coral reefs ecosystem. Thus, the goods and services that provided by coral reefs systems would also get affected; therefore the livelihoods of coastal people. In addition to the coral system loss, coastal tourism may face hardship due to change in coastline. Frequent storms can destroy the beautiful beaches which provide livelihoods to the surrounding people.[64]

### **2.9.4** Human Health

Healthy and pure environment is an essential pre- condition for a good health. Climate change is certainly changing the basic elements of a healthy environment. Pure air, pure drinking water, fresh and nutritional food, shelter in extreme weather conditions are some basic elements for human body to remain healthy. Climate change is expected to affect these elements which are essential to a good health. It is well known fact that high temperature with high humidity causes various direct and indirect health hazards. Heat wave is such an extreme condition of high temperature which can dehydrate human body and some time could be fatal. Further, high temperature and humidity lead to air pollution, water pollution and responsible for the contamination of food.

According to the WHO's estimate climate change can cause additional 25000 deaths between 2030 to 2050 and most of them would be directly attributed to the malnutrition, heat stress, malaria and diarrhea. Climate change induced health impacts could seriously dent the economic health of developing countries, where health related infrastructure is already in poor condition and unable to cope with the additional burden of diseases that may cause by climate change.[65]

Climate change can affect human health in many ways, some of health hazards are directly linked with the climate change and others indirectly. Impacts of climate change on human health are mapped as:-

**Heat Related Morbidity:** Direct exposure to the sunlight in high temperature weather condition may seriously affect the human health. Heat exposure can cause cramps, dizziness, fainting and extreme exhaustion. Heat waves are particularly dangerous for elder people and kids. The older age group is particularly vulnerable to the heat waves. It could be fatal for older people, especially, if they have already been suffering from cardiovascular and respiratory diseases. Similarly, people who are hypertensive or diabetic are at greater risk during the heat waves as certain medications (diuretics) for these alignments deplete water content from body. According to data from Statista website, across the world, heat waves killed 55736 people in 2010. In 2003, due to heat waves, 20089 people in Italy, 19490 people in France, 15090 people in Spain and 9355 people in Germany lost their lives. The heat waves in India, in 1998 and 2015 killed 2541 and 2248 people respectively.[66]

**Health Impacts due to polluted Air:** Air pollution has profound negative effect on human health. Toxic atmospheric gases and particles can cause severe damage to respiratory system in humans. Owing to global warming and increased Ultra Violet radiation, photochemical reactions among various oxidants (Nitric) produce highly toxic Ozone gas in troposphere. Ozone is highly toxic gas; even slight exposure to Ozone can cause severe symptoms like chest pain, nausea or vomiting in healthy individual. The greenhouse gases, particularly CFC and HFC, are mainly

responsible for depletion of Ozone layer which protects the earth from dangerous UVB. Thinning of Ozone layer due to air pollution can increase UVB radiation in atmosphere which causes skin cancer, melanoma and cataract.

Particulate matter is another important cause of air pollution which determines the air quality and thus determines the health impacts of air pollution. Particulate matters typically measured according to their size which vary in the range of 2.5 to 10 micrometer and measured in terms of microgram concentration in per cubic meter of air. Particulate matters mainly include smoke, dirt and dust originate from roads, farming, factories, soil, and coal rock blasting and crushing of rocks and so on. The Air Quality Index typically consider two sizes of particles- particles of diameter 2.5micrometer or less than and particle of diameter 10 micrometer or less. Particles of size PM2.5 are quite light in weight and remain suspended in air for long time; can travel to long distances with the winds. Being small in size, these micro particles can penetrate deep in the human respiratory system and can cause chronic obstructive pulmonary disease (COPD) and severe form of allergic asthma.[67]

**Chemical Pollution:** Chemical pollution is mostly caused by use of pesticides and fertilizers in farming. This chemical compounds are absorbed by the plants and remaining mix with water. These compounds are very harmful and even found carcinogenic if penetrate frequently in human body.

**Water Borne Diseases:** The hydrological cycle in climate system is vastly affected by the climate change. These affects manifest in form of droughts, floods and storms. These extreme climatic conditions are pathogenic and produce ideal conditions for the growth and reproduction of various types of microorganisms, parasites and mosquitoes. These microorganisms contaminate the drinking water- mostly in urban areas where water is supply trough pipelines due to mixing of sewerage water - in rainy season or during the floods. There is several water borne microorganisms that cause variety of diseases. “Waterborne microorganisms include protozoa that cause cryptosporidiosis, parasites that cause schistosomiasis, bacteria

that cause cholera and legionellosis, viruses that cause viral gastroenteritis, amoebas that cause amoebic meningoencephalitis, and algae that cause neurotoxicity."[68]

**Vector Borne Diseases:** Climate change can change the seasonal cycle of a region. High temperature and humidity along with extended rain fall season produce ideal conditions for the growth of pathogenic parasites bacteria and viruses. These organisms can cause a variety of contagious diseases, especially in tropical and subtropical areas where climatic conditions favor their reproduction. The diseases carrying vectors include a variety of organisms- Mosquito (Aedes) can cause Chikungunaya, Dengue, Rift valley fever, Yellow Fever, Zika; Anopheles mosquito can cause Malaria and Lymphatic Filariasis; Sanflies can cause Leishamariasis, Sandfly fever; Ticks can cause Crimean-Congo fever, Lyme disease, relapsing fever, Rickettsial disease, Trick-borne encephalitis; Triatomine bugs can cause Chagas disease; Fleas can cause Plague, Rickettsiosis; Black flies can cause Onchocerciasis; Aquatic Snails can cause Schistosomiasis and Lice Tyhus can cause relapsing fever.[69]

According to the WHO's estimates every year more than 700000 people lose their lives due to vector borne diseases. The WHO documented that along with other factors "climate change can impact on pathogen transmission, making transmission seasons longer or more intense or causing disease to emerge in countries where they were previously unknown. Changes in agriculture practices due to variation in temperature and rain fall can affect the transmission of vector-borne diseases."[70]

**Impacts on Mental Health:** Climate change can affect almost all aspects of human life. It is well documented in various studies that impacts of climate change can substantially affect the physical and psychological health of humans. This climate change impact can be more severe for those, who already living with some kind of mental illness. American psychologist Clayton and Doherty[71] described that climate change can induce three types of psychological impacts that can affect mental health, as:-

- Acute or Direct Impact includes those impacts that can arise suddenly, without any anticipation. Natural disasters like heavy storm, lightening, hurricane, Tsunamis, landslides strike suddenly and can cause severe destruction of livelihood, house, farms, livestock or other valuable assets or even cause death of near and dear one. These sudden disasters induce direct and acute psychological impact on a person that can lead severe anxiety, emotional distress and even shock. This acute psychological pressure can further exacerbate into cardio vascular ischemia, stroke or hypertension.
- Psychological impacts include "emotional and affective responses associated with viewing images of environmental degradation or human suffering in the media or with questions of lifestyle or purchasing choices."[72] Thus individual responses can alter the normal psychological reactions into anger or feeling of alienation that can further develop into violent acts, group conflict or engagement in criminal activates or even in terrorist activities.
- Indirect impacts are gradually affect the mental health. These indirect impacts are sometimes so subtle that cannot be identified explicitly. People feel anxiety and stress when they come to know about the tragic natural calamities. These indirect impacts are very common in migrated or displaced communities mostly due to climate change. Uncertainty about the future causes slow buildup of mental pressure that manifest in sleep difficulty and sometime in sexual dysfunction. Dependency on alcohol and drugs can also be resulted due to psychological stress.

The brutal face of psychological distress and depression can lead people to commit suicide. The population that greatly depends on farming, fishing and any such activities that directly need stable climate condition can psychologically be prone to impacts of climate change. It is difficult to pin point the exact psychological issues

that can arise from climate change, but it is quite certain that climate change affects mental health of people.

### **2.9.5** Change in Timing of Seasonal Life

Environmental and climate conditions play an important role in the annual life cycle of some species. These species sense the climatic indications for their migration, blooming and mating. Mostly species migrate from cold regions to warmer region or from higher altitudes to lower altitudes and vice-versa by sensing seasonal change in climate conditions. Due to climate change, there is substantial change in duration of season; either long or short, creates ambiguity in sensing indication of climate conditions. Thus, these spices mismatch with seasonal timing and not able to initiate their migration, breeding and food securing activities. In other words, these species get confused due to abnormally long or short duration of seasons. This mismatching significantly reduces their survival and growth.

### **2.9.6** Impacts on Weather System

Although average weather conditions observed on longer time scale are regarded as climate, however, climate change alter normal weather variations to extreme levels. Normal variations in winds, dust storms, fog, rain clouds and snow can abnormally increase or decrease in frequency and intensity under the influence of climate change. Less common weather phenomenon that include hurricanes, cyclones, floods, thunder storms, tornados, heat or cold waves all are expected to be affected on positive side in terms of frequencies and intensity due to climate change. Climate change can lead to abnormally long summer or winter that can cause disruption in crop cycle and eventually frequent failure of crops.

Climate change has multi dimensional, interdependent and wide spread consequences that cannot be fully anticipated as of now.

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# Chapter 3

## Major International Conferences: A Historical Road Map

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The greenhouse gases surrounding the earth maintain the earth warm enough to support the life on the earth. This is a unique equilibrium in atmosphere that maintains balance between incoming and outgoing solar radiations. It is a greenhouse effect that traps heat and maintains earth's mean temperature around $14^0$-$15^0$C. Since the industrial revolution excessive amount of greenhouse gases have been added to the atmosphere by human activities that causing rise in global mean temperature.

Initially, long before political involvement, the issue of climate change mainly deliberated in scientific realm. However, it was taken a lot of time to determine the direction of climate change, weather cooling or warming due to anthropogenic activities. The science of climate change was in infant situation with respect to the magnitude, potential effects and direction of climate change.

## **3.1** Development towards Scientific Consensus

The climate science has long roots in the History. In 1827, a French Scientist Jean Baptiste Fourier discovered the heat trapping ability of the atmosphere. He had drawn the idea from the glass walled greenhouse which traps the heat inside the glass house. He also suggested that the heat trapping ability of the atmosphere directly influenced by concentration of certain gases. Thus, heat trapping is directly proportional to the concentration of GHGs. In absence of atmospheric GHGs the earth would be colder by $-33^0$C and life on the Earth would have not been flourished.[1]

In 1896, Swedish scientist Savante Arrhenius had presented the theory of global warming. He clearly demonstrated that burning of substances containing carbon liberate $CO_2$ that could raise the global mean temperature of the earth surface.

He calculated that $5^0$-$10^0$C increase in temperature could be resulted by doubling the $CO_2$ concentration in the atmosphere.[2]

By 1970 and 1980 with systematic computer modeling, the cloud of uncertainties had been started to diffuse. The global warming was finally confirmed by the report of the 'US National Academy of Science' in 1979. The World Metrological Organization was a leading agency for coordination of various climate data centers. Under the auspices of the United Nations the WMO and the International Council of Science Unions (ICSU) established a World Weather Watch (WWW) in 1963 to procure climate data for observation and prediction of world climate.[3]

Further, the WWW and ICSU jointly created 'Global Atmospheric Research Programme' to conduct large scale weather experiments. In 1971, the MIT and Swedish Scientific bodies organized a conference 'Man's Impact on Climate (SMIC) near Stockholm. The conference produced a 300 pages report containing various observations and recommendation which later formed the basis of Stenholm conference in 1972.[4]

### **3.1.1** The Stockholm Conference (1972)

The idea of a conference on environment issues was firstly initiated by Sweden. The government of Sweden conveyed the proposal of a global conference to 'United Nations Economic and Social Council' (ECOSCO) in 1968. The ECOSCO endorsed the idea and the UN General Assembly decided to organize such conference by passing Resolution 2398 in 1969.[5] According to the mandate of UN General Assembly, the Secretary-General of UN suggested that agenda of conference would focus on guideline for action to address environmental issues. The UN Secretary General designated Maurice Strong as Secretary-General of the conference and an advisory committee of 27 representatives of countries constituted to facilitate Secretary General of conference in preparations. Nearly 80 countries submitted their

reports on their own environmental situations and on specific environmental issues. Ahead of the Stockholm conference, in 1971, concerns of developing countries were taken up in a meeting of 27 experts in Founex, Switzerland. The meeting produced 'Founex Report which incorporated the agenda of development and poverty in context of environmental issues.[6]

The Stockholm conference produced its outcomes in 'Stockholm Declaration' and the most tangible outcome was to create 'United Nation Environmental Programme' (UNEP) to integrate all climate research activities and programme under an umbrella. The Stockholm Conference was the first global and coordinated effort that propelled the environmental agenda into international political realm. The Conference also recognized the difference of perceptions of North-South over the relationship of environment and development. On the basis of Founex report, the developing nations attributed the issue of environmental degradation to the developed world and demanded that they should act to correct it. Indian Prime Minister Indira Gandhi, in her seminal speech, emphasized the necessity of poverty alleviation for environmental protection. The conference was a mile stone as it produced a tangible effect on global awareness about environment degradation. Several countries, in response, domestically enacted environment protection laws and acts.

### **3.1.2** First World Climate Conference (1979)

Under the joint auspices of the WMO, UNEP and ICSU, First World Climate conference was held from 121 to 23 February 1973 in Geneva. This was a major conference on the climate issue, but essentially scientific in nature, barley could capture political attention. This Climate Conference was mostly focused on climatic impacts on human activities and vice-versa. The conference identified agriculture, fishing, forestry and hydrology as major vulnerable areas. The conference concluded climate change as a severe threat to humankinds and urged nations to curb anthropogenic activities that interfering with climate of the earth. The conference further led to the creation of 'World Climate Programme' (WCP) and 'World Climate

Research Programme' (WCRP).[7]Meanwhile, the US National Academy of Science had identified $CO_2$ as a main greenhouse gas. With this discovery, the experts of UNEP, ICSU and WMO met thrice in 1980 in Villach Austria to discuss and assess the role of Carbon Dioxide in Climate Change.

### **3.1.3** Villach Conference (1985)

Villach Conference on climate was organized in 1985 in Villach, Austria under the joint auspices of the WMO, UNEP and ICSU. The conference again mainly attended by scientists, however, especially focused on other greenhouse gases. In Villach, the scientific community attained the consensus regarding the certainty of global warming and climate change. On the basis of this firm consensus, an 'Advisory Group on Greenhouse Gases' (AGGG), comprising of 6 scientists was formed. The AGGG later organized two workshops, one was held in Villach from 28 September to 2 October 1985 and the second one was held in Bellagio between 9 to13 November 1987. The two workshops recommended the prioritization of actions to tackle the climate change. The Villach conference and subsequently held two workshops were successfully sealed the consensus of scientific community regarding climate change. The Villach conference decisively called policymakers for collective global action to avert climate change.[8]

The climate science had attained significant degree of certainty by Villach conference. The scientific consensus during and after Villach conference led the concrete foundation of climate science and created momentum in public awareness regarding climate change. Daniel Bodansky described three additional factors that catalyzed this momentum. First, a small group of environmental scientists under the leadership of Bert Bolin (Sweden), acted as prominent source of climate knowledge. In close collaboration with the WMO and UNEP, they promoted scientific knowledge and awareness through various conferences and workshops and publications. Second, the discovery of Ozone depletion that caused hole in ozone layer over Antarctica unleashed worldwide concerns regarding environment degradation. The Ozone

depletion later attributed to manmade CFC and HFC that confirmed the role of human activities in environmental degradation. Finally, massive heat waves and summer drought in North America in 1988 generated huge support for climate conservation. It was also evidenced from the cover page of Time magazine (2 January 1989) titled "Endangered Earth, Planet of the year" All these development built up a momentum of public concern and awareness and led the foundation for political actions.[9]

### **3.1.4** Toronto Conference (1988)

In the backdrop of wave of climate concerns and awareness, Toronto conference was held in Canada in 1988. The conference had envisioned of Vienna convention and Montreal Protocol in hand. The conference was entitled as "The International Conference of the Changing Atmosphere: Implications for Global Security". The conference compared the severity of climate change with Nuclear War and highlighted the urgent need of actions to curb climate change and its adverse effects. The conference had extensive deliberation with respect to alternative energy options. The nuclear energy was also considered, albeit highly debated as an option for clean energy.

The conference was commonly estimated the likelihood of temperature increase in the range of $2.7^0$-$8^0$ C by 2050. First time a quantified target of 20% reduction in atmospheric $CO_2$ from 1988 level by the year 2005 had been recommended by the conference. The target was called as "Toronto Target' and discussed in many countries, even country like Austria executed this target. The success of the conference materialized in a unanimous demand for inter governmental actions to deal with climate change. Thus, Toronto conferences was laid down the agenda for inter governmental efforts that were later resulted in the establishment of the IPCC and the UNFCCC.[10] The certainty of climate change was unanimously confirmed by scientific world on various platforms but, respective national positions were still lacking on climate change.

## **3.2** Agenda Setting in International Political Realm

The climate change so far had been mostly researched discussed and debated in scientific realm without any close association or involvement of national governments. Now, for the decisive and imperative policy response, political consensus among national governments was inevitable. With the view to provide a intergovernmental platform to build the necessary political consensus with respect to all aspects of climate change and its impacts, the WMO and UNEP established the Intergovernmental Panel on Climate Change" in 1988.

The United Nations Resolution 45/53 dated 6 December 1988 outlined the objectives of the IPCC as "... to provide internationally coordinated scientific assessment of the magnitude, timing and potential environmental and socio-economic impact of climate change and realistic response strategies."[11] The Resolution further urged to the WMO and UNEP to identify "elements for inclusion in a possible future international convention on climate change."[12] The IPCC met firstly on 9 to 11 November, 1988 in Geneva. Three working groups were formed and assigned specific aspect of climate change. The WG-I was assigned to compile scientific research and establish the scientific basis of climate change. The WG-II was assigned the responsibility for assessment of impacts of climate change. And the WG-III was to formulate strategies of response to climate change. All three working groups published their findings in the summer of 1990. Together, these reports later formed the basis of the UNFCCC negotiations. These reports were compiled in 'First Assessment Report' 1990 and submitted to the UN General Assembly in its 45$^{th}$ session in August 1990.[13]

### **3.2.1** The Second World Climate Conference (1990)

The 'Second World Climate Conference' (SWCC) was convened from 29 October to 7 November 1990 in Geneva under the joint auspices of the WMO, UNEP

and the ICSU. The conference was organized in two parts; one part was scientific gathering that unanimously demanded serious policy strategies from policy makers. The second part was comprised of ministers that hardly declared any substantial commitments.

During the conference, differences were surfaced out between the EU (Supported by Canada, Australia and New Zeeland) and the US (supported by the USSR and Japan). The US blocked inclusion of any provision pertaining to the National commitment on target and timetable. Daniel Bodansky hypothesized that the US was opposing because "the US was jockeying for a favorable position and attempting to create a reputation for toughness". Further, the majority of members of 'White House Domestic Council' were skeptical about the certainty of climate change and the cost of abatement efforts.[14]

Another fissure broke out between developing and developed world was related to the demand of developing countries for equal weight of development right to environment in the proposed climate change convention. Further, developing countries were insisting for shifting of whole negotiation process under the auspices of UN General Assembly rather than the IPCC. The developing world was lacking on scientific knowledge of climate change and hence they were unable to fully protect their own interests. Therefore they demanded a political body for safeguarding their interests.[15]

### **3.2.2** The Intergovernmental Negotiating Committee (INC)

Soon after the SWCC, the UN General Assembly with reference to its Resolution 43/53(6 December 1988) and Resolution 44/207 (22 December 1989)- contained with the acceptance that "climate change is a common concern of mankind"- established the 'Intergovernmental Negotiating Committee' through its resolution 45/212 on 21 December 1990.[16] The INC was constituted in response to demand of developing countries to shift the negotiation process under direct auspices

of the General Assembly. The INC, under the auspices of UN General Assembly, now was opened for all state members of United Nations and its agencies. It was an important development for developing countries as the INC would have to follow the UN General Assembly rules of procedures that rely upon unanimous consent and assign equal weight to all countries irrespective of their size or power or influence.

### **3.2.3** Negotiations for the UNFCCC

In February 1991, first session of the INC was convened at Chantilly, Virginia in the US. The first session was entitled as "Protection of Global Climate for Present and Future Generation of Mankind". The bitter differences were emerged again in the first meeting of the INC. The EU and Island countries were in favor of target based and time bounded commitments for GHGs reduction, while the US and OPEC opposed any such inclusion of target and time tables.

By May 1992, four session of the INC had been lost to the divisive perspective of the EU and the US. The 5$^{th}$ session of the INC that was held from 29 April to 8$^{th}$ of May 1992 in New York was the last opportunity to reach any decisive agreement over the draft of the convention ahead of the Earth summit, scheduled in June1992. The INC was under immense pressure as the process of negotiations was under micro scanning of international media. The INC was seeking to prepare consensus draft of the convention in ready to put for signature format at the proposed UNCED.[17] However, until the last day of 5$^{th}$ session, the INC was struggling to formulate a compromised draft due to many issues, main issues were as:-

- **Target and Time Table:** The EU and the AOSIS were in strong favor of a target and timetable based convention, while the US and OPEC was in opposition of the idea. Other developing countries-G-77, China and India- were favoring the target and timetable based approach provided would cover only developed countries.

- **Issues Pertaining to Finance and Technology Transfer:** Developing countries, especially India, demanded creation of a new fund in addition to the existing funding facility. They sought to include provisions for 'new and additional' financial resources for adaptation and for implementation of convention's obligations pertaining to them. In contrast, developed countries were insisting to use the 'Global Environment Facility' as a main source of funding to developing countries.
- **Compliance Mechanism:** The UK with other OECD countries was in favor of creating a broad based, multilevel mechanism to monitor implementation of the UNFCCC obligations. A strong compliance mechanism that would verify and measure the implementation of mitigation efforts. However, developing countries were generally opposed to have any such strong compliance mechanism in the convention due to their fear that such mechanism could interfere with their sovereign right of development.[18]

Eventually, compromisation had been reached around the principle of CBDR-RC. The principle CBDR was suffixed with RC to indicate that the principle of CBDR would be applicable according to the Respective Capabilities of all parties. It is pertinent to mention that Rio Declaration 7 did not have the same suffix. In fact there were no concrete formulation of consensus resulted in the UNFCCC draft. It was just an adjustment of words in a consensual language by deferring core issues for future negotiations. In other words, the agreed draft was a consensual layer which was floating on differences and therefore vulnerable to berate down in future negotiations.

Dr. Narrotam Gaan rightly summarized that "150 nations finalized the draft of the convention, which contained 'non-binding aims'. It is in the nature of voluntary commitments for industrialized countries to begin to return their net emission GHGs

to 1990 level and to devise plans for stabilizing concentration of gases in the atmosphere by the year 2000.[19]

## **3.3** The United Nations Conference on Environment and Development (UNCED)

The days of June, from 5-14, 1992 were listed in the golden letters in the history of mankind, when the whole gathered to save the planet earth at Rio De Janerio in Brazil. It was the occasion of 'United Nations Conference on Environment and Development' (UNCED). Nearly 172 governments were involved, including 108 heads of governments. The conference also witnessed gathering of 2400 representatives of NGOs and 17000 individuals.[20] From 4th of June to 14th of June 1992, during the UNCED, the UNFCCC was kept open for signature and thereafter at UN headquarter from 20 June 1992 to 19 June 1993. However, after signature nations would have to deposit the instrument of ratification, acceptance or approval according their individual political or legal system. With 50th deposition of the instrument of ratification, the UNFCCC entered into force on 21 March 1994. The UNFCCC currently holds worldwide acceptance comprising 196 country parties and one regional economic integration organization.[21]

The UNCED was an unprecedented conference with respect to the scope of concerns; it manifested the climate change as a global disaster for the existence of mankind. The conference basically themed by the relationship of environment and development; the development was defined as sustainable development to save the environment and its resources. The conference was aimed to produce, spread and provide impetus to national governments to take in account of environmental conservation in pursuant of their objectives of development. The Rio conference produced 'Convention on Climate Change', 'Convention on Biodiversity' and 'Agenda 21' (action plan for sustainable development). The 'Rio Declaration' was

accepted unanimously at the end of the day, which included the broader principles for environment conservation, albeit non-binding in the nature.

## **3.4** Towards Kyoto Protocol

After the enforcement of the UNFCCC in 1994, the INC was dissolved. The parties to the convention had replaced the INC. Now, the Conference of Parties acquired the ultimate authority and decision making powers with respect to implementation and review of the convention. The CoP meetings have been convening every year since the first CoP meeting.

### **3.4.1 CoP-1(Berlin)**

The CoP 1 was held from 28th March to 7th of April in 1995. It was the first CoP meeting hence mostly dealt with the procedural norms. However, it adopted the decision 1/CP. Known as 'Berlin Mandate' which led down the basis for applicat6ion of the convention. It was commonly felt that commitments made under the UNFCCC article 4 (a) (b) to return to 1990 level of GHGs emission by the year 2000 were 'not adequate' to achieve the fundamental objectives of the convention. Therefore, in Berlin Mandate, it was decided to launch a new process for "a set of quantified emission limitation and reduction objectives" (QELROs) for developed parties listed as Annex I parties in the convention. However, developing countries (Non Annex parties) successfully got omission from 'any new commitments'.[22]

The Cop 1 had also established an 'Open ended Ad Hoc group of Parties' to precisely negotiate for the QELROs. The Ad Hoc Group was called as 'Ad Hoc Group on the Berlin Mandate' (AGBM). The chairmanship of AGBM was designated to Argentina's ambassador Raul Estrada-Qyuela.[23] Another two specialized bodies were also created as:-

- Subsiding Body for Scientific and technical advice (SBSTA): The SBSTA was tasked to deal with scientific and technical aspects or issues of negotiation process and IPCC reports.
- Subsiding Body for Implementation (SBI): This body was tasked to deal with the implementation and execution of CoP's decisions, National Assessments of execution of the UNFCCC objectives.[24]

The centerpiece of the 'Berlin Mandate' can be said as the aim to reduce the ambiguity of commitments listed in article 4(a) (b) of the convention. In other words, converting qualitative commitments into quantitative commitments with specific targets and within specific timeframe was the major mandate of the Berlin. The emerging economies like India and China were in strong favor of time bound legally binding commitments for developed countries. On other hand, developed countries were insisting for inclusion of large developing countries into legally binding commitments. Amid of North-South tussle, OPEC was concerned of economic losses that would be anticipated to arise from decrease in fossil fuel consumption as a measure to be adopted to mitigate GHGs emission. The OPEC was demanding compensation for such losses due to implementation of the UNFCCC objectives.

### 3.4.2 CoP 2 (Geneva)

The Second conference of parties was convened in Geneva on 8$^{th}$ of July 1996. The produced 'The Geneva Ministerial Declaration', however, it was not adopted just noted by the CoP for future negotiations. The CoP mainly adopted decisions of 'National Communication' for developing countries. Further, the CoP called for acceleration in AGBM negotiations on QELROs that had to be adopted in CoP 3. It was also felt by the CoP that the voluntary reduction targets that had been offered by the Annex I countries through their National Communications were not adequate to return to 1990 level of emission by 2000. Therefore, it was decided to enhance existing commitments with the new set of guidelines for the National Communication. Importantly, the CoP 2 decided to negotiate for a protocol or another

instrument to establish an explicit agreement on commitments if developed countries in accordance of article 4 (a) (b).

### 3.4.3 Cop 3 (Kyoto)

The CoP 3 was an important conference as it had adopted the Kyoto Protocol; the first legally binding instrument to stabilize emission of greenhouse gases. The CoP 3 was held in Kyoto, Japan from 1-10 December 1997. The Kyoto Protocol, hereafter referred as KP, was a legally binding mechanism to curb the GHGs emission. After adaptation it was further needed to be ratified by the signatories'. It was provisioned in the KP that it would only be entered into force when "at least 55 parties accounting at least 55 % of Annex I parties carbon dioxide emission of 1990's level."[25]

The KP was opened for signatures for one year from 16th of March 1998 to 15th of March 1999 in New York at the UN headquarter. On 16$^{th}$ of February 2005, the KP entered into force. A total of 192 parties including one regional economic integration organization were participated in the first phase of the KP. Some of main highlights of the KP are listed as:-

- Parties to the KP were under legally binding commitments.
- Parties were broadly divided into Annex I and Non Annex countries.
- Only Annex I parties were under obligation to take quantified emission reduction targets.
- Six gases-$CO_2$, $CH_4$, $N_2O$, HFCs, PFCs and $SF_6$- were included for the reduction targets.
- In the KP, the reduction targets allotted to Annex I countries were different in percentage terms due to considering their different economic situations, level of development, population, size and climate.
- On an average at least 5.2% reduction below of 1990 levels was the target that had to be achieved between 2008-2012 periods.

- For three gases $CO_2$, $CH_4$, and $N_2O$ the base year was decided 1990 and for other three gases, HFCs, PFCs and $SF_6$, the base year was 1990 or 1995.
- Three mechanisms known as 'Flexible Mechanism' were introduced for Annex I parties to achieve the reduction commitments, namely Joint Implementation (JI), Clean Development Mechanism (CDM) and Emission Trading (ET).All these three mechanisms are discussed in chapter 5 of the thesis.

The KP was the first concrete mechanism that had been designed according to the fundamental principle of CBDR-RC enshrined in the UNFCCC. The KP was explicitly made differentiation between developed and developing countries with respect to legally binding mitigation obligations to reduce GHGs emission. However, the detailed procedural norms, rules and compliance mechanisms for implementation of the KP were left for future conferences of parties.

## **3.5** Towards Copenhagen Accord

### 3.5.1 CoP 4 (Buenos Aires)

The Cop 4 convened under the presidency of Maria Julia of Argentina from 2 November to 14 November 1998 in Buenos Aires. It was the first CoP after the KP; therefore, it was focused on then remaining issues pertaining to the execution of the KP. The main issues which were still unresolved included compliance mechanism, norms and procedural rules. The CoP 4 produced 'Buenos Aries Action Plan' in which developing countries were urged to adopt sustainable path of development.

During the CoP 4, the host country, Argentina expressed its willingness for the acceptance of voluntary commitments for developing countries. This Argentina move was strongly opposed by major developing countries like India and China. The

major developing countries formed a 'Rejectionist Block' to counter any pressure of reduction commitments on developing countries. Further, China and India were skeptical about the Flexible Mechanisms introduced in the KP. Both the nations demanded per capita based emission entitlements for their developmental objectives.[26]The 'Buenos Aires plan of Action' was mainly included the funding provisions to developing countries through the GEF. Further, the Action Plan decided to provide special considerations to the most vulnerable countries.[27]

### 3.5.2 CoP 5 (Bonn)

The fifth conference of parties was held in Bonn, Germany from 25 October to 5 November 1999 and was opened by German Chancellor Gerhard Shroder. This conference was convened under the shadow of the US hesitation to ratify the KP. However, relief breath was come from the EU and Japan who indicated their willingness to ratify the KP. The CoP 5 witnessed huge divergence of interests within the G-77; the islands countries and the OPEC were in deadlock situation over the issue of defining the term 'adverse effects' of climate change. The OPEC was demanding that its revenue loss should also be considered as an 'adverse effect' of climate change.

The US was another problematic country trying to derail the whole process. The US was expressing its unwillingness to ratify the KP due to the exclusion of large developing from legally binding emission commitments. It was continuously exerting pressure on whole conference of parties to include large developing countries, especially India and China, into the ambit of legally binding commitments. However, developing countries-India and China- argued that 'required' cannot be the same as the 'voluntary' and they rejected the US demand.[28]

Two important development were achieved during the CoP5, firstly, capacity building in most vulnerable countries granted the status of separate item and secondly, 'Consultative Groups of Experts' (CGE) from Annex I parties formed to

provide assistance to developing nations in the their drafting of National Communications. The CoP 5 ended with several unresolved issues.[29]

### 3.5.3 CoP 6 (Hague)

The CoP 6 was convened from 13 November 2000 to 25 November 2000 in Hague, Netherland. The Cop was inaugurated by the president of Netherland, Mr. Pronk. In his opening remark he called for agreement on all remaining issues pertaining to the KP. The Cop 6 was immensely dominated by the conflicting position of the EU and the US. The US was asserting on the inclusion of Carbon Sinks (forests) and Nuclear energy for credits of emission reduction units, the EU was against of any such inclusion. In fact most of the parties were against of that US demand.[30]

The newly elected US president G. W. Bush had already indicated that the US would not accept the KP as it did not include large developing countries. He said that the KP was "Fatally Flawed" for the US economy and would adversely affect its competiveness with China and India. On November 25, under the hovering fear of the US withdrawal, the CoP 6 resulted in failure due to the prevailing contentious issues of compliance mechanism, finance, Flexible Mechanisms and land use change.[31]

After the failure of first part of CoP 6, the CoP again convened in second part from 16 July to 27 July 2001in Bonn. Eventually, the CoP 6 adopted the 'Bonn Agreement' merely a bunch of political decisions considered as just a package of decisions for future negotiations. However, in second part, some degree of consensus on Carbon Sinks and Clean Development Mechanism were emerged.

### 3.5.4 CoP 7 (Marrakech)

A beautiful city, Marrakech in Morocco hosted the Cop 7 from 29 October to 10 November in 2001. The CoP 7 was remarkable as most of the contentious issues

were resolved pertaining to the implementation of Buenos Aires action Plan. The CoP 7 produced "The Marrakech Accord' that was contained with a compromisation formula on various contentious issues. Some of key highlights of Marrakech Accord are as:-[32]

- All emission reduction units that generate from three KP mechanisms would be treated equally.
- The Carbon Sinks credits included in the KP and accordingly allowed to meet emission reduction targets; called as 'Removal units' (RMU). However, not allowed to carry forward beyond the KP.
- Importantly, now, developing nations were allowed to create their own CDM projects without any collaboration with developed party.
- Developing countries were permitted to trade in their emission reduction units generated from their unilateral CDM projects.
- An Executive Board was created to maintain the registry of CDM projects. The board also authorized to develop all methodological procedural rules and norms to assign emission reduction units.
- The Accord accepted to allow the credits for carbon absorbing forest activities. However, country wise cap was imposed on such credits.
- On compliance mechanisms consensus could not achieved, especially on legal nature of non-compliance situation.

### 3.5.5 CoP 8 (Delhi)

This was the 8th meeting of CoP convened in an emerging economy, India. There was huge expectation with the conference as it was happening in world's largest democratic country. It was held from 23 October to 1 November 2002. The CoP was inaugurated by Indian Prime Minster Mr. Atal Bihari Vajpayee and Mr. T. R. Baalu, environment Minister of India was elected as the president of the Conference of the parties.

The Cop 8 was failed to produce any substantial progress in the negotiation process. It was labeled as a "CoP between CoPs". The CoP 8 just reiterated the principle of CBDR-RC and called to ensure the equity issue as the fundamental corner stone of the UNFCCC. The Cop produced "Delhi Ministerial Declaration on Climate Change and Sustainable Development" which was largely contained with the Philosophical interpretations of the UNFCCC principles. Many countries criticized the outcomes of the conference as they failed to provide any long term visibility to the negotiation process. However, the 'Delhi Declaration' was unanimously adopted by the CoP, but largely failed to leave any affirmative impression in the history of climate change regime.

### 3.5.6 Cop 9 (Milan)

The beautiful and fashionable city of Italy, Milan, hosted the 9$^{th}$ annual meeting of conference of partiers from 1 December to 12 December, 2003. The Milan CoP witnessed a little progress on technical issues, however remained in ambiguity to find the next direction or move in climate change regime. The CoP was struggling with the fear of Kyoto collapse as the US had already rejected the KP. The required ratification was still inadequate to enforce the KP. The first week of the conference saw a great uncertainty over the fate of the KP due to the mixed indications from the Russia. Amidst of the US withdrawal from the KP, Russian ratification was inevitable to keep the KP alive. Majority of parties were in strong support of the KP and hoping positive response from Russia.

Despite the clouds of uncertainty over the enforcement of the KP, some enthusiastic parties were interested in making sketch for next round of emission reduction commitments i.e. after the KP expiration in 2012. However, majority of CoP parties were unwilling to initiate any such discussion or negotiations. It can be said that Milan CoP was a direction less CoP without any agenda on discussion table. However, the CoP 9 made some technical decisions regarding the CDM and Sinks. The Cop 9 also took some decisions on financial assistance through the Special

Climate Change Fund and Least Developed countries Fund. The CoP 9 was also seemed as leaderless event and ended with a strong call for the enforcement of the KP.[33]

### 3.5.7 CoP 10 (Buenos Aires)

The 10th annual session of Conference of Parties was held in Buenos Aires from 6-18 December, 2004. It was a remarkable occasion as in November 2004, Russia ratified the KP. With the Russian ratification the uncertainty over the fate of the KP splashed out and it was now crystal clear that KP would be effective by February 2005.

As the KP was immense to enter into force, prominent players like the US geared up to call for next steps in climate regime. It was clear that the US wanted to initiate a new dialogue process for another treaty beyond 2012. The CoP 10 adopted a new Buenos Aires Work Programme with respect to adaptation and further decided to organize a seminar to discuss future steps in climate regime. However, on strong insistent of developing countries-India and China- it was made clear that the seminar would not open any new negotiation track or new set of commitments for Non-Annex countries.[34]

### 3.5.8 CoP 11/MoP 1 (Montreal)

This was the first occasion when Conference of Parties also serving as Meeting of Parties (MoP) to the KP. The CoP 11/MoP1 held at Montreal, Canada from 28 November to 10 December 2005. The CoP-11/MoP-1 was remarkable as it was finalized most of the operational rules of the KP pertaining to the execution of CDM. However, some developing countries were demanded for the expansion of CDM scope with the inclusion of other projects. They also insisted for rapid approval of CDM projects. The Cop 11 also served as MoP 1 established an Ad hoc Working group, by the decision1/CMP.1, under the KP to negotiate future commitments for

developed countries beyond the first period of the KP (2008-2012). It was decided that the AWG-KP would report its progress to the MoP.

The CoP/Mop also took some decisions regarding the future commitments of developed nations in second phase of the KP and negotiations for long term cooperation, albeit non-binding in nature. Thus, Montreal CoP/MoP produced a sentiment of informal consent to two track dialogues, one for second phase of the KP beyond 2012 and second for another track of talk for long term cooperative action.[35]

### 3.5.9 CoP-12/ Mop-2 (Nairobi)

The CoP 12/MoP 2 was convened in Nairobi, Kenya from 6 November to 17 November 2006. Two track negotiations were clearly emerged as the next course of action. One track was already functioning under the AWG-KP and another track was taking the required shape. However, the second track was not clear yet, but it was became apparent that there should be a effective mechanism or body to design or chart the next level of steps to combine all international efforts in a cooperative manner. The CoP agreed to some adaptation related decisions and called for decrease in deforestation. The conference also gave ears to the proposals presented by Brazil and S. Africa, in which they advocated for stronger efforts from developing nations.

Some of key outcomes[36] of the CoP 12/ MoP2 are listed below:-

- Two tracks of process established, however for long term cooperative action, institutional mechanism or any subsidiary body under the convention was not there yet.
- A periodic review of Protocol was decided in accordance of article 9 of the KP. Developed nations (Annex I) parties demanded a clear date for the review so that they could make a claim of inadequacy of their unilateral mitigation commitments. However, developing parties reasserted that

periodic review should be confined only with commitments of Annex I parties.

- Russia proposed for the establishment of a process to include developing countries in mitigation ambit under the KP.
- It was decided that 2% levy would be imposed on CDM projects to support the Adaptation fund.
- The UN Secretary-General Kofi Annan announced the Nairobi Frameworks for utmost even distribution of CDM projects across the globe. This was, as announced, would be a joint framework initiated buy UN Climate Secretariat, the UNDP, the UNEP, World Bank and the African Development Bank.
- The issue of technology transfer became more bitter in this CoP. The CoP decided the extension of Expert Group on Technology Transfer (EGTT) for one more year.

### 3.5.10 CoP-13/MoP-3 (Bali)

The CoP-13/MoP-3 was an unprecedented conference in context of progression towards the future negotiations. It was held in Bali, Indonesia from 3 December to 14 December 2007. The IPCC's 4th Assessment Report (AR4) had been published by the conference and it was created an overwhelming effect on the conference. In Bali, the two tracks of negotiations were explicitly emerged. The conference adopted a comprehensive plan to conduct future negotiations, called Bali Roadmap. The Bali Roadmap included the Bali Action Plan which was defined by the UNFCCC as "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. The Bali action Plan included five categories: shared vision, mitigation, adaptation, technology and financing."[37]

An Ad Hoc Working Group on Long-Term Cooperative Action (AWG-LCA) was created. It was decided that AWG-LCA would deal with all five categories of

Bali Action Plan with dedicated work streams. Now, there were two Ad working groups, AWG-KP and AWG-LCA, to conduct the negotiation process. The AWG-KP was established in Montreal Cop to conduct negotiations for second phase of the KP and AWG-LCA was established to conduct negotiations for long term action to address all aspects of climate change.

The Bali Conference has a significant importance in the History of climate change regime as first time developing countries including India and China, indicated to embrace voluntary mitigation efforts in "measurable, reportable and verifiable" format. However, it was made clear that their mitigation efforts would reciprocally depend on financial and technological support from developed countries in "measurable, reportable and verifiable" format.[38]

The Bali Roadmap produced by the CoP-13 was regarded as an umbrella of decisions, the key decisions[39] are listed below:-

- **The UNFCCC Negotiation:** An Ad Hoc Working Group, AWG-LCA, was created to conduct negotiations for long term cooperation.
- **Kyoto Protocol:** In line with article 9 of the KP, the MoP adopted the parameters for second review of the KP, scheduled in 2008. It was made clear that review of KP would not create any new commitments or obligations for any party.
- **Russian Proposal:** The Russian proposal that had been firstly presented in Montreal CoP, allowed for discussion in upcoming KP review and in AWG-LCA. However, it was just a deferring of any discussion on the proposal as it was clear that no party would accept any new commitment under the KP review.
- **Adaptation Fund:** The management issue of Adaptation Fund was resolved by the decision of restructuring governing board. Now, it would comprise of 16 members, 10 members from 5 regional groups (2 by each),

1 from SIDS, 1 from LDC, 2 from developing nations and 2 from developed nations.

- **Transfer of Technology:** It was decided that the Expert Group on Technology Transfer (EGTT) would be extended for another 5 years to explore all possibilities of technology transfer to developing countries from the devolved one.

### 3.5.11 CoP-14/MoP-4 (Poznan)

The Poznan CoP/MoP was the important event as the two AWGs were working in full throttle to deliver a comprehensive draft agreement before mid of 2009. The Conference of parties was excited in the anticipation of Obama's presidency in the US. During the conference, representatives of various countries were expecting for a new momentum in climate negotiation as Obama had already signaled affirmative stance during his election campaign. On positive note, the CoP14/Mop4 was held in Poznan, Poland from 1-12 December 2008.

It was broadly expected by the CoP/MoP that two tracks of negations would complete their work by mid 2009 and the texts of draft would available in form of a comprehensive deal. Thus, this textual draft would serve as the basis of negotiations in 2009. However, there were several proposals under the AWG-LCA with different interests and contradictions. All such proposals were complied in an 'Assembly Document' with numbers of brackets of disagreement. Thus this Assembly Document was decided to discuss in length in AWG-LCA before the Copenhagen conference.

The Poznan conference was convening under the shadow of economic crisis of 2008 that was originated from the US and its cascading effect soon caught several other developed and developing countries. However, in Ministerial meeting, during the conference, the general sentiment asserted that the economic crisis would not be allowed to stall the climate negotiations. The ministerial consensus called that

economic crisis should be seen as a great opportunity to heal the global economy by injecting new investment in green development.

The key progresses made during the Poznan conference are listed below as outcomes:-

- **AWG-LCA:** The AWG-LCA was responsible for the work pertaining to the Bali Action Plan. The AWG-LCA had a big challenge to create a textual draft by incorporating all proposals from several parties. The AWG-LCA was confined with a strict deadline of 2009. It had to prepare the textual basis to facilitate negotiations in 2009. Further, this text would have to convey to all parties by mid of 2009 to ensure the full participation of all parties.
- **AWG-KP:** The AWG-KP was under a clear objective to prepare textual basis that would have to complete by mid of 2009. On the basis of this textual draft parties to the KP would have to negotiate for second round of commitments in KP II. However, gradually, it was becoming clear that developed countries were not that much interested for second phase of the KP after 2012.
- **Review of the KP**: With the objective of strengthening the financial assistance, developing countries demanded for 2% levy on other two mechanisms of the KP, joint Implementation (JI) and Emission Trading (ET).
- **Adaptation Fund:** Some of developing parties were particularly expressed their disappointment with the lethargy process of financing through the AF. They demanded that instead of existing route of GEF, they would be given a direct access to the AF for rapid distribution of fund. Despite the opposition of developed nations, eventually, developing countries were permitted direct access and required mandate was granted to the Board of the Adaptation Fund.

### 3.5.12 CoP-15/MoP-5 (Copenhagen)

The Copenhagen Conference was an important event in the History of climate change regime. The world was hoping for a global deal from the soil of Denmark. It was an unprecedented conference with respect to billions of expectations. It was expected across the world that the Copenhagen conference would seal the deal and a concrete consensual mechanism of actions would emerge from the world gathering. But, unfortunately, it did not happen.

The Cop-15/MoP-5 was held in Copenhagen, Denmark from 7-19 December 2009. It was a phenomenal gathering of around 115 head of governments and states. The conference witnessed thousands of expatiators outside and inside of the conference venue. Huge demonstrations outside on the streets made the event historical. The Copenhagen conference was the top most headline of every print and electronic media across the world. Even in India, the conference occupied huge political and public attention.

The two AWGs held five meetings between the Bali conference and the Copenhagen conference to prepare consensual texts for a deal. The AWG-KP was partially succeeded to gain some degree of consensus. Despite the strong urge of developing nations the developed nations were not showing substantial interest in Second round of commitments. They were continuously insisted for the meaningful involvement of the US and developing countries in the KP II. On the other hand, the AWG-LCA produced a 200 page document by incorporating various proposals from parties. The complexity of the document can be understood by the presence of thousands of brackets (brackets denoted the disagreement) in the texts.

In the beginning of the conference, the rumor of leaked 'Danish Text' was broke out. The conference caught by the vagueness regarding the negotiation texts. On 16$^{th}$ of December 2009, during the beginning of high level segment, Danish presidency intended to present its own two texts for the negotiations. The Danish

presidency stated that these two texts were derived from the text prepared by the AWGs. Thus, announcement of Danish version of texts provoked a high tide of anger, disappointment and protest among parties, especially in developing countries. However, some parties supported the 'Danish text' as the basis of negotiations. They argued that texts prepared by the AWGs were too complex to negotiate by head of governments and states. Eventually, texts drafted by the AWGs were accepted for negotiations, but their complexity was going to be a big challenge for political negotiators.

Another dramatic event was unfolded when groups of developing countries- LDC, SIDS and African Groups- registered their protest against the attempt of sideling the negotiations pertaining to the second period of the KP. The protest was also joined by the G-77/China and India. This deadlock unleashed frustration among developed countries. This protest was seen as a walkout of developing countries from the conference. Finally, on 18 December 2009, in late night, the Copenhagen accord was brokered between the US president Mr. Barack Obama and leader of BASIC countries. However, Copenhagen Accord was highly criticized by SIDS and African countries. They alleged that the Copenhagen Accord was a product of undemocratic and nontransparent process which left out majority of parties. Thus, the Accord received fragmented support, albeit supported by majority of parties. Finally, the CoP agreed to "take note" of the Accord and accordingly called to submit emission targets by 31 January 2010.

The Accord was a political formulation resulted by the closed negotiations of big boys. Even the EU and other developed nations were left out of the negotiations. One fact clearly emerged from the Copenhagen conference that involvement of large developing nations would be inevitable for a meaningful climate deal. The Accord operationalized with immediate effect. The Accord reflected nearly all elements of Bali Action Plan. Key Outcomes of Copenhagen Accord are listed below:-

- **Long Term Goal:** The Accord acknowledged that stabilization of global rise in average temperature below $2^0$C as a long term goal.
- **Mitigation:** Developed (Annex I) parties had to reduce economy wise emission in accordance to their submitted target pledges for 2020. Developing countries to implement 'Nationally Appropriate Mitigation Actions' (NAMA). The Accord decided 31 January 2010 as a deadline to submit respective emission reduction targets and NAMAs.
- **MRV:** International MRV would be applicable to emission targets of Annex I countries. The financial and technological support from developed countries would also be subjected to the international MRV. On the other hand, NAMAs would be subjected to the domestic MRV, however, a biennial report pertaining to the implementation of NAMAs would be communicated and subjected to the 'International Consultation and Analysis' (ICA). Further, it was also decided that internationally supported NAMs or projects would be subjected to the international MRV.
- **Adaptation:** The Accord mandated developed parties to provide support for adaptation and capacity building efforts in developing countries.
- **Finance:** The accord mandated that new and additional funding would be provided to support the NAMAs in developing countries. It would be a joint and collective effort of developed nations to mobilize a 100$ billion fund every year by 2020 to support mitigation actions in developing parties. A new fund 'Copenhagen Green Climate Fund' was also proposed.
- **AWG-LCA & AWG-KP:** The Copenhagen Accord decided to continuously support and endorse the two tracks of negotiations under both the AWGs. Both the AWGs were mandated to finalize their work as soon as possible to avoid any gap between the first period of the KP- which was going to expire in 2012- and second period of the KP.

## **3.6** Towards Paris Agreement

### 3.6.1 CoP-16/MoP-6 (Cancun)

The Cop-16/MoP-6 was held in the environment of mistrust that had been emerged in the Copenhagen in 2009.The Cop held from 29 November to 10 December 2010 in Cancun, Mexico. The prime objective of the CoP was to rebuild environment of trust and cooperation among parties. The Cancun conference was not expected to produce any remarkable outcome. However, the Conference produced 'Cancun Agreement' containing with some forward looking decisions. The key outcomes of the Conference are listed below:-

- Mitigation: A registry system was set up to record all NCs in biennial reports. All types of supports would also be entered in the registry.
- AWGs: A long term goal of stabilizing the rise in global temperature below $2^0$ above pre industrial level was set as prime objective under the convention and the KP.
- MRV: More detailed biennial reports were decided to strengthen the MRV mechanism. It was decided that under the SBI, parties' mitigations actions would be analyzed in context of their submitted reduction pledges. It was also decided that ICA would not be punitive in nature and would maintain the respect of sovereignty of developing states.
- Finance: It was decided that Green Climate Fund would be guided by the CoP and remained accountable to the CoP. A new standing committee was also created to assist the CoP on various issues pertaining to the MRV, transfer of fiancé and technology.
- Technology Transfer: A technological Mechanism was formed with the inclusion of 'Technology Centre and Network' and 'Technology Executive committee'. The Technological Mechanism was mandated to provide technological assessment of needs and requirements of developing

countries. it was also mandated to promote collaboration among governments and private sectors. It would be fully operational by 2012.

### 3.6.2 CoP-17/MoP-7 (Durban)

The Durban Conference was an important conference in the history of climate regime as it had changed the basic determinants of the UNFCCC, albeit without much noise. This conference was particularly important because it was initiated a new talk for an agreement which would have to decide the post 2020 climate regime. The Durban conference gravelly recognized that there was a significant difference between total mitigation pledges of all parties and the needed amount of GHGs emission reduction to keep the rise in global average temperature less than $2^0$C or in best case scenario less than $1.5^0$C. To fill this gap the conference decided to "launch a process to develop a protocol, another legal instrument or an agreed outcome with legal force under the convention applicable to all parties."[40]

It was clear from the decision taken by the Durban Conference that the new agreement would be applicable to all parties, with legal force. Further, no reference of CBDR was made in the decision text which explicitly exhibited that Kyoto based firewall between developed and developing countries had been destroyed. Thus, the fundamental equity principle of the UNFCCC to differentiate the parties in context of their respective capabilities was undermined to a great extent. To conduct the negotiations for new agreement, the conference established a new Ad Hoc Working Group, called "Ad Hoc Working group on the Durban platform for Enhanced Action". The AWG on Durban Platform mandated to complete its work by 2015.The Durban Conference fundamentally changed the dynamics of climate regime by including developing countries like India and China and the US.[41]The key outcomes of Durban Conference[42] are listed below:-

- **AWG-KP:** The AWG-KP had concluded its work in Durban. The AGW-KP was under mandate to conduct negotiations for the second period of

the KP that was scheduled to begin in 2013, immediately after the expiration of first commitment period. Although, AWG-KP had completed its assigned task, but enforcement of KP II would highly unlikely due to the unwillingness of some developed nations. On 12 December 2011, Canada officially denied to participate in KP II. Russia and Japan also joined the denial camp. The US had not participated in the first phase and again retreated that it would also not join the KP II. However, some countries including the EU, Switzerland, Australia and signaled positively to participate in KP II. The AWG-KP had drafted the text for the KP II contained with new norms of emission accounting, trading and flexible mechanism, to be adopted by the MoP-8. A new gas, Nitrogen Triflouride ($NF_3$) was added to the existing list of 6 gases in KP II.

- **The AWG-LCA** was under mandate of charting a long term goal for abatement of global emission by 2050. It was agreed that under the Shared Vision of Bali Action Plan, a global peaking of GHGs emission had to be adopted on the basis of scientific data and in context of equitable sustainable development.
- **Mitigations:** The Durban conference urged developed countries to raise their mitigation targets and submit the same by 5 March 2012. It was decided that developed parties of Annex I of the convention should submit their first biennial reports by 1 January 2014. Further, developing countries were urged to submit their NAMAs as soon as possible in accordance of their national circumstances. Additionally, developing parties (Non Annex) were requested to submit their first biennial reports by December 2014, however, such submission of biennial reports by SIDS and LDCs left on their discretions.
- **MRV:** It was decided that first round of the International Consultation and Analysis (ICA) for developing countries would be undertaken within the

six month of submission of biennial reports and this would be applicable on developing nations other than SIDS and LDCs.

- **Durban Platform for Enhanced Action:** Under this mandate an 'Ad Hoc Working Group on the Durban Platform for Enhanced Action' was set up with the aim to conduct negotiations to formulate "a protocol, another legal instrument or an agreed outcome" to avert climate change in post 2020 scenario. Although the mandate was agreed but, after a huge contested debate with respect to its legality and applicability to all parties. Three big boys were particularly in deadlock position; the EU was demanding for legally binding agreement, the US was insisting for equal footing for developed and developing countries and India was insisting for reference of CBDR. The demands of EU and The US were included but, India's demand of CBDR reference was not included due to the US opposition, however, on India's insistence the term 'Agreed outcome' was included in the mandate. It is pertinent to mention here that with the inclusion of term 'Agreed outcome' India got a window to get back the CBDR in process for new agreement.
- **Finance:** The Green Climate Fund was formally launched with a governing body comprised of 24 members, equally from developing and developed nations. A direct access to the fund was also granted to developing countries.

### 3.6.3 CoP-18/MoP-8 (Doha)

The conference of parties first time convened in a country of Middle East. The CoP 18/ MoP 8 was took place in Doha, Qatar from 26 November to 8 December 2012. It was an important event as the two parallel tracks of negotiations had been concluded in this conference. In Doha conference it was decided that further negotiations would be conducted by a single track Durban Platform for Enhanced Action. Now, the negotiations for a new agreement were on single track and with a

precise objective. The conference decided to implement various elements of AWG-KP and AWG-LCA. It was accepted by the CoP that as both the AWGs finalized their outcomes, they should be terminated now. The outcomes of the AWG-KP were adopted by the MoP by making an amendment into KP I. The amendment extended the KP to the second phase of commitments from January 2013 to 2020. The Outcomes of AWG-LCA including pledges, financial provisions, loss and damage and other elements which had been agreed during the negotiations, now set for implementation and absorbed into new process of negotiations for an agreement by 2015.

The key outcomes of Doha conference are listed below.

- **KP II:** The Mop adopted the AWG-KP outcome and amended the KP by the decision 1/CMP 8. Called Doha Amendment to the KP. This amendment extended the KP up 2020. The KP II included 18 % reduction target from 1990 levels between the year 2013 and 2020. The KP II retained the basic differentiated structure of countries in context of mitigation obligations. It was made clear by the MoP-8 that the parties to the KP II would only be allowed to trade in emission credits. During the adoption of Amendment, a big issue was emerged regarding the 'Assign Amount Units (AAUs). Some counters were holding these AAUs in excess and they indented to trade in these units without being parties to the KP II. Particularly, three countries Russia, Ukraine and Poland were holding huge amount of AAUs and they wanted to sell them in KP II period. However some countries objected that these AAUs had not been generated through any mitigation action rather they were 'Hot Air" and basically accumulated due to the transition of economies into market economies. Finally, the trade of these surplus AAUs were restricted, albeit not completely and non participants in KP II were completely banned to

take part in emission trading. Thus, with adaptation of amendment into the KP, the AWG-KP was closed.

- **AWG-LCA:** The AWG-LCA completed its work that had been assigned to it under the Bali Action Plan. The major achievement of AWG-LCA was the inclusion of developing countries in the ambit of mitigation obligations through NAMAs supported and enabled by the financial and technological assistance from developed countries in MRV format. Many countries submitted their mitigation pledges, albeit full of ambiguity. The AWG-LCA created many institutional structures like Green Climate Fund, Climate Technology Centre and committees on IPR, finance and adaptation. The concept of the loss and damage due to climate change had long been argued by the AOSIS, adopted in AWG-LCA outcomes. In Doha, parties consented for the arrangement of institutional framework to consider compensations for the loss and damage caused by the adverse effects of climate change, especially in SIDS and LDCs. Thus, AWG-LCA provided many institutional arrangements to achieve long term goal of global cooperation in stabilizing global GHGs emission under the BAP. The AWG-LCA was terminated in Doha conference as its outcomes were adopted, however some of unresolved issues of global emission targets and peaking of emission were handed over to the AWG-ADP.
- **AWG-ADP:** The AWG-ADP was born in Durban Conference with the mandate to negotiate for a new agreement or protocol or agreed outcome with legal force that would govern post 2020 climate regime. In ADP mandate, no explicit reference to the convention's principles was made. In Doha, there were lots of uncertainties regarding the applicability and legality of the new agreement. Ambiguity regarding the directions, scope and principles of the ADP negotiations was foremost question for the parties. The US and other developed parties were increasingly attempting to depart the whole process of negotiations away from the equity principles of the convention, especially the CBDR-RC. They were keen to

dissolve the differentiating firewall between developed and developing countries with respect to mitigation obligations. On the other hand, China and India along with "Like Minded Developing Countries" (LMDCs) were attempting to uphold the equity and CBDR principle in the ADP mandate. On the strong insistence of India, China on behalf of LMDCs, the CoP acknowledged that "the AWG-ADP would be guided by the principles of the convention".[43]

- **Loss and Damage:** The issue of Loss and Damage emerged as a contentious issue in Doha conference. The SIDS and LDCs demanded compensation for Loss and Damage due to impacts of climate change. They argued that they had contributed least or zero to the causes of climate change but, they would have to suffer exponentially. In Doha Conference, it was decided that an institutional arrangement would be set to address the issues pertaining to the Loss and Damage.
- **Finance:** On the Front of financing, developing countries raised concerns regarding the hollow commitments of developed countries of mobilizing 100$ fund annually by 2020.

### 3.6.4 CoP-19/MoP-9 (Warsaw)

The CoP-19/MoP-9 was organized in Warsaw, Poland from 11-23 November 2013. The AWG-ADP was the focal point of negotiations. The Warsaw Conference was encountered with concerns raised in the UNEP Emission Report. The report clearly indicated the lack of substantial emission reduction efforts. The report further rang the alarm by saying that global emission in 2013 was increased and the long term goal of stabilizing global rise in temperature below $2^0$C was under threat of missing. Thus, the UNEP Emission Gap report underscored the urgency of taking mitigation actions. In the backdrop of the UNEP report, Warsaw conference was can be regarded as mid point to the Paris agreement in 2015.

In Warsaw, various issues were on table of negotiations. The issue of financing was particularly raised by the developing countries. They were very disappointed on poor funding by the developed countries. The GCF was still an empty bag, however, developed countries made promises to scale up the financing, but their hollow promises were not sufficient to boost the level of confidence and trust in developing countries. The issue of Loss and Damage was also emerged as a factor of mistrust and contention between developed and developing countries, especially the SIDS and LDCs. Further, the procedural issues and decision making process were also questioned by many countries.[44]

The AWG-ADP, which was tasked to prepare draft of negotiation text for post-2020, itself, was struggling with many issues. Among several issues, the legal nature of 2015 agreement was particularly under the ambit of debate. Further, the issue of differentiation in Paris agreement was also a centerpiece of deadlock between countries. Several developing countries, especially "Association of Independent Latin American and Caribbean States" (AILAC) were supported to a discussion to explore the way to incorporate differentiation in 2015 Agreement. However, LMDCs were against of any such discussion. They argued that the 2015 Agreement should reflect the basic differentiating structure of Annex I and Non-Annex countries, enshrined in the Convention. The developed countries were also in demanding mode to redefine the differentiation in 2015's Agreement. They pushed the argument that some Non-Annex countries-finger pointed out towards BASIC-were emerged as big economic giant and their emission level also converging or surpassing the emission levels of developed countries in absolute term. Therefore, the Paris agreement in 2015 should revisit the outdated differentiation structure of the UNFCCC in the light of future emission of large developing countries.[45]

Another important issue was related to the pre-2020 mitigation scenario. The Doha Amendment to the KP was still, waiting for the needed ratification of 144 parties to enter into force. Further, for pre-2020 mitigation efforts, several countries had not submitted their required NAMAs. It was clear that pre-2020 mitigation

efforts were hugely compromised due to the lackluster interest of developed countries. There was hardly any ray of hope left for the enforcement of the KP II.[46]

Key Outcomes of the Warsaw Conference are summarized in below points:-

- **The AWG-ADP:** The Warsaw conference urged the AWG-ADP to accelerate its work to draft essential elements of the negotiation text by its first session in 2014. The essential elements were included mitigation, adaptation, fiancé, technology and capacity building. The Warsaw CoP also urged to the ADP to ensure the submission of "Intended Nationally Determined Contributions" (INDCs) to present in 20th session of CoP in 2014.[47]
- **Loss and Damage:** The Warsaw conference established "Warsaw International Mechanism" to consider the issue of Loss and damage due to climate change. The said mechanism would be governed by an executive committee accountable to the CoP.[48]
- **Finance:** Financing was a major issue in the Warsaw conference. The developing countries were particularly concerned about the lackluster implementation of financial pledges that had been made by the developed countries to boost up the adequacy of the GCF. Further, the Warsaw CoP decided to take up the issue of financing from 2014 to 2020 through a biennial ministerial dialogue.
- **MRV:** In Warsaw, modalities regarding the MRV were agreed. All required procedural arrangements to carry the process of ICA of biennial reports were finalized.
- **REDD:** The Issue of REDD had been particularly important in the climate change regime as this involve the forest practices. The REDD implies for "Reducing Emission from Deforestation and Degradation" which is associated with the carbon emission due to deforestation and burning of woods. Thus, the efforts for maintaining protecting, conserving

afforestation and reforestation considered as mitigation efforts to limit the GHGs. Thus, REDD was eligible for credits and financial support. In Warsaw the detailed guidelines regarding various elements of REDD were adopted.[49] It was decided that a developing party, on voluntary basis, could propose for reference base of emission level which would be subject to the technical analysis. Such analysis and assessment would be done by a technical team, comprised of equal representation from developing and developed countries.[50]

### 3.6.5 CoP-20/MoP-10 (Lima)

The CoP-20/Mop-10 was an important conference just before the 2015 Paris agreement. Therefore, it was expected from the conference that it should finalized all the contentious issue which could be a potential cause of breakdown or collapse of the Paris deal. The conference convened in Lima, the capita; city of Peru, a country in South America. The Cop/MoP was took place from 1December to 14 December 2014 in Lima.

The Lima conference was mainly remained focused on the AWG-ADP's work. The CoP extensively discussed the procedural norms pertaining to the submission of the INDCs. The Conference got necessary impetus from the joint announcement of the US and China to undertake substantial mitigation efforts. This announcement had made by the two countries in a joint statement after signing a bilateral agreement on climate change, just before the Lima conference. The EU and other developing countries also announced their mitigation pledges, they were going to make through respective INDCs. Amid of the positive environment of mitigation pledges, there were several issues still, pending on the negotiation table.

The Lima had main objective before it to draft the negotiating text for Paris Agreement and produce consensus regarding the various elements of the negotiating text. The central issue was revolving around the differentiation; how it would be

captured in Paris agreement was a fundamental question before the conference. On one side, countries like India and China, through the platform of LMDC, insisting for 'differentiation' in reference of the CBDR-RC, equity and principles of the convention. On the other side, the US was advocating that the 'differentiation' should only be seen in context of 'National Circumstances' of an individual country. The US intention was clear; it wanted to create fragmentation in the larger block of developing countries, the G-77.[51]

The US attempts were succeeded to some extent as the AOSIS, LDCs and AILACs were speaking their own language of interests and that was different from the common voices of developing countries. The AOSIS and LDCs were demanding the balance approach for INDCs. They insisted that the INDCs should have equal charting of mitigation and adaptation. They further pressed for the inclusion of Loss and Damage as a separate element in the Paris Agreement.

It was clear from the CoP negotiations that the INDC would go to form the basis of the Paris agreement. The Lima conference produced the 'Lima Call for Action' in which scope of INDC was elaborated. However, common template was not emerged for the comparison of various INDCs of the countries. The issue of INDC's scope was mainly related with the balancing of mitigation and adaptation. In Warsaw decision, the objectivity of the INDC was linked with the article 2 of the convention, which was focused only on mitigation. On this basis, developed countries demanded that INDC should only be mitigation centric. This was highly opposed by the developing countries.[52]

Another area of contention was emerged regarding the review of the INDCs. The US, the EU and the AOSIS were in strong favor of review and consultation of the INDCs to calibrate the net total effects of mitigation pledges in the light of contemporary science of climate change. However, this was highly opposed by the developing countries (LMDCs) and they resisted any pre-Paris review ( Ex Ante) of INDCs. It is pertinent to mention that in Lima, the principle of CBDR-RC restored to

some extent. In 'Lima Call for Action' the inclusion of phrase "in light of different National Circumstances" made the necessary window for differentiation among developed and developing countries.[53]

Key outcomes of Lima Conference are listed below:-

- **AWG-ADP:** The ADP was holding two papers before it, the important one contained with the negotiating text of draft of Paris agreement. The draft included all elements of negations ranging from mitigation to legality of the Paris agreement. It also included various proposals from countries. Second one, contained with text of decisions pertaining to the INDCs.
- **Issues related to the Scope of INDCs**: The developed countries insisted for mitigation based INDCs, while developing countries pressed for adaptation as well.
- **Information**: Initially, it was mandatory to provide information regarding the quantified emission target and timeframe in the INDCs but later, eventually, it was replaced with the phrase "fair and ambitious" and made discretionary.
- **Ex Ante Review:** The ex ante review of INDCs was strongly resisted by the major developing countries and finally, it was decided that a synthesis report would be prepared to assess sum total effect of all mitigation pledges included in all INDCs.
- **Differentiation:** The issue of differentiation was sorted out to some extent by the inclusion of CBDR-RC in the Lima Call. However, the CBDR-RC was supplemented by the phrase "in light of different national circumstances".[54]
- **Finance:** on the finance issue, some pledges from developed countries were welcomed by the Cop. During the conference, the Green Climate Fund received US$10.2 billion funding. The CoP expressed satisfaction with this initiation and called for implementation of mitigation and

adaptation activities with this fund. However, developing countries were skeptical about the mobilization of US$100 billion fund, annually, by developed countries to finance mitigation and adaptation efforts in developing countries.

- **Loss and Damage: A** Two year work plan of executive committee on loss and damage was adopted. Although, 'Warsaw Mechanism' to consider loss and damage was already in place, but the CoP decided to review and reassess its functions and establishments at CoP-22. Thus, for time being, the issue of Loss and Damage was set aside till the Paris Agreement in 2015.

### 3.6.6 Cop-21/MoP-11 (Paris Agreement)

The most awaited and Historical moment in the climate regime had arrived at Paris, when the Conference of parties also serving as Meeting of Parties to the KP Ii, convened from 29 November to 13 December 2015. It was the unprecedented and historical moment that awaiting to become the witness of global cooperation which was resulting in The Paris Agreement. The focus was on the ADP's draft text of Paris Agreement. The AWG-ADP began a day before of the opening of the Paris conference. The ADP formed contacts groups to deliberate issues that were not concerned with agreement. To consider the draft text of agreement article by article, various small spin off groups formed. The various spin-off groups were also assigned the responsibility to deliberate the decision text of the CoP and text on pre-2020 obligation.

The ADP completed its work on 5 December 2015 and the resulted outcomes were forwarded to the CoP-21 for remove the brackets of disagreement. The CoP formed 'Comite de paris' which divided the negotiation in minister-led 'indabas'. On 12 December 2015, in evening, the 'comite de paris' transmitted the final text of Paris Agreement and decision text to the CoP. The CoP had two texts, one was Paris Agreement and the other one was decision text that itself contained with the decision

of adaptation of Paris Agreement. The historical moment arrived at 7.29 pm on 12 December 2015; nearly 195 governments adopted the Paris Agreement, world's first universal deal on climate change. The CoP21 president, French Foreign Minister, Laurent Fabius lay down a gavel at 7.29 pm and the historical Paris Agreement sealed with the global intention to save the Earth from climate change and its adverse effects. The Paris conference produced two documents, one was decisions adopted by the CoP which included the adaptation of the Paris Agreement and the other one was the 'Paris Agreement'.[55]

The key outcomes of Paris conference (Decisions) are listed below:-

- **AWG-ADP:** The AWG-ADP ended with the completion of draft text of decisions and Paris Agreement. It also produced a reflection note containing with the parties suggestions and comments of disagreement. On 5 December 2015, all text drafts were forwarded to the CoP and at 1:07 pm, ADP co-chair Reifsnyder announced closure of the ADP.
- **Adaptation of Paris Agreement:** Through the decision 1/CP.21, the Cop adopted the Paris Agreement and decided to keep it open for signatures from 22 April 2016 to 21 April 2017, at New York. Further, it was decided to create an Ad Hoc Working Group on Paris Agreement (AWG-APA) to facilitate enforcement of the Paris Agreement.[56]
- **INDCs:** The CoP21 expressed satisfaction with the received INDCs and further urged parties to deposit their INDC who had not been yet done so by or before Cop22. Importantly, the CoP raised concern regarding the INDCs aggregate emission cuts. The CoP21, on the basis of Synthesis report (covering all INDCs submitted by 1 October 2015), estimated that in 2025 and 2030, the INDCs would not sufficient for holding the rise in global temperature below $2^0$C. The CoP urged for greater mitigation pledges to ensure the rise in temperature below $2^0$C.[57]

- **Mitigation:** The Cop urged to remaining countries to deposit their INDCs. It was also decided that in every five year, parties would have to communicate a new INDC with more aggressive pledges. The CoP agreed that INDCs should be contained with 'fair and ambitious' quantified pledges in light of its national circumstances. The CoP urged to AWG-PA to prepare guideline, rules, norms and modalities for INDCs and the registry.[58]
- **Adaptation:** The Cop urged the Adaptation Committee to prepare necessary guideline and procedural modalities to identify the efforts of developing parties as adaptation activities. Further, The CoP urged adaptation committee to prepare methodologies for recommendation of an adaptation activity eligible for financial assistance. These methodologies would jointly developed by the Standing Committee on finance and LDC Expert Group. The CoP also urged to the GCF to support the adaptation activities in developing country parties, especially in LDCs.[59]
- **Loss and Damage:** The Cop21 repatriated the decision of Cop20 that 'Warsaw International Mechanism' (WIM) for loss and dage would be reviewed in CoP22. For time being, the CoP21 urged the Executive Committee of WIM to prepare necessary rules and procedures to consider loss and damage.[60]
- **Finance:** The Cop21 decided that necessary financial assistance for the implementation of the Paris Agreement would be provided to developing parties. The Cop21 recognized that the REDD should be adequately supported by financial assistance but did not produced any provision in this regard. It was also decided that all existing funds (GCF, GEF, LDCF and SCCF) would also serve the Paris Agreement.[61]
- **Technology development and Transfer:** The CoP21 decided to empower the 'Technology Mechanism' under the convention and it was further urged to the TEC and the CTCN to serve as technology mechanism to implement the Paris Agreement. It was also decided that the TEC and

CTCN would report their activities through subsidiary to the MoP to the Paris Agreement. Further, the Cop decided to take periodic assessment of technology mechanism with respect to its functionality and role in implementation of the Paris Agreement.[62]

- **Capacity Building:** The CoP 21 decided to create a committee on capacity building. The committee was charged with responsibility to ensure the need of implementation of capacity building in developing countries. This committee would cover both, the Paris Agreement country parties and parties to the Convention. Further, the CoP21 decided to initiate a work plan that would be executed between 2016-2020 with the aim to create necessary synergies and coordination among various activities and institutions designated for capacity-building in developing parties.[63]
- **Global Stocktake:** The Global Stocktake, in general implies for the assessment of effects of all INDCs in achieving the goal of stabilizing rise in global temperature below $2^0$C. The provision of Global Stocktake is listed in article 14 of the Paris Agreement. It is deemed as an important activity to assess the impacts of mitigation, adaptation, finance and technology transfer in combating the climate change. The outcomes of Global Stocktake will be communicated to the parties to enable them for review and update in their INDCs. In 2023, the first Global Stocktake will be undertaken and thereafter in every 5 year.[64]
- **Enhanced Actions (Pre-2020):** The Cop21 urged countries to ratify the KP II and it also urged to submit their biennial reports. Further, the Cop21 requested to all parties of the Convention and KP II to take necessary compliance mechanism.

As on 5 October 2016, the Agreement received necessary required ratifications and the Paris Agreement entered into force on 4 November 2016.

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[54] UNFCCC CoP 20th Session, "Further Advancing the Durban Platform", Draft Decision, CP.XX, FCCC/CP/2014/L.14, para 3, 13 December 2014. Obtained from the link <https://unfccc.int/resource/docs/2014/cop20/eng/l14.pdf>

[55] Earth Negotiation Bulletin, "Summary of the Paris Climate Change Conference", IISD, Vol.12, No. 663, 15 December2015, pp.1-47. Available on < from <www.end.iisd.org/vol12/enb12663e.pdf>

[56] UNFCCC, Decision adopted by the CoP21, "Adoptation of Paris Agreement", Decision 1/CP.21, FCCC/CP/2015/10/Add.1, 29 January 2016, para 1,2,7,8. Available on link <https://unfccc.int/sites/default/files/resource/docs/2015/cop21/eng/10a01.pdf?download>

[57] UNFCCC, Decision adopted by the CoP21, "Intended Nationally Determined Contributions" Decision 1/CP.21, FCCC/CP/2015/10/Add.1, 29 January 2016, para12, 13, 17.

[58] Ibid. Para 22, 27, 29.

[59] Ibid. Adaptation, Para 41, 45.

[60] Ibid. Loss and Damage, para 49.

[61] Ibid. Finance, para 52, 58.

[62] Ibid. Technlogy Development and Transfer", para 66,68,69.

[63] Ibid. Capacity-Building, Para71, 73.

[64] Ibid. Global Stocktake, para 99.

# Chapter 4

## International Politics of Climate Change: Cooperation and Constrain

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## International Politics of Climate Change: Cooperation and Constrain

There is no dearth of examples in history to demonstrate that climate shifts or extremes of weather triggering conflict and even contributing to the rise and fall of civilizations and nations. Climate change was explicitly recognized as a universal disaster in Earth summit 1992.It was defined as a great threat to the existence of humankind. Unanimously, every country participating in the summit was agreed to the point that urgent, collective and decisive measures are needed to combat climate change and its adverse consequences. Green House gases had been identified as the main culprit causing climate change well before the Rio summit. The curbing GHG emission was accepted first step to combat climate change.

Since the beginning of the industrial revolution, irrespective of development model, whether capitalist or communist, fossil fuel extensively has been used for energy needs. Invention of new technologies provided the tool to exploit the nature for the materialistic development. Countries, pioneer in technologies, brutally exploited Mother Nature for their own sake, of development without considering the future of mankind. The result was obvious, warmer earth owing to the unrelenting emission and accumulation of carbon dioxide ($CO_2$) and other greenhouse gases in the atmosphere. Global North which was first to emit $CO_2$ in large quantities with the industrial Revolution, has been the main driver of climate change for two centuries. But the adverse consequences of climate change are unevenly distributed. They are particularly severe in the developing countries of the global South, a majority of the world's population lives, as do most of its poor. The South is vulnerable to climate change because of geographical, social and economical factors. Climate change is liable to erode the food and water security of millions of its people, increase hunger

and disease, and worsen human misery. It threatens development and general human well-being.

During the earth summit and afterward in the UNFCCC, developing countries were very vocal about their right of development. China and India were in same camp. They were equally concerned about the right of development with the concept of equity and fairness. Developing countries were not willing to accept any restriction on their emission as they blamed developed nations for the environment degradation. Rio Earth summit was an attempt to integrate the issue of development (primary concern for developing countries) and environment protection (primary concern for developed countries).The issue of development was also linked with the poverty eradication, social justice and equity for developing nations. Conflict between Global North and South were a central issue at the Earth Summit conference. Southern countries were unreceptive to arguments that they should modify their development paths unless assisted by technology transfer and additional financial aid from the North countries.

Questions were raised about the conservation of natural resources for the utilization and development of future generation. In order to protect Earth's environment a different way of development which would be essentially non fossil fuel based, were advocated. This way is recognized as sustainable development. Although, sustainable development was not a new concept, but it was raised some doubts about the rationality.

Rio Earth summit, which succeeded in a convention (UNFCCC), came into force on 21 March 1994 after ratification of 55 countries. Since UNFCCC has been a political platform of conflicts and constrains of different interests of the countries. Articulation of different interests in a comprehensive treaty has been remaining challenging. Equity, burden sharing finance and technology transfer are core issues since the Earth summit. The Rio Declaration and later on UNFCCC contained some

guiding principles which provided the theoretical, conceptual framework to articulate different interests and address the core issues of disagreements.

The issues of fairness, justice and equity in burden sharing of mitigation efforts are always critical in global negotiations under auspices of the UNFCCC. Mitigation efforts are coupled with sustainable development and remain a cause of concerns for developing countries. These contentious issues were brought to the negotiation table by the conceptualizing the principle of "Common but Differentiated Responsibilities".

Anthropogenic climate change is a formidable trans-boundary global challenge. Yet, countries facing climate change impacts and their contribution to GHGs emissions are substantially different. The United Nations Framework Convention on Climate Change (UNFCCC) has recognized the different contribution of different countries to the global stock of carbon. Similarly, the UNFCCC has also acknowledged the different development and capacity level of different countries. These differences are clearly enshrined in the principle of CBDR-RC.

Disparities between countries on the one side and economic and ecological interdependence on the other have given a rise to a number of challenges in international cooperative efforts. Integrating different national interests of different countries in a cooperative manner in a global climate regime is indeed a big challenge.[1]

## **4.1** The Common but Differentiated Responsibility

In 1990 the inclusion of CBDR as a guiding principle was played an important role in enabling negotiators to agree on an international legal framework for climate change policy. However it has been proved a centerpiece of contentions in context of a comprehensive global treaty on climate change Lack of universally accepted definition of CBDR made the principle itself a contentious issue. It can be

described as an un-equal allocation of responsibilities where the problem sought to be resolved is of common concern to all parties. It takes consideration of different circumstance of the parties while framing a collective responsibility to a treaty for the protection of the environment.[2] It may bind parties to an international nature of treaty with non-uniform allocation of responsibilities based on their various contributions to degradation of the environment and their respective capacities in rectifying such problem.[3]

It could be said that the principle of CBDR is a thread to unify nations, with different interests, in combating global issue of climate change in a cooperative manner. The CBDR is recognized as an effective tool to ensure sustainable development of developing countries and transitional economies. It also recognized the special need of capacity building in most vulnerable countries, especially small Island and low laying countries.

The principle of CBDR clearly acknowledges differences in the contributions to environmental degradation (historical and current) while recognizing varying economical and technical capabilities in tackling them.[4] The source of the CBDR can be traced in the concept of the "common heritage of mankind." Indeed, irrespective of countries common responsibility, fair and justifiable difference can be made in respect of their responsibility towards addressing issues of environmental degradation. Thus, CBDR consists of two major components; one, international cooperation which is denoted by 'common responsibility' and second, liability which is denoted by 'differentiated responsibility.'[5]The concept of CBDR consists of two elements common responsibility and differentiated responsibility. These two elements are explained below.

### **4.1.1** Common Responsibility

Common responsibility denotes the sharing of responsibilities among nations to the conservation and protection of a specific natural resource. Such natural or

environmental resource may or may not be belong to sovereign boundary of state but importantly belongs to common interests of all. The evolution of the concept of common responsibility is a result of an extensive series of international laws governing resources marked as 'common heritage of mankind' or of 'common concern'[6]

The concept of common responsibility has been applied in several treaties, where the resource has labeled as 'common heritage' or 'common interest of mankind.' For instance, Tuna Convention (1952) recognizes Tuna fish as a common interest of all human beings. Similarly the space and all planets in the space are also belongs to all human beings irrespective of their country 'The outer space treaty' clearly recognized this fact that the space is a common belonging of all.[7] Common responsibility under CBDR has a wide meaning. It clearly reflects the historical responsibility of states in the degradation of environment. Further, it provides necessary vision to ensure the fairness and justice when the legal obligation for environment protection is considered. It is clear from the above that common responsibility under CBDR includes the principle of solidarity of fair sharing of both the mitigation efforts to protect resources and of the enjoyment of the accruing benefits.

### **4.1.2** Differentiated Responsibility

Differentiated Responsibility mirrors the different situations and different degree of historical responsibilities in environmental or climate degradation. Differentiated responsibility facilitates the different parameters for the differentiation among countries in context of their different national circumstances. These circumstances include variety of parameters like economic development, special needs, socio-economic structure, geographical or climatic conditions, current or future emission and most importantly contribution to the degradation of environment and climate.

Thus, differentiated responsibility is an effective tool to ensure the essential equality between the rich and poor states or precisely between developed and developing countries within a regime. The logic behind the differentiated treatment for different states is to ensure that developing countries can come into compliance with particular legal rules resulted from regime.

## **4.2** Building Blocks of the CBDR-RC

CBDR-RC serves the ultimate purpose of reflection of fairness and equity in the international climate regime. These notions are usually used interchangeably in political literature and discussion, especially, where contradictory interests of developing and developed countries are in conflicting position. Fairness stems from the self realization of being felt 'just' from inside. The notion of fairness essentially involves the realization of 'justice, when applied to the multilateral negotiations and treaties. In climate change regime, the fairness notion is linked with involvement of individual countries with the approach that they will be treated equally, without being prejudice of their economic and other capabilities. Thus fairness demands equal opportunity of making consent or dissent with the regime which eventually translate into equal voting right and that is accepted as fundamental principle in the UNFCCC decision making.

Another dimension of fairness notion which comes nearly identical to the equity concept is related to the equal atmospheric right. Every country involved in climate change regime is wrangling for its fair share in natural resources. In climate regime, the earth and its atmosphere is regarded as "common heritage of mankind" which clearly establishes equal right of every individual state in global atmosphere. Similar argument can be apply on individual person which than make justification for per capita approach.

In climate change regime fairness comes into play when some countries (developed) utilizing excess of carbon space and leaving masculine space for

developing countries. Thus fairness concept advocates equal emission right with respect to global atmospheric resource. The CBDR-RC is intrinsically founded by the fairness and equity notions which can be expressed in term of equal per capita atmospheric right.

According to Dellink the CBDR as a policy principle enshrined the notion of equity and fairness on the basis of consequential approach. Consequences that are arise from climate change or environmental degradation assingned the corrective responsibility to the responsible entity. This attribution of responsibility further translates into other principles which are generally followed in multilateral negotiations or in treaties to ensure fairness and equity. These principles are also regarded as building blocks of CBDR-RC in climate change regime.[8] Pieter Pauw, Dr. Steffen Bauer and other described some of them which are listed below:-

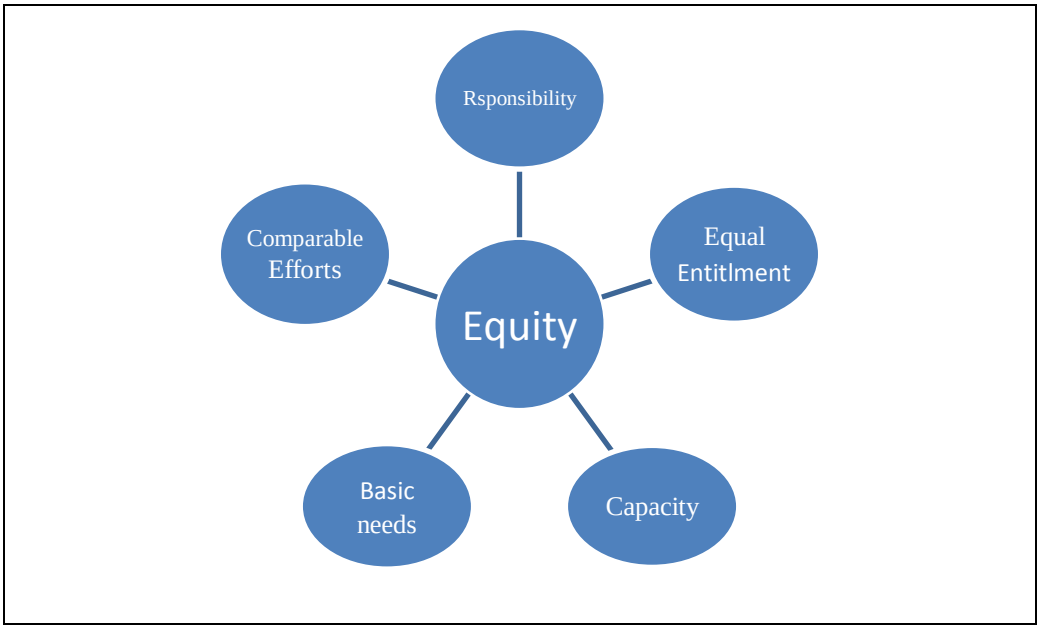
- **The principle of polluter pay**: The polluter is liable to pay the cost of corrective measures to restore the degraded environment.
- **No harm principle:** This principle discards the sovereign right of state to harm other state.
- **Precautionary principle:** The obligation to minimize or completely avoid irreversible harm to others, even such probability is not confirmed by scientific data.[9]

CBDR-RC as a "single hybrid policy principle" is an important basis to ensure fairness and equity in multilateral negotiations like climate regime. Conclusively, it can be said that the CBDR-RC is a fundamental principle, capable to intertwine fairness, equity, capability and responsibility together in climate change regime. It is the reason behind the contentions regarding the degree of applicability of CBDR-RC in climate regime. This principle indeed, goes against the interests of developed countries, therefore they have been attempting to push the climate regime away from this principle, while developing countries advocating for it.

## **4.3** Equity in Five Dimensions

Equity is most contentious issue in climate change regime. The notion of equity is fundamental argument expressed by developing countries in context of climate change. Equity has been seen as per capita right to carbon space. Owing to large population, it is most popular notion expressed by developing nations to ensure justice in climate change regime. Climate regime presents a wider and more diverse set of equity consideration, can be identified as different dimension of equity.

**Figure 4.1: Equity in Five Dimensions**




**Responsibility:** This dimension simply indicates that the responsible entity has to bear the cost. Precisely it is denoted by the "polluter pay principle". In climate change regime developed countries are responsible for environmental degradation and hence, they have to bear the cost to avert climate change.

**Equal Entitlement:** The equal entitlement thought stems from the idea of equal right. In the realm of climate change equal entitlement to the atmosphere is

argued. It is well received by the developing countries to strengthen the idea of per capita for the calculation of their share in global carbon space.

**Capacity:** The notion of capacity is related to ability to act, more able to do more. The scheme of progressive taxation is rely on the notion of capacity to pay. In climate change regime, developed countries are far better equipped with advance technologies, capital and better positioned to deploy domestic policies to fulfill international commitments. Thus, the notion of 'capacity' is the call for an equitable approach to climate change, the most equipped (developed) should respond more.

**Basic Needs:** Every human is equal by birth and have equal right to live the life with dignity. The 'Millennium Development Goals' advocated that basic human needs to be fulfilled by shared action and aid from richer one, who can provide it. Many developing countries argued that poverty eradication is their first priority and economic development is inevitable to achieve that goal. Any emission restriction on developing countries could deviate them from development path leaving billons of their people under the shadow of poverty and thus, deprive from fulfillment of basic needs.

**Comparable Efforts:** Parties always compare their responsibilities with each other. Comparable effort as a notion clearly has links to responsibility, entitlement, capacity and basic needs, especially with capacity. Comparable effort lies in between interests and equity where they intersect each other. The essence of comparable effort is lies in the efforts being asked to a party seems to be fair in absolute terms in context of circumstances of related party and in comparison of effort deal secured by other parties. Further the comparability notion also serves as an essential tool to ensure the efforts of countries in context of fairness and equity. For instance, on the basis of comparability respective mitigations pledges of different countries are evaluated in with respect to their historical responsibility and their capacity.

## **4.4** The Origin of CBDR under the International Climate Change Regime

The 1972 UN conference on the Human Development known as 'Stockholm Declaration' that first took the note and apply CBDR, as it requires "taking into account the circumstances and particular requirement of developing countries and any costs which may emanate from their incorporating environmental safeguards into their development planning…and the need for making available to them, upon their request, additional international technical and financial assistance for this purpose"[10]

"In the developing countries most of the environmental problems are caused by underdevelopment… therefore, the developing countries must direct their efforts to develop…..the industrialized countries make efforts to reduce the gap themselves and developing countries. In the industrialized countries, environmental problems are generally related to industrialization and technological development."[11]It was the 'Stockholm Declaration' first to consider the need to be fair in addressing climate issues by acknowledging the peculiarities of developing nations.

Historically, developed countries had taken action to address challenges posed by climate change while, developing countries like China and India have been more concerned about tackling more immediate problems like economic development and poverty eradication.

In 1988 Canada initiated an international conference in Toronto. The conference mainly remain focused at the reconciling the differences between policy makers and scientists on climate change. Various recommendations were made by the conference statement. It recommended a 'World Atmospheric Fund' to be partly funded by tax on fossil-fuel consumption from developed countries. Developed countries were held responsible to take measures in addressing climate change and transfer of technological and financial resources to developing countries. The

conference statement implicitly accepted the principle of CBDR by placing the main responsibility of combating climate change on developed nations.

In the regime of climate change, intergovernmental dimension was emerged after Toronto conference, where negotiations were becoming difficult. The US was first to raise the question regarding the potential economic implication of addressing climate change in the absence of substantial scientific research. Unlike US most of the developed countries supported immediate action response to tackle climate change.[12]

The issue of climate change was raised for the first time in 1988 before the United Nations General Assembly. Malta demanded the inclusion of an agenda 'Conservation of Climate as a part of the Common Heritage of Mankind.' It was accepted with an amendment in a final resolution and recognized as 'Climate Change is a Common Concern of Mankind.'[13]

Noordwijk Ministerial conference[14] on 'Atmospheric Pollution and Climate Change' was a significant milestone in the evolution of the CBDR principle under international climate change regime. The conference participants recognized a number of key principles of relevance to a climate treaty. These included concepts of climate change as a 'common concern of mankind' the common but differentiated responsibility of states the sovereign right of states to manage their own natural resources and the necessity of sustainable development.[15]

The Noordwijk declaration explicitly recognized the need for international cooperation and leading role of developed countries in taking action to address climate change including financial and technical assistance to developing countries. Noordwijk declaration identified differentiated responsibilities for 'North and South' to address the climate change. Various differences were emerged between North and south. Noordwijk Declaration proclaimed the necessity of stabilization of GHG emission by developed countries, as soon as possible. However, US, Soviet Union

and Japan strongly opposed any agreement on specific targets for stabilization of GHG.

The second World Climate Conference (SWCC) was an important event that elucidated the emergence of CBDR into the regime of climate change. Developing countries were very vocal to their interest at the conference. One significant fact was appeared in the conference that differences between North-South were to play a pivotal role in any endeavor aimed at tackling climate change.

The Vienna Convention, which resulted in the Montreal Protocol, was an important step in the perspective of CBDR evolution. The CBDR logic was the guiding principle in the Vienna Convention to seize the production of CFC, HFC and PFC to avert depletion of the Ozone Layer. The Vienna convention established a role model for the notion of a framework convention. Vienna convention produced binding framework to stop the production of Chlorofluorocarbons (CFCs) which causes the depletion of stratospheric Ozone. Although, the Vienna Convention, was not contained the CBDR as such, but it was embodied in the convention as the convention explicitly recognized the different need of different countries in their respective capability. The preamble of the Convention clearly reflects the CBDR as it recognized "particular requirement and circumstance of developing countries." Further, according to the Article 2.2 of the convention, the general obligations rely on the capacities of the parties.[16]

The Vienna convention that produced the Montreal Protocol (1987) on manmade compounds (CFC, HFC and PFCs) that caused damage to ozone layer in Stratosphere was a historical success for Southern countries. The Preamble of the convention clearly charted the need of special provisions for developing countries.[17]In Montreal Protocol, there were several provisions which granted special relaxation for developing countries. For example, the developing countries were provided a 10 year grace period for compliance and that would be subject to the

fulfillment of financial cooperation and technological transfer from developed nations.[18]

Despite the normative developments and consensus towards CBDR as a balancing principle, divergence of policy positions on climate change were also emerging among developing countries. Oil producing countries were skeptical about the economic implications of efforts proposed to fight climate change. They considered any measure in combating climate change, would adversely affect their economic interests.

Conversely, the small island developing states (SIDS) and low lying coastal states were in favor of more strong and immediate responses as they were at greater risk of being drowned by the resultant rise in sea levels. Similarly, emerging economies like China, India, Brazil, Mexico etc. were more prone towards ensuring the right of their development to eradicate poverty. These large developing countries were very keen to the inclusion of CBDR in any future agreement on climate change.

### **4.4.1** Rio Declaration (UNCED, 1992)

In Rio, informally known as the Earth Summit, three major agreements aimed at cooperative approach to development and environmental protection, were adopted. The Earth summit produced Rio Declaration and the Agenda 21. Additionally, two legally binding conventions, The 'United Nations Framework Convention on Climate Change' (UNFCCC) and The 'Convention on Biological Diversity', were also presented for the ratification.

The Rio Declaration is a series of 27 normative principles defining the rights and responsibilities of states "with the goal of establishing a new and equitable global partnership through the creation of cooperation among states…. Working towards international agreement with respect to the interests of all and protect the integrity of the global environment and development."[19]

Principal 6 (Box4.1) of the Rio Declaration highlights that priority should be given to the particular circumstance of developing countries. Similarly principal 7 (Box4.1) of the Rio Declaration established CBDR as a general norm of international environmental law. First time, CBDR formally recognized as an international principle during the Earth summit (UNCED 1992) and placed in principle 7 of the Declaration.

**Box 4.1: The Principal of CBDR in Rio Declaration**

Principle 6 *"The special situation and needs of developing countries, particularly the least developed and those most environmentally vulnerable, shall be given special priority. International actions in the field of environment and development should also address the interests and needs of all countries."*

According to Principle 7 of the Rio Declaration, the principle of CBDR is defined as follows (UNCED1992):

*"States shall co-operate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, states have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command."*

Source: UNO

## **4.4.2** CBDR under the UNFCCC

Under the UNFCCC incorporation and consideration of different interests and needs of developed and developing countries was inevitable. Again, different interests within each of groups had to be considered to build the UNFCCC as a main international legal instrument on climate change. Small island states (SIS) were concerned about the likelihood of their disappearing in event of sea level rise. Oil producing and exporting countries (OPEC) Saudi Arabia Kuwait Nigeria etc. were

bothered more about their economies and income which may be shrink with the reduction of fossil fuel consumption. On the flip side, there were large emerging developing countries like China, India, Brazil and South Africa (BASIC), particularly interested in ensuring their economic growth and not willing to accept any binding restriction on their emission. Similarly, developed countries block was equally divisive regarding measures to be adopted in addressing climate change. For instance, US opposed to commit itself to any emission reduction target or time scale while, other developed countries like Australia ,Belgium, Canada, France, Germany, Italy, Japan, New Zealand and UK were indicated their willingness to reduce $CO_2$ Emission.

UNFCCC was entered into force 21 March, 1994, with 195 parties to the convention; it holds today a universal nature and scope. The evolution of this regime can easily be linked to Montreal Protocol and the United Nations Conference on Environment and Development. Montreal Protocol accepted pollution control (phasing out use of CFC) as a fix to save the protecting Ozone Layer depletion. The protocol acknowledged the different circumstances of developing countries and duly addressed by incorporating special provisions to ensure developing countries compliance to the protocol. This precedent of Montreal Protocol greatly influenced the development of climate change regime in political context. Second, under UNCED, the issue of climate change integrally correlated with the sustainable development. It was enshrined with intra; inter generational equity; historical contribution of developed countries in environment degradation; high level of poverty and lower capacity of developing countries to deal with.[20]

The preamble is supposed to be the spirit of any international agreement. It briefly describes the background, aim and context of an agreement or treaty. Preamble to the UNFCCC is expressly important to elaborate the various provisions embodied into the convention text. It provides reference to a number of existing and emerging norms of international environmental law. The principle of CBDR can

easily be traced in several paragraphs of the UNFCCC preamble. For example it is noted:

**Box 4.2: Preamble to the UNFCCC**

Para 3
*"That the largest share of historical and current global emissions of greenhouse gases has originated in developed countries, that per capita emissions in developing countries are still relatively low and that the share of global emissions originating in developing countries will grow to meet their social and development needs."*

Para 6
*"That the global nature of climate change calls for the widest possible cooperation by all countries and their participation in an effective and appropriate international response, in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions."*

Para 10
*"That standards applied by some countries may be inappropriate and of unwarranted economic and social cost to other countries, in particular developing countries."*

Source: UNO

The paragraph No. 3 of the preamble (box 4.2) to the UNFCCC clearly attributes largest part of historical and current GHG emissions to developed countries. The expression, "that per capita emissions in developing countries are still relatively low", recognizes the demand from developing countries that they should allow to emit more to meet their social and development needs.

The above preamble architecture of the UNFCCC explicitly indicates that CBDR is a core principle enshrined in text of the UNFCCC preamble. Article 3 of the UNFCCC contains of 5 principles. Article 3.1 expressly mentions CBDR and attribute leadership role to developed countries in addressing climate change and its effects. While, Article 3.1, itself does not explain the reasons for developed countries to take the lead but read in context of paragraph 3 of preamble, it can be argued that historical contribution to GHG stock by developed countries, as well as notions of

justice and equity were those reasons for attributing leadership to the developed countries.

**Box 4.3: Article 3(Principles) of the UNFCCC**

Ar.3.1: *"The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof."*

Ar.3.2*: "The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration"*

Regarding the UNFCCC's general principles, CBDR was thus expanded to include "respective capabilities". However, the convention's section on commitments (i.e. Article 4) does not refer to CBDR, but to "specific national and regional development priorities, objectives and circumstances," which widens the room for interpretation. The UNFCCC's 1997 Kyoto Protocol, in turn, prominently reiterates the UNFCCC text under "commitments" when it mentions CBDR as well as specific national and regional development priorities, objectives and circumstances.

Source: UNFCCC

Article 3.2 is also equally important in addressing the issue of equity and fairness in relation to developing countries.

## **4.4.3** The Berlin Mandate

At Cop-1 in Berlin, in march 1995,the CoP-1 issued so called Berlin Mandate that voluntary approach had been failed and agreed that there would have to be binding commitments by Annex-I countries to reduce their emission of heat trapping gases some time after the year 2000. [21]Indeed, Berlin Mandate was remained focused on mitigation commitments made by developed countries and reaffirmed that

mitigation of Green House gases was the primary responsibility of developed countries.

## **4.5** Analytical Rationales for CBDR in the Climate Change Regime

The justification of CBDR in climate change regime is rely upon two main principles, one the equality and polluter pays principle and second, the economic and capacity principle.

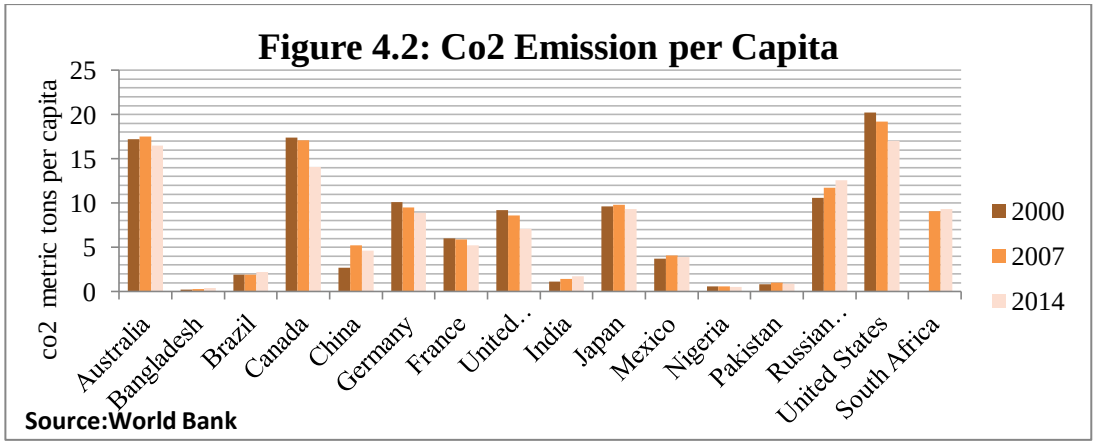
### **4.5.1** Rationale of Equity and polluter pays principle

From the beginning of Climate change regime in international political arena, developing countries consistently advocating and advancing the argument that developed countries are primarily responsible for environmental degradation. Hence, in context of their historical emission they have to bear the burden of averting climate change.

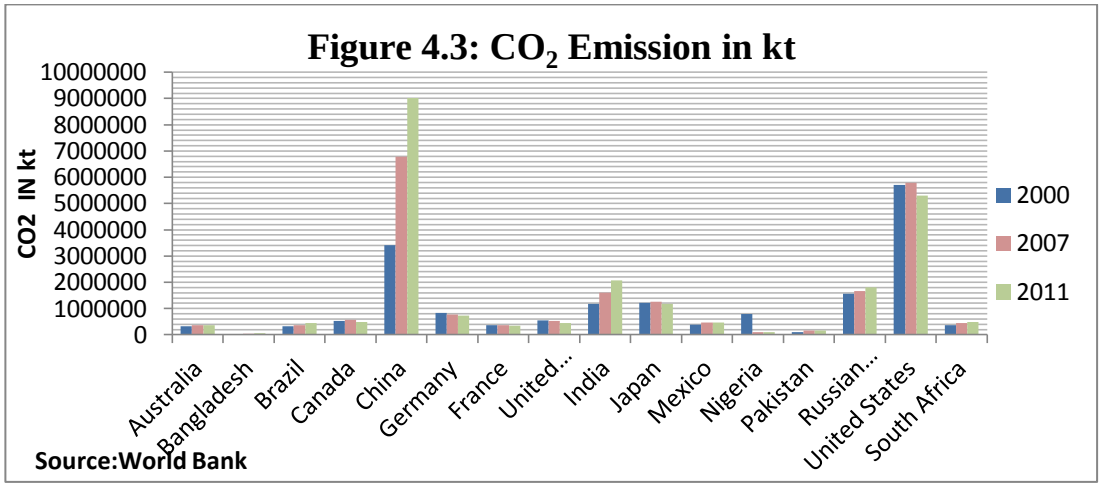
Under the climate change regime it is established and well accepted fact that atmosphere is common heritage of humankind. Therefore, every individual has equal right to share the natural resources of the earth. Proponent of this school of thought is mostly from developing world. They are continuously emphasizing the idea of "Per Capita" as this is a direct measure of human welfare, expressed and accepted in international negotiations. From developing countries point of view the Notion of 'Per Capita' is most significant criteria for deciding the equal right to environmental space.[22]

Developing countries particularly, China and India were frontiers to raise the per capita norms in climate change regime to combat climate change. They had very clear assumption that progressive convergence towards an equitable distribution of emission rights should be based on per capita norms.

CBDR is mostly framed to compare per capita or national emission levels. These indicators capture the relevant notion of responsibility, however fails to capture other facets. Per capita emission captures the population size but does not cover the causal-contribution aspect concerning responsibilities of sovereign states at the international level.

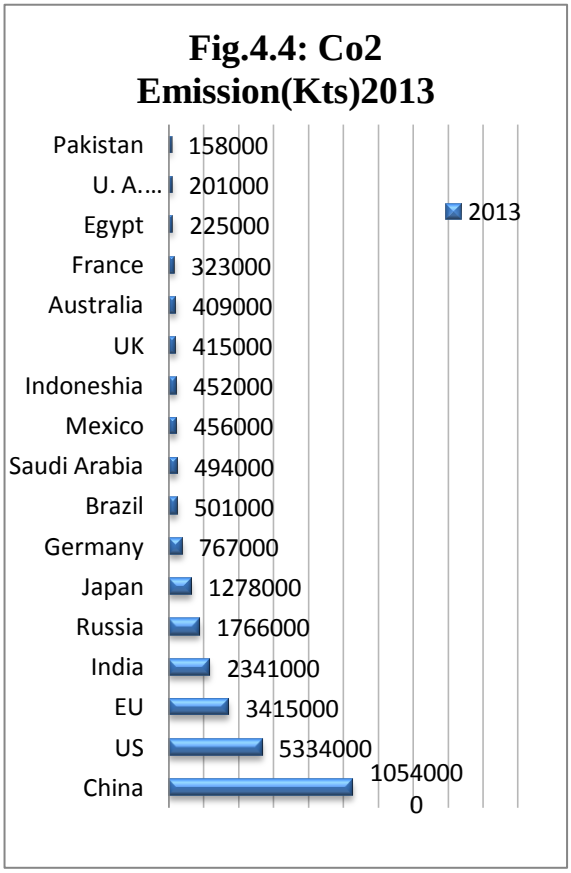


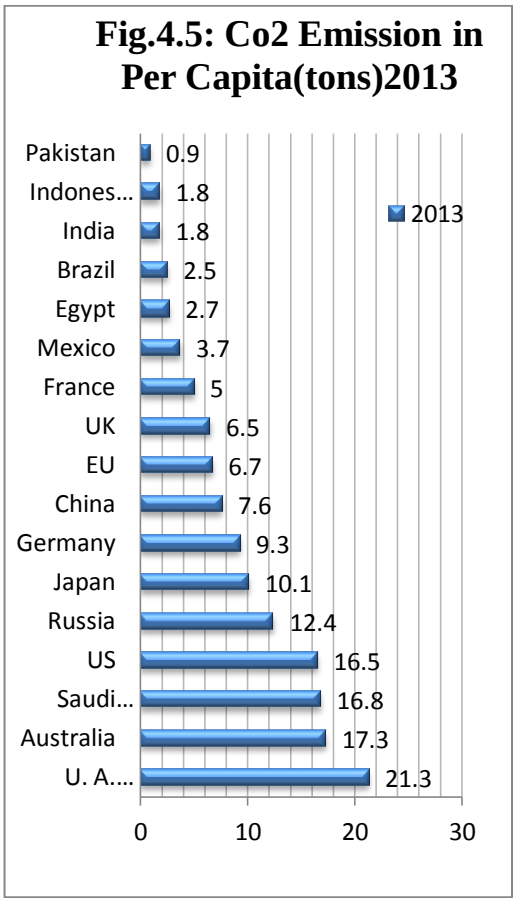

It is clear from the Fig.4.2 that larger emission blocks belongs to developed countries, assigns greater responsibility to developed countries in combating climate change. However, if similar data is compared on the basis of aggregate national emission (which does not capture population size), different picture emerges.




It becomes clear from the figure no 4.3 that on the aggregate basis China is top most of emitter of the world followed by the US and India. Thus, in context of

aggregate emission the principle of CBDR-RC fails to capture the notion of equity and historical responsibility. Further on aggregate basis, logically China and India should take lead in mitigation commitments.




Source: EU EDGAR

On the basis of data obtained from EU Edgar (Emission database for Global Atmospheric Research) fig. No 4.4 and 4.5, for the year 2013, it is clearly illustrated that on the basis of nation wise indicator developing countries have to opt mitigation efforts in combating climate change. The US is very keen to include large developing emitter like China and India in any meaningful agreement to mitigate GHG. On the flip side, China and India are consistently advocating the per capita indicator to decide the distribution of mitigation efforts. They have made it clear that per capita is the only basis to ensure equity in any meaningful agreement.

Again, the per capita argument is logically transformed in the idea of 'Carbon Debt'. The notion of 'carbon debt' recognizes historical emission of developed countries. The notion of carbon Debt implies that those who have been using excess of carbon space over their fair share (on per capita basis) are running under the debt to those using less than world average in terms of per capita.[23] Thus, the difference between existing emission on per capita basis and the world average of emission is demanded by the developing countries. The fair share also demands the convergence of emissions of all countries (on per capita basis) at certain point. Thus, indeed the Carbon space notion presents a quantitative statement that developed countries have to reduce their emission to accommodate the rising emission of developing countries.

The North owes a climate debt to the South and it is rising. "The North's high historical emission, coupled with its continuing failure to reduce GHG emissions substantially, have only left a limited, indeed minuscule, carbon budget on which the Southern countries must pursue their development objectives-providing to their poor people a modicum of food and water security, primary health care, literacy, elementary education, access to energy, and employment security."[24]

Although it has been always a critical issue to estimate the total carbon space and assign respective emission rights on the basis of such estimate to nations. But in the light of latest scientific research and computer stimulation and modeling, the IPCC has calculated the necessary data to measure the size of carbon space. However, the notion of carbon debt significantly boosted the legitimacy of per capita Argument which eventually transformed into the requirement of special provisions of consideration, technology transfer and importantly financial assistance from developed countries.

### **4.5.2** Rationale of the Economic and Capacity Argument

Vulnerability to climate change impacts is divisive, it differ country to country, depending on the economical social and institutional structure of a particular

country. Highly concentrated rural population and dependency on agriculture and natural resources, makes developing countries more vulnerable to climate change impacts. According to World Bank data for the year 2014, 70 % of world's poor who live in rural areas, depends on agriculture for their livelihood. Climate change poses a serious threat to these population, which is mostly concentrated in developing and under develop countries. The global average of rural populations is 47%, against this world average, rural population LDCs is 69%; in pacific island small states it is 63%; in South Asia it is 67% and in Sub-Saharan Africa it is 63%.While a well below of global average, rural population in OECD members is 20% and in Euro area it is 24%.[25]

**Table 4.1: Rural Population (% of total population)**

| **Country Name** | **1991** | **2000** | **2007** | **2014** |
|---|---|---|---|---|
| Australia | 14.6 | 12.8 | 11.7 | 10.7 |
| Brazil | 25.3 | 18.8 | 16.6 | 14.6 |
| Canada | 23.4 | 20.5 | 19.6 | 18.4 |
| **Bangladesh** | **79.7** | **76.4** | **71.8** | **66.5** |
| **China** | **72.7** | **64.1** | **54.8** | **45.6** |
| Germany | 26.7 | 26.9 | 26.3 | 24.9 |
| France | 25.8 | 24.1 | 22.4 | 20.7 |
| **Indonesia** | **68.4** | **58.0** | **52.5** | **47.0** |
| **India** | **74.2** | **72.3** | **70.1** | **67.6** |
| Japan | 22.5 | 21.4 | 12.0 | 7.0 |
| Mexico | 28.2 | 25.3 | 23.1 | 21.0 |
| **Nigeria** | **69.8** | **65.16** | **59.18** | **53.0** |
| **Pakistan** | **69.2** | **66.8** | **64.6** | **61.7** |
| Russian Federation | 26.6 | 26.7 | 26.4 | 26.1 |
| South Africa | 47.4 | 43.1 | 39.4 | 35.7 |
| United Kingdom | 21.8 | 21.35 | 19.52 | 17.6 |
| United States | 24.3 | 20.9 | 19.7 | 18.6 |
| World | 56.7 | 53.5 | 50.0 | 46.6 |

Source: World Bank

It is clear from the table No 4.1 that highest% of rural population to the total population mostly living in developing countries (Highlighted) and more prone to impacts of climate change.

Vulnerability to climate change and its impacts is directly proportional to the degree and nature of economic dependency on the natural resources. Climate change is certainly affecting the long term pattern of the weather of a region or country and thus, posing a greater risk to the stability of the economies which are highly depended on agriculture and natural resources. An assessment can be drawn from the data compared in the table No 4.2.

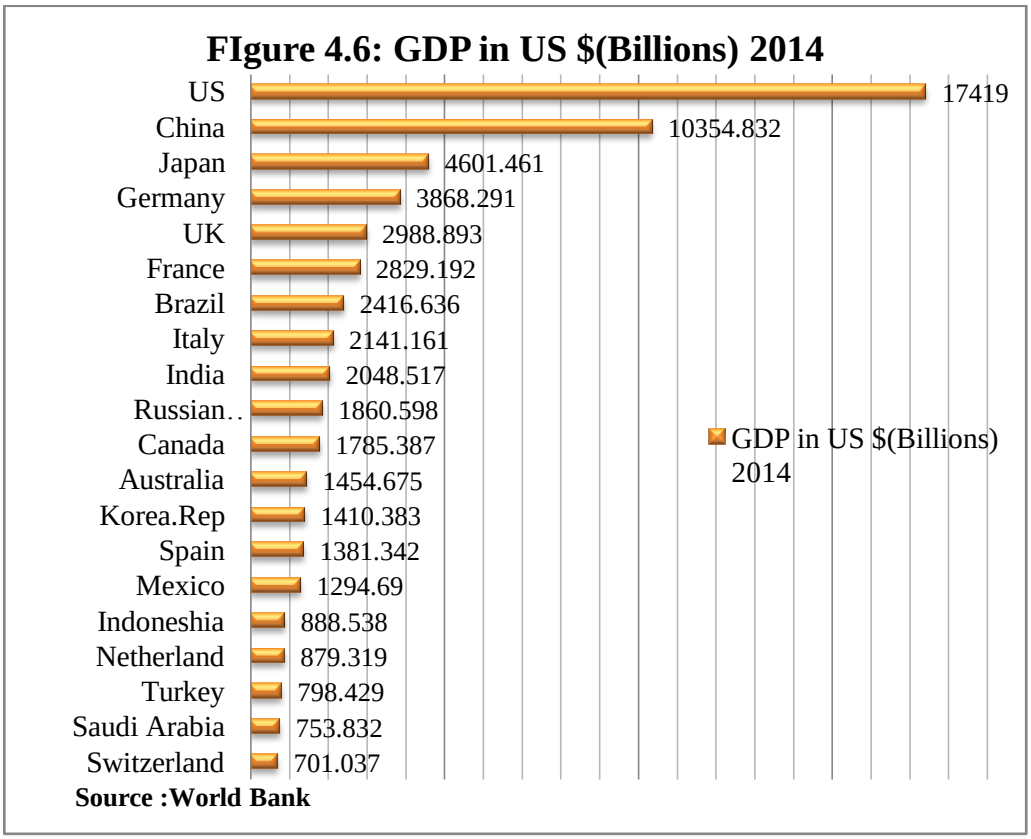
**Table 4.2: Agriculture Value Added to Total GDP (In % Term)**

| Developing | | Developed | | World |
|---|---|---|---|---|
| Country Name | 2011 | Country Name | 2011 | |
| Ethiopia | 41.0 | Kuwait | 0.3 | |
| Mali | 38.8 | UK | 0.7 | |
| Burma | 38.2 | Canada | 0.7 | |
| Afghanistan | 34.9 | Germany | 0.8 | |
| Cambodia | 30.0 | US | 1.2 | |
| Zambia | 21.4 | Japan | 1.2 | |
| Pakistan | 20.9 | Switzerland | 1.3 | World Average 6.1 |
| Albania | 20.7 | France | 1.8 | |
| Kenya | 19.0 | EU | 1.8 | |
| Bangladesh | 18.4 | Denmark | 1.9 | |
| Nigeria | 17.8 | Itly | 2.0 | |
| India | 17.2 | Norway | 2.6 | |
| Indonesia | 14.7 | Poland | 3.4 | |
| Egypt | 14.5 | Australia | 4.0 | |
| China | 10.1 | Russia | 4.5 | |
| Brazil | 5.5 | New Zealand | 4.8 | |

Source: IMF

Illustration of table no 4.2 clearly indicates that agriculture sector is a major contributor to the GDP of developing countries and this sector is more vulnerable than to other sectors of GDP. Decrease in crop yield makes the social structure unstable and could lead to social conflicts in developing countries. Again the poor infrastructure, weak governance and poor functioning of institutional structures make the impacts of climate change multifold in developing countries.

Apart from Mitigation, adaptation to the impacts of climate change is also linked with economic capacity of a country. Resilient economies are better positioned to cope with adverse effects of climate change in term of adaptation. Adaptation capacity is rely upon the economic capacity of a particular country. It has been always a critical constrain in global negotiations that how to determine the economic capacity of a particular country to adapt climate change. In terms of absolute GDP, (PPP) is taken to determine the economic capacity; it reveals that developing countries are not far behind of developed countries. In Fig No 4.6 the absolute GDP (PPP) is compared on the basis of data published by World Bank for the year 2014.[26] In Fig. 4.6 Gross Domestic Product (PPP) of top 20 countries has been compared. TheUS is ranked first with the GDP(17419 $ Billions) followed by largest developing country China(10354 $ billions).Besides developed nations, Brazil(Rank 7) followed by India(9), Korea Rep(13),Mexico(15) and Indonesia(16).It shows that large developing countries are well economically positioned to cope with climate change and they should accept more responsibility in the endeavor to fight climate change.



Conversely, developing countries have different perspective. They have argued that economic capacity should not be seen in absolute GDP terms, instead, they argued in favor of per capita ratio. In term of GDP per Capita, the above comparison inverts in results. As it reveals from the Fig 4.7 on the basis of GDP per capita indicator large developing economies are far behind of developed nations.

On the per capita basis developing countries are arguing that they should not be compelled to take legally binding emission restriction in account of their requirement for developmental needs to eradicate poverty and meeting the basic needs of their billions of people.

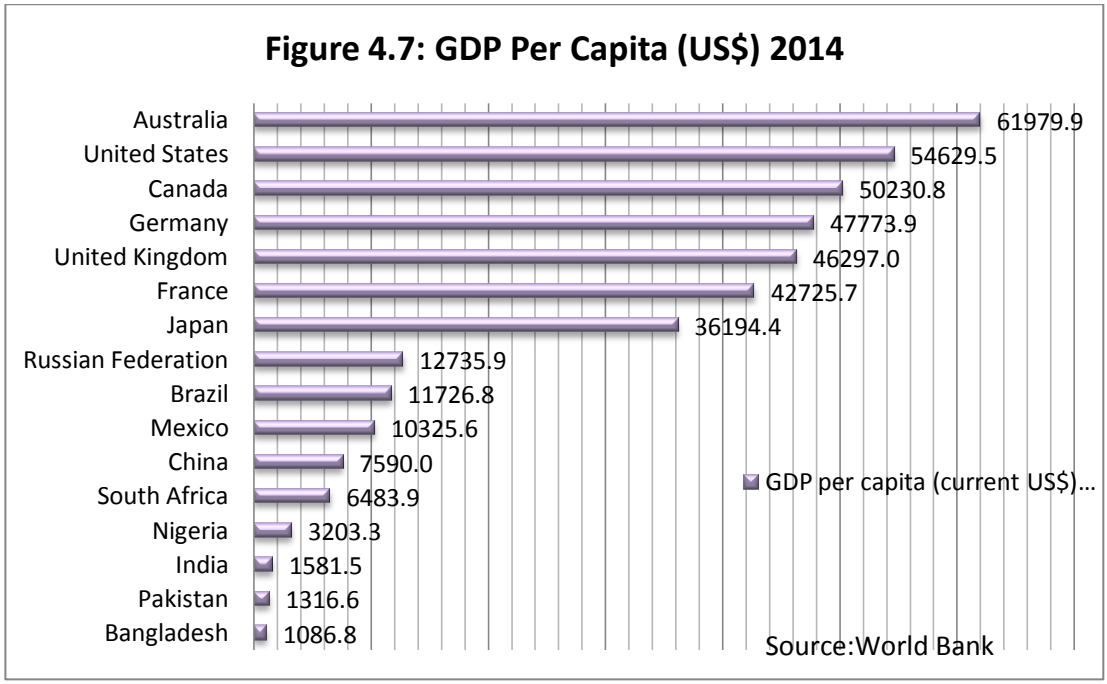
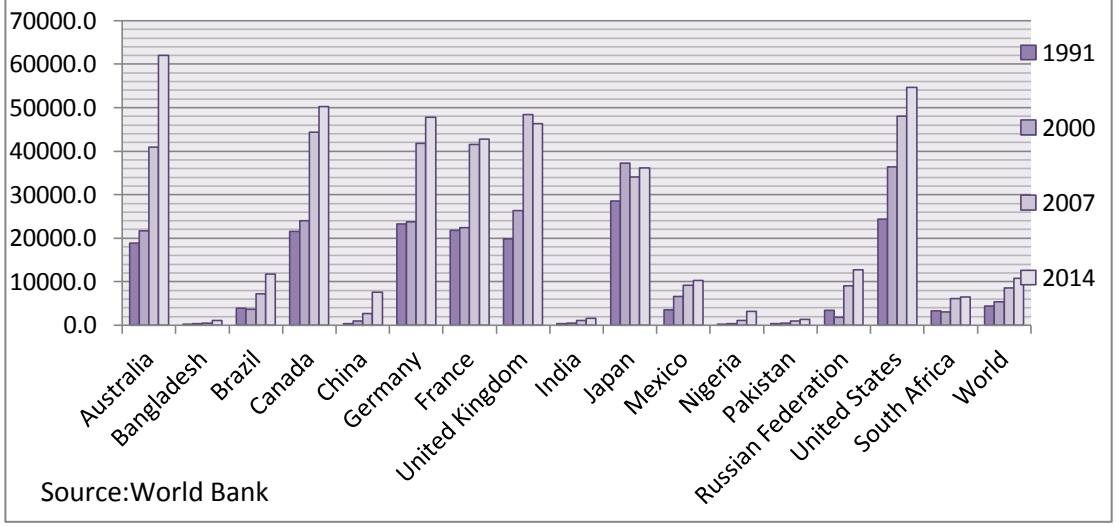



Illustration of Fig.4.8 shows that in different four year developed countries are way ahead of developing countries in terms of GDP (PPP) per capita norms. It also reveals from the Fig. 4.5 that in some developed countries like France GDP per capita is marginally increased from the year 2007 to year 2014, while it is fallen in UK for the same years. On the other hand it is continuously rising in developing countries year by year.

**Figure 4.8: GDP per capita ( US$)**




In climate change regime 'Capacity' is one of the most important criteria for differentiating between countries under the principle of CBDR. Rio Declaration expressly recognized that developed countries responsibility premised on their capability of their superior technologies and financial resources and thus included in UNFCCC on the basis of their respective capabilities, which is denoted by classification of Annex-I and non Annex countries.[27]The capacity criterion, enshrined in the CBDR, is based on the 'polluter pays principle' which reflects the responsibility of the polluter to bear the cost of averting climate change and adaptation cost of climate change.[28]

However the validity of this argument is challenged by the fact that GHG emissions of developing country parties are increasing with a faster pace and are expected to surpass emissions of the US and other developed nations, sooner or later. The combustion of fossil fuel is a main cause of anthropogenic emission of Co2 and world energy use continues to be the contagious issue in global climate change debate. Indeed, emission in developing countries has begun to rise and country like China and India are anticipated at the top position in emission list. It is well charted

fact that emissions of developing countries are predicated to rise continuously, 7 times faster than in the developed countries. China is now top emitter followed by U.S., and its emissions growth is projected to be 9 times greater than that of the U.S.by 2030.[29]

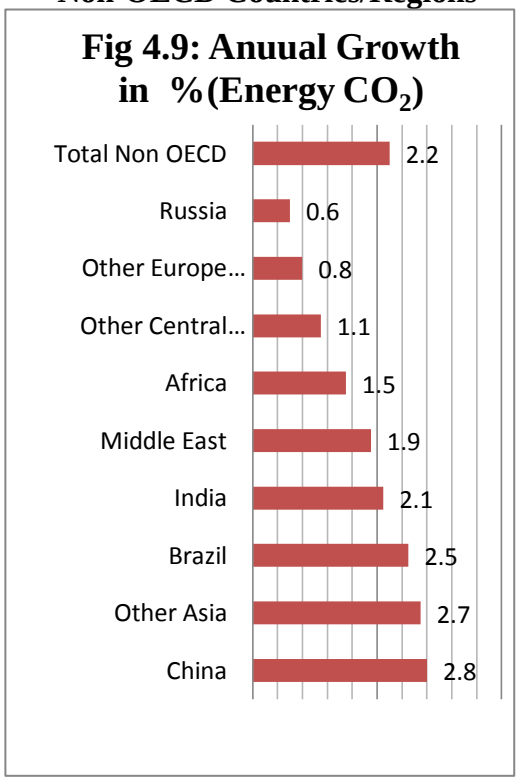
International Energy Outlook, 2009 (IEO) has estimated growth projections for different countries and regions. According to IEO report, China and India will grow at faster rate. China is expected to grow with expected rate at 6.4 per year and India is expected to grow at 5.6 annually by 2030. Higher growth requires intensive use of energy and energy portfolios of China, India and other fast developing countries are mainly depended on fossil fuel like coal Natural gas and oil. According to World Bank in year 2011, China's 79% of electricity production is based coal fired power plant and India's 68% electricity was coming from coal based power plants.

On the basis of data obtained from Energy Information Administration, USA, average annual growth in energy related Carbon Dioxide emission in the OECD and non-OECD countries have been charted below for the trajectory of year 2006-2030. From the comparison between OECD and Non-OECD it can be estimated that the collective efforts are needed to address climate change in a comprehensive manner but again, different perspective of developed and developing countries on the equity issue has made it critical to decide the distribution of responsibilities.

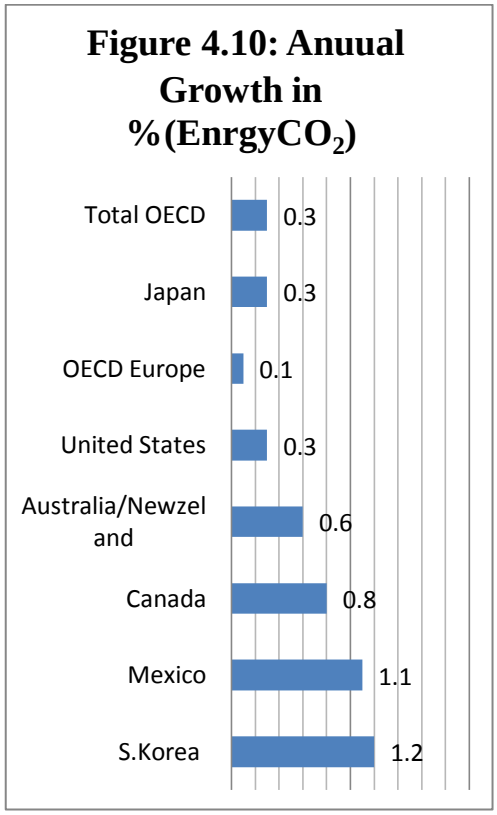
On account of robust growth projections in developing countries, their $CO_2$ emission is likely to increase with excess demand for energy at much faster pace as compare to OECD countries. Developed countries, especially US, continuously pressurizing large developing countries to take legally binding emission cuts. On the other hand, developing countries are more concerned of their development requirement and not willing to accept any legally binding emission targets. It is clear from the Figure 4.9 and Figure 4.10 that $CO_2$ emissions related to energy production are projected to grow at the rate of 2.2 % annually in Non-OECD countries from

2006 to 2030 and it is likely to grow in OECD countries at much slower rate 0.3% annually. In non-OECD group $CO_2$ emission (energy related) of Chain, Brazil and India are likely to grow at around 2% annually. Average Annual Growth in Energy-related projection for year 2006 to 2030 is shown below.[30]

**Non-OECD Countries/Regions**




**OECD Countries**

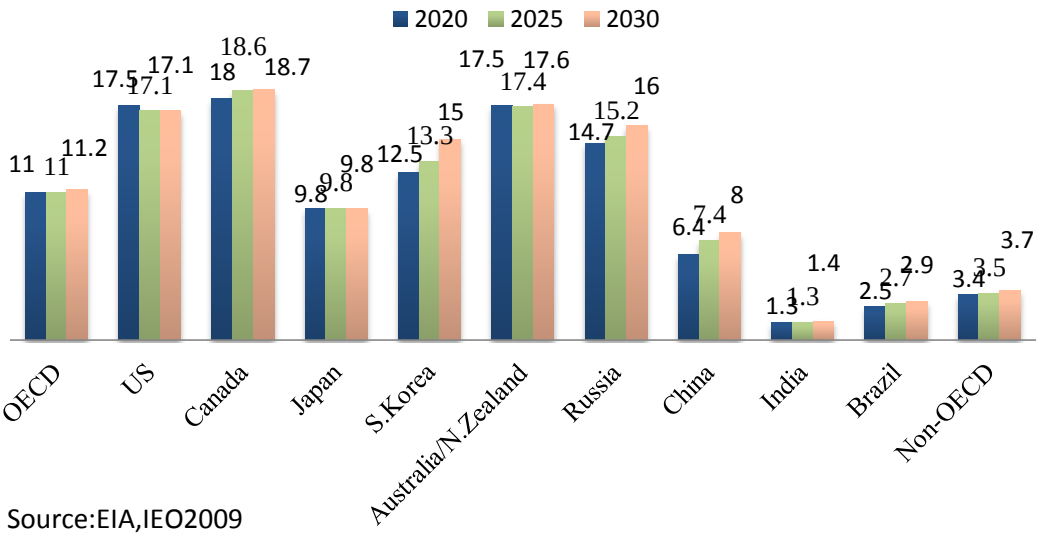



Source: EIA, USA

Again when the same projection were done on the basis of per capita indicator in Fig.4.11 it reveals that despite faster growth in energy related $CO_2$ emission in Non-OECD countries, these non-OECD(3.7 metric tons)) countries will not be any close to OECD (11.2 metric tons) countries by 2030. It can be said that energy is necessary for development and developed countries are still far behind of that developed nations. The IEA estimate clearly shows that energy related $CO_2$ will increase in Non OECD or developing countries at faster rate, but despite the faster increase in their energy related $CO_2$ emission, it will be far lower than the OECD by 2030. Thus for the sake of poverty reduction, development is only weapon and

development needs sufficient energy. It is the argument on basis of which developing countries are not willing to accept binding emissions targets as they fear that their growth prospect could severely affect due to opting alternative energy source.

**Fig 4.11: Projection of Energy related Co2 emission per capita (metric tons)**




Source:EIA,IEO2009

India is projected to release only 1.4 metric tons per capita Co2 related to energy by 2030 which will be masculine compare to US or Canada. It is clearly illustrated from the Figure 4.11 that after growing at fast rate the per capita $CO_2$ in developing countries will remain below. It is very well known fact that higher per capita energy consumption is explicit indicator of higher development. Therefore, developing countries don't let go their sovereign right to choose of increasing their per capita energy consumption. Similarly, they also don't wish to give up the right of choosing options of energy source. In climate regime, it is inevitable to embrace lower carbon based development path which demands lower use of fossil fuel for energy production. Shifting the economy on lower carbon consumption requires drastic investment of capital and technology. This factor brings the issue of financial and technological support from developed countries to developed countries. Thus, the whole cooperation and constrain in climate regime revolves around these factors.

## **4.6** Rationales against CBDR in the climate regime

Developed countries led by United States have been strongly in opposition of unfair advantage of CBDR in contrast of unfair advantage to developing countries.US has made the argument several times in climate change debate that the principle of CBDR would be used as a shield to avoid any responsibility in curbing of GHG emission by developing countries.US pointed out that developing countries would get unfair economic advantage if they kept out of the same binding emission restrictions as a Annex I parties. This unfairness would create unfavorable economic scenario of Trade disadvantages, increased energy and consumer costs and manifest itself through shifting of industries, and jobs to developing countries.US also pointed out that without meaningful participation of developing countries, especially China and India, would not produce any effective treaty to combat climate change.[31]

At the time of Kyoto Protocol (KP) this US policy stand point officially recognized as Byrd-Hagel Resolution introduced in the Senate on 6th of December 1997and passed subsequently with unanimously (95-0). The Byrd-Hagel Resolution do not allow the US to accept any obligation or responsibility by signing or ratifying any legal agreement regarding the UNFCCC that "would (1) commits to reduce or limits GHG for Annex-I nations unless the protocol or other instrument also mandates such specific commitments for developing country parties within same compliance period and (2) Result in serious harm to the US economy"[32]Thus, The Byrd-Hagel Resolution decided the official Policy position of the US on climate regime. It also serves the overarching parameters to judge or examine any new treaty in contrast of US interests.

It is also argued that inclusion of CBDR in UNFCCC and KP is unfair to developed countries as they exempt 77% of all countries from any responsibilities. Large developing countries like China, Mexico, India and Brazil are completely left free to emit to any extent. Thus, as they are not bound to any mitigation commitments, they can produce cheaper products of same quality due to lower

manufacturing cost. Further, low grade safety measures and environmental standards along with cheap labor provide huge benefits to keep the production cost at lower side. Thus, the developed countries are falling back from business competitiveness due to higher production cost. Hence developing countries with the free hand of unrestricted emission could send the developed economies into deep freeze.[33]

Another argument is placed into climate change regime regarding CBDR that any emission reduction from developed countries would be offset by increasing emission of developing countries and ultimately this would lead to failure in efforts to reduce green house gases. The climate change regime have no proper and sufficient instrumental arrangement to distinguish among developing countries. The Regime does not make any difference between China and Botswana in terms of mitigation obligations to curb GHG emission.[34] This argument certainly keeps legitimacy to some extents so special consideration to these LDCs has been given in the UNFCCC and in Kyoto Protocol in terms of adaptation and capacity building.

Another argument to undermine the CBDR-RC and associate differentiation is based on the lack of knowledge. Developed countries argued several times that they were not aware of climate change. It was an historical accident and in absence of scientific knowledge they accidently emitted excessive GHGs without knowing that this would cause severe damage to the environment. Therefore, they should not be punished for their historical act in light of recent scientific knowledge. Although, this argument seems to be holding some validity but it is quite weak argument as it was became clear in 1860 that greenhouse gases could impact the climate of the earth. In fact after firm establishment of climate science, developed countries have not taken any substantial efforts to curb their GHGs emission. Even today, developed countries, especially, the US is not ready to take that much responsibility of mitigation to the degree it has been responsible in environmental degradation. The US is alone responsible for the largest portion of atmospheric carbon stock, but it is not taking that much responsibility.

## **4.7** Analysis of CBDR in the Climate Change Regime

The principle of CBDR echoes as a normative principle in international agreements. Despite the fact that CBDR has not been standardized in definite words by any agreement, it is widely and frequently used in different regimes to indicate the highly ethical concepts of justice, equity and fairness, especially, where national interests are in conflicting positions. In fact, the principle of CBDR is induced in different agreements to compile different national interests in balancing manner. In climate change regime, different national interests either expressed by individual country or their respective groups are articulated around the principle of CBDR. A number of provisions have been incorporated in climate change regime to ensure maximization of cooperation and minimization of constrains.

Analysis of these provisions can reveal how the different conflicting interests of developed and developing countries have been incorporated in the UNFCCC and applied in subsequent Kyoto Protocol. In international climate change politics the notion of justice has been claimed as compliance with the principle of CBDR-RC. The CBDR-RC principle has been developed over the time as a response or an answer to the voice of developing countries for fairer negotiations procedures and rules in international environmental cooperation[35]

The analysis of CBDR in the climate regime is done under Provisions that differentiate between developed and developing countries in context of Central obligations (Emission reduction targets). However it is pertinent to mention here that the applicability of CBDR and according differentiation can also been pointed from other provisions of implementation and financial and technological assistance enshrined in the UNFCCC and associated Kyoto Protocol. As this thesis is concerned only with mitigation, therefore other provisions are not analyzed.

The central obligations are those obligations, which are compulsive in nature and must be executed to fulfill the objectives and purposes of the treaty

(UNFCCC).The ultimate objective of the UNFCCC is stabilize GHG concentration in the atmosphere at a level that would prevent dangerous anthropogenic interference with climate system[36] This objective of the UNFCCC is to be achieved through mitigation of emission. The UNFCCC clearly assigned the responsibility of mitigation efforts to developed countries by underscoring the importance of CBDR. It is also required by the UNFCCC that developed countries have to convey detail information about the efforts they would adopt to mitigate climate change. The UNFCCC described that objective of such efforts is to return at 1990 level of anthropogenic emission of $CO_2$ and other GHGs, which are not controlled by Montreal treaty.[37]

The manifestation of The CBDR principal is evident from the division of countries into three groups (Annex) on the basis of their level of economic development and respective capacity to deal with climate change, as follows-

**Annex I parties:** This annex includes mainly industrialized nations that were members of the OECD, nations, whose economy were under transition, Russian Federation(EITs), the Baltic states and several Eastern central European states.

**Annex II parties:** This annex includes all Annex I OECD parties but it excludes EITs. Countries listed under Annex II are required to provide financial and technological support to developing and EIT countries to undertake mitigation and adaptation measures to tackle climate change.

**Non Annex Parties:** All remaining parties (mostly developing countries) to the UNFCCC invariably fall into this category. Apart from these formal categories UNFCCC also recognized certain groups which are most vulnerable to adverse impacts of climate change, for instance Low-lying coastal countries SIDS and LDCs, which includes 49 countries.

Kyoto protocol is the result of practical application of the CBDR principle. Under Kyoto Protocol, the primary responsibility to undertake mitigation efforts is assigned exclusively to developed countries. Article 3 of the KP clearly required that developed countries, weather in individual or joint capacity, should not surpass their granted amount (allowable level of emission) of aggregate anthropogenic $CO_2$ equivalent emission( listed in Annex A of KP) of certain GHGs( 6 gases).[38]

The general target was set to 5 % below of 1990 level of GHG for the commitment period 2008-2012.Although individual targets assigned to Annex I countries were not equal ,they vary from -7% for the US to -8% for the European Union. On the other hand, some ANNEX I countries were allowed to increase their GHG emission- such as Portugal (27%). Similar to UNFCCC, an obligatory language was used in the KP by introducing the phrase "parties shall" in article 3.1 and 3.2 of the Protocol.

The UNFCCC and Kyoto Protocol both excluded developing countries from the obligations and commitments. Thus, this exclusion of developing countries was a clear demonstration of differentiated treatment, as the principle of CBDR required. Further article 3(9) of Kyoto Protocol made provision for developed countries to extent commitment in subsequent period.

The Kyoto Protocol established mechanism for realizing the commitment of Annex I countries. It required that Annex I countries to establish national system for the accounting of anthropogenic emission by source and removal by sinks of GHG.[39] The protocol also required Annex I countries to communicate such data of inventories to ensure compliance with their mitigation commitments.[40] This inventories related data would then be reviewed by an expert review team, in context of emission reduction targets assigned to Annex I countries. The Kyoto Protocol facilitated Annex I countries to subtract or add from their assigned amount, by trading 'Kyoto Units' with other parties. The Kyoto Protocol itself introduced three mechanisms to realized mitigation targets.

- **Emission Trading (Article-17):** In accordance of Article 17 of the Kyoto protocol, Annex I parties were allowed to acquire or transfer Kyoto units to another Annex I parties. Emission trading did not affect the assigned total amount of Annex I parties, it only re distribute the assigned amount to Annex I parties among themselves.
- **Joint Implementation (Article-6):** This mechanism allowed Annex I parties to invest in a project that reduces emission in another Annex I party and receive Emission Reduction credits (ERU) for the emission reduction or removal achieved by that project. Joint implementation did not affect the total assigned amount to Annex I partiers collectively but provided facility to redistribute the assigned amount among themselves.
- **Clean Development Mechanism (Article-12):** This was the only mechanism which included developing countries. The CDM allowed Annex I party to invest in the project, which reduces emission, in developing countries and gets certified emission reduction (CER) credits, each equivalent to one tone of $CO_2$. This mechanism addressed the need of sustainable development in developing countries and provided facility to developed countries in achieving their reduction targets.

The Clean development mechanism is a very important tool in achieving ultimate objective of the UNFCCC. The CDM was a result of Brazilian proposal for Clean Development Fund, submitted on 28$^{th}$ of May 1997 to the Ad Hoc Group on the Berlin Mandate (AGBM) in its 7$^{th}$ session. Brazil proposed a clause of financial penalty of 3.33US$ for each effective emission unit on Annex I countries if they failed to achieve compliance target of emission reduction. Brazilian proposal, further proposed to channelize this fund to Non Annex countries to address climate change.[41]The Brazilian Proposal emerged as Clean Development mechanism under Kyoto Protocol, which involved developing countries in the mitigation efforts of emission reduction and also provides some flexibility to Annex I countries in meeting their compliance emission reduction targets.

Article 12(2) of the Kyoto Protocol clearly defines the underlying logic for CDM. It states that CDM is assist Non Annex parties in achieving sustainable development and emission reduction(which otherwise, would have been increased in absence of assistance from developed countries).Similarly, CDM assists Annex I parties to fulfill the requirement of compliance with their quantified emission limitation and reduction objective (QELRO) commitment under Article- 3 of Kyoto Protocol. Thus, CDM enables both the parties to achieve their differentiated responsibility.[42]

It is clearly evident from the above discussion that fairness to all parties of the UNFCCC and Kyoto Protocol was addressed via the concept of historical responsibility. The 5% reduction in emission below 1990 level was the common responsibility of all parties, but it was based on their respective capability, individual country had different commitments.

All three mechanism of Kyoto protocol allowed developed nations to take on responsibilities based on their capabilities higher than developing countries. Another area where Kyoto Protocol employed CBDR was in providing financial assistance to developing countries. Kyoto Protocol established differentiated "general obligations" on developed countries to assist developing countries in mitigation and adaptation through "Global Environment Fund" and "Adaptation fund".

Differential treatment in context of implementation of the treaty can be deduced from the preamble of the UNFCCC. The preamble of the UNFCCC clearly acknowledged historical and current GHG emission that has been mainly originated in developed world. (Box4.2, Para 3). It further emphasized that climate change is a global problem, requires global participation from all states according to their individual circumstances and capabilities. (Box4.2, para 6)

The principle of CBDR is regarded as a compromise formula between developed and developing countries. The inclusion of CBDR-RC in the UNFCCC

was a significant move to reflect the main 'responsibility principle', which determines that climate change is primarily caused by the luxurious lifestyle of developed countries; hence they are primarily responsible for mitigation efforts.

It is very clear from the preamble of the UNFCCC that developing countries are kept aside in context of mitigation responsibility. The preamble of The UNFCCC upholds the 'per capita' norms and affirms that emission of developing states is comparatively masculine (on per capita basis) and expected to grow to fulfill their socio-economic and development objectives.

During the UNFCCC negotiations, Indian proposal argued the notion of per capita which is based on the assumption that GHGs emissions of developed and developing countries should converge at common per capita level. The UNFCCC acknowledged that emission from developing countries has to grow and decrease in developed countries, at a point (on the basis of per capita indicator) convergence of GHG would arise and then all countries contract their emission to keep the world under threshold limit of 2°C temperatures.

## **4.8** Positions of Groups/Countries and CBDR-RC

### **4.8.1** The AOSIS

The group of small island developing states and low-lying coastal countries organized themselves as "Association of Small island States", in 1990. This group is highly heterogeneous and some states in this group are also member of some other groups like G-77 and the LDC. It has 44 members as of now. It is well recognized distinct group in the UNFCCC and consists of the states located across Caribbean, Pacific, the Atlantic, South China Sea and Indian Ocean. During the 'Earth Summit' in 1992, these small island developing states were considered as a special case for their development and environmental needs in context of 'Agenda 21' of the Summit.

Despite of their heterogeneous nature, these states share some common characteristics as small size of population, small economies, dependency on fossil fuels, import oriented economies heavily concentrated in low-lying coastal areas. These common characteristics along with their socio-economic conditions make them disproprotiately and equally vulnerable to the adverse effects of climate change. The SIDS has a total population of around 65 million and they contribute less than 1 % to the total global GHG emission. Disproprotiately they have to suffer first due to the rise in sea level and even some of them may become inhabitable and even disappear from the global map.[43]

Individually, these micro countries were powerless and to some extent speechless in climate regime. Hence, they formed an Ad-Hoc negotiating alliance 'AOSIS' to speak in one voice and amplify their voices to be taken seriously in global climate negotiations. This alliance of SIDS works with consultation and coordination and does not own any formal charter, budget or secretariat. Despite this anomalous structure of working, these micro and relatively powerless developing countries have managed to play a pivotal role in shaping of the global climate policy. This is evident from the fact that AOSIS has been granted a special seat on the Bureau of the negotiation in the INC as well as in the CoP and a number of UNFCCC provisions considered SIDS particularly vulnerable and treated accordingly with special relaxation in terms of commitments and assistance.

The issue of tackling climate change and its impacts is deeply coupled with survival and existence of these SIDS countries. The social, economical and geographical background of the AOSIS countries explicitly signals their stance and positions in global climate regime. The AOSIS has been continuously insisting to the international community for deeper emission cuts and mobilize grater financial and technological resources from developed countries for adaptation to the climate change.

The climate policy of the AOSIS can be sense from the 'AOSIS view on the shared Vision' presented by Philip Weech on behalf of the AOSIS. Important features of the 'AOSIS view' are summarized as below.[44]

- Survival and avoidance of catastrophic impacts in SIDS is a critical principle which be supported by all nation;
- Ambitious, measurable and concrete emission reduction targets for medium and long term;
- Protection of most vulnerable;
- The principles of the convention should be followed;
- Common but Differentiate responsibility and respective capability;
- Polluter Pays Principle;
- Precautionary Principle;
- State responsibility to not cause damage beyond National jurisdiction;
- Inter Generational Equity.

Through this vision document AOSIS demanded deeper emission cuts to be peaked in 2015 and reduce thereafter, well below 350 ppm $CO_2$ eq. to keep the rise of average global temperature under 1.5°C. The AOSIS emphasized that 85 % of GHGs reduction from 1990 level must be achieved by 2050 through collective actions from both developed and developing countries. Developing countries would need to significant deviation from base line over comparable time period.

The AOSIS has clearly recognized the historical responsibility of developed nation and urged them to take lead in combating climate change and over the course developing countries should join them. The AOSIS further demanded that mitigation actions by developing countries must be in line with their national circumstances and in accordance of "Common but Differentiated responsibility and Respective capability.

During negotiations around Kyoto Protocol (KP), the AOSIS supported proposals that would include developing countries to accept voluntary mitigation goals, however, denied due to strong opposition of large developing countries.[45] In 2009 at Copenhagen Summit, the AOSIS advocated the proposal of National Mitigation Action (NAMs) for all countries according to their common but differentiated responsibilities and respective capabilities. The AOSIS argued in favor of setting a threshold limit of 1.5°C to save their existence. They called upon all countries to reduce GHG emission 45% below that of 1990 levels.

In 2011 at Durban, AOSIS strongly demanded for legally binding agreement, but equally opposed by China and India. In 2012 at Doha Conference, AOSIS strongly called upon developed countries to ratify 'Doha Amendments 'which were related to the second commitment period(2013-2020) under Kyoto Protocol. After the Doha Conference, AOSIS has been continuously urging to ensure that developed countries should undertake mitigation responsibilities under KP II. As of now only 64 countries has ratified KPII which covers merely less than 15 % of Annex I GHG emission, therefore enforcement of KP II seems to be difficult.

Above stated summary shows that AOSIS position in climate regime is two faced. Principally they are in line with G-77 and China regarding equity and "Common but differentiated responsibilities" as central notion of the UNFCCC. On the issue of adaptation, they share same concerns with G-77 and China and accordingly demanded transparent mechanism of financial funding and technology transfer.

Paradoxically, on the issue of mitigation, they seem to stand with developed countries. The AOSIS has been continuously pressing international community to take ambitious GHG reduction targets to keep the rise of global average temperature within 1.5°C range. As these AOSIS countries have negligible contribution to the aggregate global GHG emission, they are continuously in favor of legally binding agreement; however they advocated the inclusion of CBDR-RC in any such

agreement to differentiate mitigation responsibilities according to the national circumstances.

Ahead of the Paris Conference in 2015, Ahmed Sareer, Maldives Ambassador chairing the AOSIS said, " these are countries, which are on the front lines of climate change impacts, so we have always been advocating for a deal… that could give the island nation a sense of security." Sareer further said, "It has to be a legally binding, strong agreement. Unless it is legally binding, it doesn't make any sense."[46]

### **4.8.2** G-77 and China

China has always been awarded with an honor of key player in global politics of climate change. Being a highest populous country and largest emitter of GHG, it has a profound effect on shaping of international climate policy. China's GHG emission configuration is unique. It is a combination of features which resemble to both, developing countries (in terms of per capita) and developed countries (in terms of absolute emission).

China has made tremendous economic growth from 1990 to 2013 by adopting open market policy and attracted huge foreign investment capital to fund its infrastructure and manufacturing industries. To meet the increasing demand of energy, china has been relied on cheap and abundantly available coal to fire its power plants, which in turn converted Chinese economy into a 'carbon economy.' Thus, environmental deterioration in China, especially in urban area is largely attributed to carbon based developmental model. According to the 'International Energy Outlook 2017', china is holding top position in the list of world's largest coal consumer. In 2015, nearly 72% of total installed power capacity was generated by coal fired power plants. It is estimated by the IEA that China's coal consumption peaks by 2018-2019 and thereafter a steady decrease in coal consumption is expected. By 2040, steady decrease could lead the coal power share nearly 50 % of total power matrix.

As par the data inserted in table 4.3 it is clear that China is largest GHG emitter of the world but on per capita basis it is below of developed nations. China's interests clearly bind it with developing nations to secure development right and to avoid any mitigation commitment.

**Table 4.3: WRI analysis of GHG data for 2012(Based on CCI)**

| Country | % contribution to total emission | Ton of emission per capita |
|---|---|---|
| China | 25.26 | 8.13 |
| US | 14.4 | 19.86 |
| EU | 10.16 | 8.77 |
| India | 6.96 | 2.44 |
| Russia | 5.36 | 16.22 |
| Japan | 3.11 | 10.54 |

Source: World Resource Institute

In 1972,China's entry into the realm of climate change came at the UN Conference on Human Environment in Stockholm, although the Chinese delegation was portrayed disruptive and unconstructive(Bojarkum2005,9).[47]Indeed, during the early years of the People's Republic of China, environmental protection did not feature as an issue for public policy. In Mao's view, nature was something to be conquered by humans (Shapiro 2001).[48]

At the beginning of the economic reform and opening-up period, development was preferred, above environmental protection and was placed "at the bottom of priorities" Until 1990, China took the issue of climate change as a mainly scientific rather than economic, social , or political issue. Later on the State Development and Reform Commission was given lead responsibility for Chinese climate change policy as a part of bureaucratic restructuring in 1998.[49]

Initially, in the beginning of climate regime, China's took the same policy stance as other developing nations like India Brazil South Africa and other G-77 nations were taking on the issues related to the climate change. Since the beginning of climate change era, the principle of CBDR-RC has been a central and common

negotiating stance of almost all developing nations of G-77 group and China. China has been very consistent with its assumptions that developed countries are responsible for historical GHG emission and environmental degradation; hence they have to take lead in mitigation efforts and should provide necessary financial and technological assistance to developing countries to boost required capacity to cope with climate change.

In 1990, china and G-77 allied themselves on the basis of commonly accepted notions of equity, right of development, polluter pays principles. This allied group of China and G-77 became the voice for climate justice during the UNFCCC and subsequent climate negotiations and advocated differentiated responsibilities for developed and developing countries. However they opposed any such differentiation among developing countries on the basis of different development levels.[50] As this was in national interest of China and tuned successfully with other emerging developing economies.

China signed the UNFCCC in 1994 and actively participated in negotiation process for the establishment of Kyoto Protocol. During the negotiation process from CoP 1, Berlin to CoP 3 Kyoto, china and G-77 had utilized every opportunity to insist the inclusion of CBDR-RC as core principle of negotiations and in any potential agreement. This was turned successful for the G-77 and China as the KP did not impose any mitigation commitments (voluntary or compulsory) on developing countries. China particularly opposed any voluntary commitment for developing countries as China feared that any such differentiation among developing countries would create a new category apart from the categories mentioned in the UNFCC and ultimately would destroy the solidarity of G-77.[51]

Since the beginning of Climate change era, China shared common position with G-77 and its other developing members especially, India, Brazil and South Africa. The G-77 is a heterogeneous group formed in 1964 to unite developing nations. It is a loosely allied and mostly dominated by China and India. It has been

argued on several occasions that these big emerging emitters take the shed of G-77 to avoid any mitigation commitments.

Since the CoP 10, Buenos Arise, China inclined toward less aggressive and cooperative position, in comparison of India, in climate negotiations. China moved apart from its traditional 'no commitment' position to 'minimum commitment 'position in 2007. At COP 3 Bali, China's pro-activeness was evidenced by its unprecedented involvement in the formulation of the Bali Road Map.[52]

In 2009, at CoP 15 Copenhagen Summit, Chinese president Hu Jintao pledged a 40-45 % cut on its Co2 emission per unit of GDP on its 2005 level by 2020, however, developed countries questioned the real contribution of Chinese pledge in terms of absolute cut. This simply implied that China was producing excess emission to per unit of economic output and Chinese pledge was, in real term, merely an indication of improving efficiency not reducing $CO_2$ emission in absolute term.

Tseng argued by citing Kent A.(2007) that there were some materialistic, social and internal reasons behind the policy shift of China. He argued that China ratified KP in 2002 only after confirmed increase of GEF funding and China's eligibility for CDM was assured.[53] Tseng further argued that Chain's policy shift was attributed to its ambition of enhancing or improving reputation and image as a world super power.

After ratification of KP, China's economic and GHG emissions were continuously surged year by year. This surge of GHG output brought China under immense pressure from developed countries. The Beijing Olympic Games also made China under the world's attention for poor environmental quality and its lackluster response in dealing with environmental issues.[54]

In 2013 at Bonn, during the meeting of Conference of parties, China announced several GHG reduction targets in terms of carbon intensity to GDP and

targets for the use of renewable energy. China's policy shift can be marked with the historical climate deal between China and the US. World's two big GHG emitters China and the US surprisingly stood together in November 2014 and announced a historical bilateral climate deal.

In a joint statement, the US president Barack Obama and his counterpart Xi Jinping announced that the US agreed to reduce its GHG emission by 26 % to 28 % below its 2005 level in 2025 and China agreed to achieve the peak of $CO_2$ emission by 2030.China further expressed its intention to increase the contribution of non-fossil fuels in its energy matrix, around 20% by the year 2030.[55]

The US- China bilateral deal on climate change does not indicate that China has completely reverted from its traditional stance of 'no commitment' but certainly, some degree of flexibility is visible in its traditional stance towards climate change. It is evident from the Joint Statement that despite the announcement of ambitious renewable energy targets, China did not make any quantitative reduction commitment. Again, the joint Statement reaffirmed the principal of CBDR-RC by stating "…they are committed to reaching an ambitious 2015 agreement that reflects the principle of common but differentiated responsibilities and respective capabilities, in light of different national circumstances."[56]

In fact China is approaching at peak of GHG emission, its energy security concerns and domestic urban pollution also played an important role in compelling China for this deal. This deal between the US and China will certainly put pressure on India not to be a deal breaker in climate agreement. China is great aspirant of world's super power image. It is equally true that China's economic power can't be undermined by the world. It is the golden opportunity for China to fill the leadership void in climate change regime in context of the US withdrawal from Paris agreement. In fact, China announced it's that it will remain stood firm with Paris Agreement and fulfill its entire obligations offered in its INDCs submitted to the UNFCCC.

## **4.8.3** European Union (EU)

The European Union is a union of European countries to strengthen their common Economical, Political and social agenda at international level. It is an Economical-political formal and legal alliance of 28 countries. The EU is the result of historical evolution. In 1950, six founding states namely Germany, Italy, Belgium, France, Luxembourg and the Netherlands were allied to support their coal and steel industries. They formed 'European Coal and Steel Community' (ECSC) to enhance economical and political cooperation. In 1957 at Rome, 'European Economic Community' (EEC) was created as a regional organization to promote economical integration among its member states. It had been referred as European Community until Maastricht Treaty on EU held in 1993.[57]

Maastricht Treaty was signed by European Community on 7th of February 1992 and entered into force on 1November 1993.The Maastricht Treated created three Pillar structure for formal European Union.[58]

- The European Communities: It was responsible for dealing in Economic, Social and Environmental issues and comprised the European Community(EC), European Coal and steel Community(ECSC) and European Atomic Energy Community(EURATOM)
- The Common Foreign and Security Policy (CFSP): It was created to deal with military and security issues.
- Police and Judicial Co- operation in Criminal Matters (PJCCM): It was established to enhance cooperation against crime.( originally named as Justice and Home Affairs).

In 2004, EU was expanded with the accession of 8 central and Eastern European countries, which were part of former Soviet Communist bloc. Finally, the 'Treaty of Lisbon' which entered into force on 1 December 2009, amended previous two treaties to form the constitutional basis of European Union. Currently, EU

operates with 7 institutions namely European Council, the Council of European Union, European Parliament, European Commission, European Central Bank, European Court of Auditors, and The Court of Justice of the European Union.

In the EU, the issue of climate change was emerged as a political issue in the second half of 1980.In 1957, the Rome Treaty, which established ECSC, did not recognized ant environment concerns. It was 1972, when EC adopted the requirement of a common environmental policy within EU.

The EU has been very sensitive toward the environmental protection and playing very crucial role in shaping of climate regime. In context of multilateral international negotiations, EU's legal status as a state was came under the dispute during the negotiations for 'Vienna Convention for Ozone Protection' in 1982. In order to increase competence, EU demanded that it should be allowed to ratify Vienna Convention as a single state actor. Many countries were skeptical about the distribution of obligations among EU member states, they were raised the question that weather European community as a whole or member states, individually, would be responsible for commitments made to Vienna Convention. After high level political meeting between the US and the EU, the EU permitted to sign the convention on behalf of EU's member states. [59]

During the negotiation process for Montreal Protocol, the EU had played a pivotal role in shaping and designing of the structure of the Protocol. With the significant contribution to the protocol, the EU secured its 'community' reorganization and managed to ensure that Protocol was signed by the EU as an individual and separate entity apart from its member states.

### **4.8.3.1** The EU's status in the UNFCCC

The UNFCCC allows its membership to Regional Economic Integration Organizations (REIOs).The EU was constituted as a Regional Economic

Organizations; therefore, the UNFCCC accepted the EU's membership like other national states' membership.

Article 22(2) of the UNFCCC states, "any regional economic integration organization which becomes a party to the convention without any of its member states being a party shall be bound by all the obligations under the convention."[60] Further, Article 22(2) states that if a regional economic integration organization and its members join the convention, "…the organization and its member States shall decide on their respective responsibilities for the performance of their obligations under the Convention".[61] The Article 22(2) mentions, "… the organization and its member states shall decide on their respective responsibilities for the performance of their obligations under the convention." [62]

The EU and its 12 states members signed the UNFCCC concurrently, therefore, according to the Article 22(2) of the UNFCCC, they have shared obligation under the convention and their membership is considered as a 'shared membership.' The Article 18(2) of the UNFCCC mentions that REIOs would be given numbers of votes equal to the number of their member states are parties to the convention. It is further clarified by Article 18(2) that "Such an organization shall not exercise its right to vote if any of its member States exercises its right, and vice versa." [63]

### **4.8.3.2** EU's Role and Position in Climate Change Regime

The EU is a heterogeneous group of states in term of per capita GHG emission, but historically as a group the EU is biggest GHG emitter. The EU contributed 10 % to the world GHG stock in 2014.The GHG emission trend in the EU is continuously in downward sloping channel. In 2013 it was 19.8 % below compared to 1990 level.[64]

Initially, the issue of climate change was framed on normative basis in different state members of the EU, but that was not backed by necessary actions. In 1986, European Parliament underscored the necessity of a common climate change

policy. In the realm of climate change regime, some European policy makers recognized the vacuum of leadership role, and presented this vacuum as an opportunity for the EU to grab leadership role to enhance its influence at international level. In 1990, at Dublin, the European Council confirmed this opportunity by stating that European Community and its member states have enormous opportunity to provide leadership in combating of global environmental issues.[65]

Despite of the intention of playing a leadership role in climate regime, the EU failed to make consensus among its member states regarding community level domestic climate policy. This failure was explicitly reflected from the limited role, the EU played during the UNFCCC negotiations.

In March 1997, prior to the CoP3 at Kyoto, European Council made significant achievement in terms of an agreement on internal 'Burden Sharing' formula. During the negotiations of KP, the EU proactively participated in the negotiations successfully played a profound and pivotal role. In the course of final KP negotiations, the EU was forced to make several compromises on the key issues with the US. Ultimately, the EU succeeded in binding the industrialized countries under the KP with quantified emission limitation or reduction targets.

In 2001, the newly elected US president George W. Bush announced that he would not submit the KP to the congress for ratification as the Protocol excluded the large developing countries from mitigation commitments. The withdrawal of world's largest emitter, contributing 36% to global stock of GHG, posed the risk for the implementation of the KP. The EU played a remarkable role to ensure the enforcement of the KP. In absence of the US, the EU managed to obtain inevitable Russian ratification for the KP by dropping its accession into the WTO. After enforcement of the KP, the EU established Emission Trading System to derive some materialistic gain.

The EU's leadership role in climate change regime was clearly visible from the efforts it invested, to ensure the enforcement of the Kyoto Protocol. But, afterward, EU's leadership role began to flaw due to its inability or unwillingness to respond effectively to global sovereign debt crisis and Iraq war. Further, the EU's leadership ability was questioned in context of divisive interests of member states on the common climate policy. The divisiveness of the member states was clearly surfaced during the financial crisis that emerged in 2008.[66]

In 2009, the EU's leadership and activeness tanked to the bottom in Copenhagen Summit. During final negotiation rounds, the EU was represented by commission's president Barroso, however on 18 December 2009, during the informal discussion with selected group of 25 parties, Barroso's role was undermined and took over by the leaders of the UK, France and Germany.[67]

Generally, the EU's position in climate change negotiations entirely guided by the EU negotiation mandate, which is always a product of deliberate preparations before formal CoP negotiations. However, in COP 15, at the level of state heads meeting, EU's representative authority was clearly diminished and took over by its member states, especially the UK, Germany and France.[68]

Groean and Niemann[69] have analyzed the 4 potential causes for EU's undermined performance during the COP 15 negotiations as given below-

1. **Issue of CO2 reduction goal of 30% below the 1990 level by 2020:** The EU council had decided in 2007 the goal of 30 % $CO_2$ reduction from that of 1990 level, provided, if other developed countries commit themselves to similar comparable emission reduction targets and developing countries commit themselves appropriately according to their responsibilities and respective capabilities. Poland and Estonia were explicitly against any such binding reduction targets because of their huge dependency on coal for energy production. This reduction target was mostly tabled in every

European Council meeting afterward but the consensus remained decisive as Italy and Poland particularly, with quite support of Eastern European states, opposed the 30 % conditional reduction target. While the UK and Germany defended the 30 % target. Again, the mandate failed to specify the exact conditions to be fulfilled by other countries. In absence of prior consensus, the EU was left directionless during the COP 15 negotiations.

2. **Issue of LULUCF accounting:** The Environment Council of Ministers was failed to reach any concrete agreement on LULUCF accounting rules for forestry in developed nations. Austria and Finland were opposed the inclusion of LULUCF in order to protect their large timber Industries.
3. **Issue of AAUs:** On 1 of March 2004, 8 Eastern European countries were given accession into the EU. These nations had been members of former Soviet Bloc, came in with large unused surplus Assigned Amount Units (AAUs) which had been allotted by Kyoto Protocol. These nations were gathered with the consensus and demanded full transfer of the surplus AAUs to the post 2012 framework. This demand was opposed by Denmark, the Netherlands and the UK due to the potential incompetency of AAUs in emission reduction in the post 2012 Climate regime.
4. **Disagreement over Financial Contribution:** The EU member states had not been agreed on the quantified financial contribution proposed for developing countries till the last moment of COP 15 negotiations. The Eastern European member states were not willing to make any quantified financial contribution to developing countries due to debt crisis. While, progressive states like the UK, Sweden, Germany, France and the Netherlands were eager to make remarkable financial contribution to secure leadership image of the EU.

It is clear from above summary that the EU's undermined leadership role was mostly attributed to disagreement over a number of issues within the EU member states. Due to the low degree cohesion; the EU was directionless during the Cop 15

negotiations, especially on those issues, where the EU mandate itself was not clear. Therefore, the EU was failed to uphold its leadership role during the COP 15 at Copenhagen. The final text of the Copenhagen Accord was resulted after a closed negotiation between the US and BASIC countries in back room just before the closing plenary of the Summit. The undermined position of the EU is explicitly evidenced by the fact that EU had been left out of this closed meeting.

After a marginalized role in Copenhagen, in COP 17 at Durban, the EU succeeded to regain its leadership position to some extent. The 'Durban platform for Enhanced Action' was launched to negotiate post 2020 treaty to include all large GHG emitter. This was in line with the EU's demand. In Durban under the Polish EU presidency, the EU allied with African, AOSIS and LDC group and called for a legally binding treaty which would be applicable to all parties by 2015.

Ahead of the Lima Conference, in European Summit in October 2014, EU states agreed to reduce GHG emission by at least 40 % with reference to 1990 level by the year 2030.The EU further proposed to reduce global emission by at least 60% below of the level of 2010 by 2015.The EU leaders further agreed to pledge half of the initial capital of US$10 billion to GCF.[70]

However, EU's pledge has been criticized by European Environmental Agency (EEA) by arguing that EU's GHG emission in 2013 was already 19% below of that 1990 level, therefore 40% reduction target is not an ambitious target. Again the EU's pledge has been lacking on transparency and clarity as it does not speak about accounting procedures for LULUCF.

During the ADP discussion, EU has been consistently demanded the need of broader interpretation of the CBDR principle to include larger developing countries under mitigation commitments. In its Submission to the ADP, the EU suggested stepwise approach to engage all parties in post 2020 treaty. The EU proposed that

mitigation targets should be based on economy and accordingly expressed in term of absolute emission.[71]

The EU made the reference to the CBDR principle in its submission but with different perspective. Its submission indicates that responsibilities would be according to the size of economy, however, the EU attempted to make balance by adding phrase 'according to national circumstances.' Furthermore, the notion of 'per capita emission' has been completely avoided for the estimation of responsibilities. It is also clear from the EU's submission that it had attempted to distinguish developing countries on the basis of their economies.

### **4.8.4** India

India is a second largest populous (1.2 billion) country in the world. Poverty eradication is top priority for the India and economical development is a key to achieve this goal. India needs energy for its development and that should also be cheaply available due to the lower purchasing capacity of Indians. India's energy matrix is mainly dominated by the coal as a primary source for energy production; around 58 % of total energy production is coming from coal based plants. India's is exceeded 10 % in global coal consumption in 2015.In 2015, largest increase in global Co2 emission from energy use came from India (5.3%).[72]

India needs electricity to sustain its economic growth and hence Indian governments has been prioritizing ram up of energy production to meet the energy demand of the country. It is estimated that around 400 million people have zero access to electricity in India. India has ambitious plan to provide electricity to each house by 2022 and in line to achieve this goal India's power production grew at the rate of 9.4% in between 2005 to2012, while coal production grew by 4.7% in the same period. To meet this shortfall, India set a coal target of 1.5 billion per year by 2020.[73]

According to the Coal India data for the 2014, India has approximately 301.56 billion of coal reserves. It indicates that coal will remain main source of energy production in India and its emission will surge accordingly. Currently, India is ranked fourth in the world in absolute term, contributing around 6% to the global GHG stock of the world. Despite India's high emission, it is far below (1/4 of the US) of developed nations in per capita emission.

India is a great believer in the notion that every individual has equal right to the atmosphere; practically, it means that every individual has equal right of emission in equal quantity. Developed countries have already used their fair share and now developing countries have equal right to use their fair share to achieve economic development. India's policy stance is based on such notions which are integrated into the principle of CBDR. Thus, India's policy stance in global climate change regime is based on the CBDR principle. India has long been promoting the 'Carbon Space' notion and insisting that developed countries should reduce their GHG emission to vacate this Carbon space to meet the developmental needs of developing countries.

India has clear interpretation of the CBDR principle; differentiation should be done according to the per capita emission in context of mitigation responsibilities. India acknowledged the historical responsibility of developed countries in environmental degradation and accordingly in favor of greater responsibility of developed nations in combating climate change. India shares the same vision with China and G-77 that developed countries should take lead in combating climate change and provide necessary financial and technological assistance for adaptation.

India's climate policy is explicitly committed to the CBDR principle and mainly focused to ensure maximum carbon Space for its development needs. In line with the objective of economic growth, India has not been accepted any legally binding emission reduction targets. India is always presented the CBDR principle as a necessary pre condition to achieve climate justice for developing countries and continuously resisting any binding commitments for developing countries.

In 2009, at Copenhagen, India was portrayed as a deal breaker country with China, as these two big developing emitter denied to accept any timeline to peak their GHG emissions. However, due to the immense pressure from developed nations, in 2008, India had released its 'National Action Plan on Climate Change' and in 2009 proposed voluntary reduction of GHG in term of Carbon Intensity by 20-25% below its 2005 levels by the year 2020.

During the period of 2009 to 2011, India tilted towards more flexible attitude under the direction of Mr. Jairam Ramesh Minister of Environment and Forestry. He was more aliened with the US and tried to shift away from India's long standing traditional stance of 'No Commitments' to more proactive and contributory stance. In the opinion article, Chandrasekhar Dasgupta highlighted Jairam Ramesh's attempt to shift India's traditional position, he wrote, "At Cancun Conference Ramesh declared, "All countries, we believe, must take on binding commitments under appropriate legal forms'. This implied that India was ready to convert its voluntary national targets into international binding commitments in an appropriate legal form".[74] However, Jairam Ramesh was highly criticized at domestic level.

At Durban, during the COP 17, India demanded that any new post 2020 agreement should be based on equity and founded by the convention principles. India was supported by China and some developing nations. Further , India also raised a voice of opposition to the 'applicability of post 2020 agreement' to all parties .however, on this issue, India failed to gather support from other developing nations and was left in isolation.[75]

Due to the changing dynamics of international climate regime, India has also been changing its stance and accepted 'Nationally Appropriate Mitigation Actions' on voluntary basis. India has also submitted the Required 'Intended National Determined Contribution' titled 'Working towards Climate Justice', in October 2015, which was agreed upon at COP 19 by decision 1/CP.19. India proposed in its INDC to reduce the emission intensity of its GDP by 33-35 % by 2030 from 2005

level.[76] India singed the historical 'Paris Agreement' in 2016 and committed to achieve its obligation offered under the INDC

### **4.8.5** The US

The US is the second largest GHG emitter after China in absolute terms, emitting 5334000(Kts) in 2013.In per capita ratio, The US emitting 16.5 ton emission in 2013, much ahead of developing countries and projected to remain on higher side. The US is 3rd largest populous country of the world having 316.5 million (2013 census) peoples accounted 4.38 % of the world population. According to the World Bank data, Energy consumption in the US is much higher in comparison of the developing countries in per capita ratio. The US energy consumption in per capita ratio was 6914 (Kg of oil equivalent per capita) in 2013, while In China it was 2226, in Brazil 1438, and in India it was merely 606.The US was largest historical contributor of GHG, in period between 1990 to 2011, the US was responsible for the cumulative GHG emission of nearly 16% followed by China 15% and the EU 12%. The US alone was responsible of nearly 27% of total world $CO_2$ cumulative emission in between period from 1850 to 2011(World Resource Institute).[77]

The above data clearly establishes the fact that the US should have been on the frontline in climate change actions. Conversely, until, 2009; the US has been a chronic spoiler of the global climate change regime mostly acted diplomatically to impose its own interests. The US president, Barack Obama and his three preceded presidents struggled to reconcile international and domestic pressures mainly due the difference of perspective between the US Congress and Presidents over the issue of commitments regarding climate change. The US congress and The US presidents, quite often, acted paradoxically over the issue of responsibility arising from the international climate commitments.

The US constitution is a classic example of the separation of powers; both the President and the Congress are independently elected and in functioning pursue the

theory of Check and Balance. The US President Authority in making foreign policy, especially commitments to any legally binding treaty or Protocol, is subjected to the Senate's consent, advice and approval. The article II, Section 2 of the US constitution is clearly establishes that "US president has power, to make treaties, by and with the consent of the Senate, provided 2/3 of the Senators presented concur."[78]

It is clear that The US president has an independent monopoly in international negotiations, but any agreed treaty with legally binding nature, only be implemented after 2/3 consent of the Senate. This system of executing international treaties has been always a cause of deadlock between The US president and Senate. Since World War II, the US presidents preferring to sign international treaties, as 'Executive Agreements' to override Article II of the US constitution as 'Executive Agreement' does not require the Senate's approval. Although the US constitution has no provision for 'Executive Agreement', it has evolved to facilitate the President in negotiation at international level.

The US president is a supreme Commander of the US and during the World War II, the urgency of prompt execution of the agreement has developed in 'Executive Agreement' system of the treaty. The Apex Court of the US also upheld the sole right of the President to perform 'Executive Agreement' in number of cases, namely United States V. Curtiss-Wright (1936), United States V. Belmont (1937) and United States V. Pink (1942).

In 1950, Republican Senator John W. Bricker proposed a number of constitutional amendments, collectively known as 'Bricker Amendments' to restrict the president's power to perform Executive Agreements with other nations in form of treaty or protocol. However, Bricker amendments were not accepted and failed in Senate by single vote in 1954. Executive Agreements have a major drawback; they are not necessarily binding on the successor president and his administration, if explicitly repudiated.

### **4.8.5.1** The US position In Climate Change Regime

In the initial phase of the climate change regime, the US was uncertain about the scientific validity of the climate change and mostly acted to stumble any legally binding agreement which obligate developed countries for quantified GHG reduction targets within a specific timeline. The US feared that any serious time bound efforts to reduce GHG emission would put constraint on its economic growth. The US was in deep economic insecurity as it feared that any GHG reduction effort could shrink its economy and adversely affect its competitiveness and economic dominance.

In 1992, during the UNFCCC negotiations, the US president H.W. Bush was struggling for re-election in a difficult economic situation; refused to accept any GHG reduction target within a specific time frame. The EU was continuously insisting for specific reduction targets within a specific time frame, highly criticized the US refusal. In the final draft of the UNFCCC, the US succeeded in its efforts to remove any GHG reduction and a specific time frame. The Bush Administration pledged to submit any future treaty or protocol negotiated under the UNFCCC to the Senate for their approval and direction. On October 7, 1992, Senate gave its advice and consent and one week later, Bush ratified the convention on behalf of the United States.

In 1995, at Berlin Conference of parties, the US delegation agreed to quantified emission target and exclusion of developing countries from mitigation targets which embodied in the CBDR principle. The Business and Industry lobby of the US criticized the US position for giving free pass to developing countries' for endless emission. Republican dominated Congress also criticized the US stance in Berlin. However, The US demanded that developing countries- large GHG emitters- should also take mitigation obligation. Eventually, in 1996 at CoP 2, the US agreed to the legally binding emission with a system of emission trading.

The US played an important but complex role in designing of the Kyoto Protocol's architecture. Against his predecessor, President Bill Clinton presented

'Climate Action Plan' to reduce the US GHG emission on voluntary basis. The US GHG emission, during the period from 1990 to 2000 surged by 12 %; in this context, the US attempted to shift the KP's base year to 1995 instead of 1990 to make KP targets within achievable range without constraining US economy.

Mostly the US position was negotiated by the Vice President Al Gore; his engagement was clearly evidenced by his book 'Earth in The Balance' published in 1992. But, the president Clinton was reluctant in dealing with climate policy. Even though, the US Senate had signaled red flag to the KP by passing Byrd-Hagel resolution unanimously, Clinton did not initiate any serious efforts to get through the Senate. The Byrd-Hagel resolution as a 'sense of Senate' mandated that the US should not to be the party to any treaty or protocol which could harm the US economy and exempt developing countries from mitigation obligation. In contradistinction to the sense of the Senate, the US signed the KP on 12 November 1998 at Buenos Arise. However, Clinton did not send the KP to the Senate for ratification.

New president of the US, George W. Bush entered in to office in January 2001.During election campaign, Bush was explicitly against of the KP. George W. Bush never communicated to the UNFCCC any formal text regarding the rejection of the KP, however on several occasion Bush stated that the protocol 'flawed and fatal' as it excluded 80 % of the world and large developing countries. The Bush administration officially rejected the KP, when the National Security Advisor, Condoleezza Rice stated that "Kyoto is dead".[79]

Jon Hovi, D.F. Sprinz and G.Bang, have examined some hypothesis regarding the role of the President Clinton in context of the question; why Clinton did not send the KP to the Senate? And why did the US reject the Kyoto Protocol?[80]

- It is argued that Byrd-Hagel resolution was just an attempt of bluffing the other negotiating parties. It was a wishful thinking in order to bring

developing countries under the mitigation commitments. The Senate resolution used as bargaining chip to shape the protocol according to the US interests.

- The Clinton-Gore administration had already given up the Kyoto Protocol, they probably aware of the fact that Senate would not ratify the KP. Clinton-Gore engagement to the KP was seen by many scholars as an attempt to keep their head up high and to show commitment to the international negotiations.
- The Clinton-Gore administration signed the KP, despite the minimal or zero probability of getting it through the Senate to blame the Senate for not ratifying the protocol.
- Some scholars suggested that Monica Lewinski scandal seriously dented the Mr. clean image of the Clinton. Hovering danger of impeachment and the lawsuit filed by Paula Jones for sexual harassment, had made almost impossible for the president Clinton to approach the Senate for the KP ratification.

Although, it is difficult to reach any concrete conclusion from above hypothesis, more or less they all contributed to the Clinton decision of not sending the KP to the Senate for ratification. It can be said that second hypothesis seems to be more explanatory as Byrd-Hagel resolution was passed by the Senate on 25$^{th}$ of July 1997 nearly six month ahead of the CoP3, where the KP was adopted. Clinton administration was remained engaged throughout the KP negotiation to show their commitment to the concerns of climate change, despite the fact that they would not able to clear the required 2/3 majority hurdle in Senate for the ratification of the resulted protocol.

The US disengagement came to end with Barack Obama's entry into the White House in 2008.During the election campaign, Barack Obama presented his climate policy by announcing 80 % GHG emission reduction target by 2050 and a

investment of $150 billion in new energy-saving technologies. On 17 November 2008, while addressing Governors and foreign officials, Obama affirmed his election campaign vow and said, "Delay is no longer an option, denial is no longer an acceptable response".[81]

The US reengagement to the climate regime can be attributed to following developments:

1. The fear of economic constraints and loss of competitiveness has been trim down considerably with the alignment between the US and China.
2. Increased recognition to the climate change and its adverse effect called the US for more constructive and cooperative actions, internally as well as externally.
3. The leadership image was seriously challenged by the US absence from climate change regime.
4. To end the isolation situation in international climate change and to secure the US interests in any future agreement.
5. The growing need to align with Changing economic dynamics and emergence of new economic world order.
6. To explore new business opportunities in renewable energy sector and to find new markets for advance, nature friendly and invented technologies.
7. The decreasing emission trends impetus the US to take credit for progress and commit further to reduction targets which would have seemed difficult and negative for economy, just a couple of year ago.
8. The fading of possibility for the second commitment period of the KP.
9. Most importantly changing approach to the CBDR principle watered down the top-down targets and time table scheme that was adopted in the KP. New arrangements were in place which require all countries to come up with their unilateral voluntary reduction commitments and that are not subjected to legally binding implications. It is particularly favorable situation for the US that had been demanded by the US, a decade ago.

10. New approach to define the CBDR principle included the developing countries under mitigation obligations, although, commitments were in form of 'Nationally Appropriate Mitigation Actions' (NAMAs), they were on board now.
11. As stated above that commitments were not of binding nature in legal term, this implied that any future agreement would not require the US to take Senate approval and agreement could be adopted as an 'Executive Agreement' to avoid the collision between the Executive Branch and Congress that was surfaced during KP.

Although, the above stated list can't be said a complete list, it included notably three important (8, 9, 10) major causes of the US reengagement in climate change regime.

With Obama's more promising and dedicated view, the US fully engaged in Copenhagen Summit. Although, Copenhagen failed to produce, much anticipated, legally binding instrument; a political agreement was stemmed from the US participation with BASIC countries. First time, in Copenhagen, developing countries accepted NAMAs to set unilaterally mitigation action plans according to their capabilities and national circumstances.

In February, 2009, Obama address to Congress, said, "To truly transform our economy, protect our security, and save our planet from the ravages of climate change, we need to ultimately make clean, renewable energy the profitable kind of energy. So I ask this Congress to send me legislation that places a market-based cap on carbon pollution."[82]

In May, 2009, "American Clean Energy and security Act 2009" popularly known as "Waxman-Markey Cap and Trade Bill" was introduced into the House of Representative. This bill was drafted in line with Obama's ambitious climate action proposals vowed during his election campaign and also placed in his election

manifesto. The US president and his administration invested huge efforts to pass the bill, consequentially, on 26 June 2009; the bill was passed by a vote of 219-212.

However, after a year of intense negotiations with senators, Obama did not submit the bill to the Senate due to the likelihood of its failure in Senate in context of the prevailing scenario of economic crisis and rising unemployment. The former Vice president Al Gore, as a renowned Environmental activist, attributed the failure of bill to the partisanship of the Senate and the influence of large commercial interests, who would likely to be affected by the bill. He said, "The forces wedded to the old patterns still have enough influence that they were able to use the fear of the economic downturn as a way of slowing the progress toward this big transition that we have to make."[83]

Ahead of the Copenhagen Summit, on 25th of November 2009, the US president Obama unveiled the GHG emission target to put in bargaining table at Copenhagen Summit. The US president announced a reduction of GHG emission 17 % below the level of 2005 by 2020. As it was became apparent by 2010 that Senate would not be going to play a supportive role in climate change legislation, Obama administration shifted to authoritative decisions rather than legislative decision to achieve the proposed GHG emission targets.

In between the period 2007 - 2013, fossil fuel Co2 emission in the US declined by 11 %. This drop has been largely attributed to the use of Natural gas instead of the coal to fire power plants. This decline in GHG emission encouraged the Obama Administration to make more ambitious and comprehensive pledges. However, Congress was seemingly in opposition of such ambitious pledges.

In February 2013, president Obama vowed, "If Congress won't act soon to protect future generation, I will. I will direct my cabinet to come up with executive actions we can take."In June 2013, Obama unveiled his ambitious 'Climate Action Plan' to regulate GHG emission. This time Obama took executive route rather than

legislative to achieve GHG reduction goals. The executive responsibility was given to the US 'Environmental Protection Agency' (EPA) which would act in accordance with the 'Clean Air Act'.[84]

The EPA regulation could have been challenged if the Apex court had not ruled in 2007 that if GHG were identified to endanger public health, the EPA would have to regulate GHG emission in accordance with Clean Air Act. However, the Bush Administration did not execute the decision and delayed them until next president. In 2009, the EPA issued it's endanger findings and identified GHGs as a source of harmful impacts on human health and accordingly issued number of executive orders and regulation to regulate GHG emissions.

Despite the dedicated actions from the US president Obama, the US Congress, especially, The Senate has been against of any internal regulatory actions or international commitments. Even, some Senators did not adhere to the fact that climate change exists. It was particularly evidenced from the Senate action who voted against Obama's flagship climate policy the 'Clean Power' and 'EPA Energy Regulations'. To nullify the EPA's rule published on October 23, 2015, that required states to reduce carbon dioxide emissions from existing fossil fuel-fired electric generating units (EGUs), the Senate passed the Resolution S.J. 24 by a vote of 52-46 on 17 November, 2015 and subsequently by the House of Representative by a vote of 242-180 on 01 December, 2015.[85]However, eventually, the resolution S.J.24 has been vetoed by the president in December, 2015.

The US signed the historical 'Paris Agreement' in the Signing Ceremony held on 22 April 2015.One year has been granted for ratification of the Agreement. It is still a hot topic of debate in the US that weather the Paris Agreement is a 'Treaty' or just an 'Executive Agreement'? Senators are referring 'Circular 175' which determines that 'Paris Agreement' is a 'Treaty' and thus, needs Senate's consent and approval for ratification. As Senators argued that 'Paris Agreement' has a number of provision that binds the US to the international commitments. Furthermore, the

Agreement is a formal and an open-ended agreement that requires financial commitments from the US.

On the other hand, Obama administration is seeking the 'Paris Agreement' as an 'Executive Agreement' to override the constitutional requirement of Senate Consent and approval (section II,2) to sustain his commitment made to the international community. If the Paris agreement is accepted as an executive agreement, it does not mean that it will bind the successive administration. In executive form the agreement can be repudiated by the successive president.

### **4.8.5.2** The US position in context of CBDR

The US has been always in favor of that the CBDR principle should be considered as a dynamic principle rather than a static principle. The principle itself differentiate responsibilities according to the respective capabilities, it implies that if capabilities of a nations are increasing than proportionally responsibilities should also be increased. The US argues that as the capabilities of developing nations has been increased since 1992; responsibilities should accordingly be determined.

The US has been continuously pressurizing developing countries to take greater responsibilities in combating climate change. Although, the US was agreed to the 'Berlin Mandate' which recognized the CBDR as bedrock to built a protocol, the US revoked to ratify the Kyoto protocol by saying that it would exempt developing countries. It is clear that the US has always attempted to meltdown the core principle of the convention.

During the draft decision of the Durban Platform, the US opposed the inclusion of any reference to the CBDR-RC; as a result, the Durban Action Plan did not make any explicit reference to the CBDR principle. However, India strongly opposed the US by saying that avoiding the CBDR would be against the UNFCCC as CBDR was included in the convention as a core guiding principle.

In Doha conference, the US indicated that it would ready to discuss the equity and the CBDR-RC, subsequently, in final text of the Durban Platform, no direct reference had been made to the CBDR-RC; it only underscored that outcome would have legal force under the provisions of the convention. It can be argued that 'under the convention' indicates indirect incorporation of the CBDR and outcome would be in line with CBDR.

Indeed, the US wants to remove the dividing iron wall of the CBDR-RC principle, which was incorporated in the UNFCCC and mainly attributed to the differentiation between developed and developing countries. The US has been constantly emphasizing that international dynamics has been drastically different from those of 1992, thereby; dichotomy of annexure does not reflect the current reality and should be removed. Furthermore, the US has continuously insisting to remove any reference to the historical emission. During the Cop 21, at Paris, the US advocated for the 'Self Differentiation' which implies that nations would individually determine their emission reduction target. However, the German Development Institute has concluded in its discussion paper that on the basis of Human Development Index (HDI) of 2013, the UNFCCC dichotomy is still relevant. [86]

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# Chapter 5

## Politics of Climate Change: India's National Interests, Role and Position

# Chapter 5
## Politics of Climate Change: India's National Interests, Role and Position

India is regarded as a prominent voice of the developing countries since the beginning of the climate change regime. For developing countries, generally environmental issues were not at forefront of their policies rather they were more concerned with their development needs. It was 1972, when Stockholm 'United Nation Conference on the Human Environmental' shaped the environmental issues as a political issue in international political arena. This conference was a milestone during the initial evolution of climate change regime as it was the first attempt of its kind to reconcile environmental concerns and economic development. Prior to the conference, mostly scientific research had been done in the western developed countries and these studies were concluded with the urgent requirement of formal global mechanism to protect the environment and avert climate change. Developing countries were suspicions of the North's call for environment protection. Many developing countries, especially, large economies like China and India saw the environment protection agenda as the obstruction tool in their development path.

After the Stockholm conference, environment protection agenda was set back and mostly deemed as local and regional crisis rather than a global crisis. Demand for new International Economic order (NIEO), 1973 Arab-Israeli war and energy crisis were on the forefront of international politics. After Stockholm conference, Divisive prospect of the North and the South towards environment protection attributed decline in political discourse. During the prevailing era of Cold War, Soviet Union invasion of Afghanistan in 1979, completely dominated the international politics. Further, worldwide recession during 1990 caused detriment of global concern for environment issues. Environmental issues were set back and economic concerns became more important for states.

The global environment issues are common and interdependent in its nature. Every state is affected irrespective of its degree of responsibility in the

degradation of global environment. Therefore, multilateral efforts in a coordinated manner are necessary in addressing the issue of environment degradation and in combating climate change. The declaration of Bonn G-7 economic summit 1985 clearly stated that 'international co operation is necessary to avert environment degradation'. Similar voices were raised by world leaders at UN in 1988 by vividly acknowledging the interdependence nature of the environmental issues and the necessity of common efforts in addressing global environmental issues.[1]

International circumstances had been started to improve by second half of 1980 fueled by declining tension between the US and the USSR and improving economic scenario in developed states. Favorable international conditions and increased public awareness again put forward the environment agenda in international politics. Thus, increased global awareness regarding Ozone depletion, climate change and loss of biodiversity was resulted in phenomenal gathering of world leaders, heads of states NGOs in1992 at the 'Earth Summit' in Rio de Janerio, Brazil.

## **5.1** Interdependency and Developing Countries

Environment is a common stake of all countries. Its nature of interdependency requires cooperation from the North and importantly from the South. For the formation and development of effective environment regimes and to mange interdependency, cooperation among actor states is necessarily required. Environment regimes, especially, climate change regime (this thesis concerns) has been described as absolute gain for all acting state actors engaged in a cooperative fashion. Principally, every state is agreed and accepted the notion of absolute gain in protecting environment from degradation, but within the execution process of absolute gain, maximum gain and minimum loss has been fostering the global politics of climate change. In international climate regime, maximum gain and minimum loss, which can be characterized as national interests, has been the root cause of climate politics.

Any logical discourse or debate on climate change regime should be deliberated with respect to socio-political and economic aspects. There are many forces across the world responsible for carbon fuel consumption that led the global GHG emission. The main forces stemmed out from the capitalist model of development adopted by Western countries. Subsequently same developmental model has been followed by the global South in endeavor to achieve their objectives of growth. The notions of Globalization, Liberalization and Privatization emerged as slogans of development.

"However, in latest avatar, capitalism acquired globalised corporate led neo-liberalism form, which acquired ascendancy in the early 1980s in the industrialized countries and global domination soon thereafter- that has taken heaviest toll on the globe's environmental resources. The period of 1985-2005 saw global $CO_2$ emission rise sharply by 46% since the early 1980s, the world witnessed the rise of the Asian tigers and then, more importantly, China and India."[2]Due to the lack of cheap and abundant low-carbon options, developing countries can only pursue their development objectives by depending on carbon fuel burning. The Greenhouse Development Rights Framework's Paul Boer & others puts it:-

"From the South's perspective, this pits development squarely against climate protection…… The developing countries are quite manifestly justified in fearing that the larger development crisis, too, will be treated as secondary to the imperatives of the climate stabilization."[3] Thus, Climate change unfolds merely not as an environmental crisis but also a problem of development.

The difference between the perception of the North and the South had been apparently become clear since Stockholm conference. It was further sharpen during the making of the UN Framework Convention on Climate Change (UNFCCC). Developing countries explicitly under the prominence leadership of China and India pressed for an agreement based on the equity. They had come up with the commonly agreed perception that climate change was the result of accumulated GHGs originating mainly in the industrialized countries.[4] Hence,

developed countries have to take the responsibility in efforts to address climate change and its adverse consequences. Developing countries were unwilling to accept any binding commitment to reduce GHGs emission as they had perception that it would deprived them from vastly available cheap energy sources and billions of poor people of the South from equal right of development.

Apart from the mitigation commitments, the North and the South were deeply divided on the issues related to the financial and technological transfer and support. Developing countries generally, were not accepted any legally binding commitments; however, instead they offered voluntary mitigation commitments on condition of financial and technological support to cover the full incremental costs of response measures.[5]

It was clear that success ratio of climate change regime would be proportional to the degree of cooperation between the North and the South. As the global South control significant portion of natural resources, densely populated and carving of development hence, rapid increase in their GHGs emission was anticipated. Thus, inevitable requirement of cooperation edged the leverage bargaining position of the South with the North on the issues like aid, debt and trade. However, interests of the South cannot be painted with the same brush. This block of the Southern developing countries is not homogeneous with respect to their socio-economic-political and geographical factors.[6]

Within the South Block there are several small groups of their own preferences of interests. Therefore, they act and negotiate according to their specific interests, sometimes quite paradoxically. The G-77, as a synonymous to the South block, is regarded as an umbrella group and has been speaking on behalf of developing countries in international regimes since 1960. As far as climate change regime is concerns; it has been often lax in strongly united perception towards climate change negotiations. Most of the developing country blocks in the UNFCCC negotiations are deeply rooted in G-77. Despite the fact that different Sothern country blocks have their own preference of interests, they prefer to be treated as developing countries under the broader auspices of G-77.

The group of Least Developing countries (LDCs) that comprised of 48 countries, mostly, from Africa, highly vulnerable to the climate change but, have done least to cause the problem. These countries, generally, concerned for the adaptation funding and act together for maximum financial support from wealthier nations.[7] The Alliance of Small Island States (AOSIS) is another an important coalition of Small Island and low-lying coastal countries comprised of 44 members from all oceans and regions of the world. It functions primarily as an ad hoc lobby and negotiating voice for Small Island developing States (SIDS) within the United Nations system.[8] As these SIDS are mostly costal countries, hence, highly vulnerable to the climate change. Rising sea level is threat to their existence. The AOSIS has always been regarded as a part of G-77 and consistent in its approach with other developing countries till the Copenhagen conference 2009. During the Copenhagen conference, Tuvalu, a pacific member of AOSIS moved a proposal of new treaty to include India and China along with emerging developed countries to take legally binding emission cut. The US and the EU supported this proposal. Contrary to G-77, the AOSIS also officially advocated limiting rise in global temperature within $1.5^0$C degree above pre industrial level against the general consensus of $2^0$C degree.[9] India and China strongly opposed Tuvalu's proposal of separate Kyoto like treaty to include India and China.

The block of emerging economies, the BASIC comprised of large emerging economies Brazil, South Africa, India and China formed on 28 November 2009, is a strong block to counter developed countries in climate change regime. This block is generally more concerned with their development rights and equity as these are the focal points of their consensus. The BASIC block is a great believer of the CBDR principle and equal right of development on the basis of per capita emission norms. Despite of the general consensus on equity issues, Differences were surfaced out during the Durban Conference. At Durban, Brazil and South Africa indicated their willingness to accept binding emission cut but, China and India were not to do so. South Africa, the host, just kept the finger crossed to declare the conference as a success. At last, China indicated some flexibility to accept binding commitment on certain conditions (unlikely to be

granted). Thus, China's move left India in isolation with its 'inflexible' stand not to take any binding commitments.[10]

Anomalies, within the G-77 can also be indicated by the role of Oil Producing and exporting Countries (OPEC). The OPEC was formed in Baghdad, Iraq, in 1960 by 5 founder members- Iran, Iraq, Kuwait, Saudi Arabia and Venezuela. Currently there are 14 members countries, share common policy stand to maintain international oil prices to keep their economies at optimum.[11]Despite the part of G-77, OPEC has been pursuing its own interests of minimizing the negative impact of mitigation measures - reduction in use of oil and carbon taxes on fossil fuel- to their economies, which heavily dependent on oil export. According to the data released by the World Bank, in 2013, in term of per capita $CO_2$ emission, Kuwait 27.3, Saudi Arabia 17.9, and Qatar 40.5 emitted excessively against the world average of 5.0 metric tons.[12]

In climate change regime, OPEC countries presented themselves as doubly impacted. On one side, they described themselves vulnerable to the climate change effects and on other side; they feared that their oil export and revenue could decrease due to the climate friendly policies of lower carbon use. The OPEC seeks to avoid GHG abatement measures and maintain high oil prices as most of the economies of the member states heavily rely on the export of oil. OPEC countries, especially, Saudi Arabia, worked hard to obstruct and delay the global process of climate change negotiations and often tacitly supported by G-77 and China.[13] The OPEC is great believer of the principle of CBDR-RC and regarded as a sub group of G-77.

The OPEC feared that mitigation efforts to curb GHG emission would certainly hurt its oil export and so revenue; hence OPEC demanded 'compensation for lost oil revenue'. Dessai indicated that an informal alliance between OPEC (S. Arabia) and the group of interests (oil and auto companies) opposing climate change mitigation in the US.[14]

## **5.2** India: The Voice of the South

India is the land of the ancient civilization and cultural heritage. It is the land of harmonious co-existence between man and the nature. Fauna and Flora always regarded as a part of human life and manifest in traditional practices and life style of the country. In Indian culture the earth is called as Mother Earth. The Nature is an eternal part of Indian culture and always regarded as Goddess 'Prkarti' feminine in nature inevitable for the existence of life on the earth. All most in all geographical regions and subcultures of India, the Mother Nature is integrated with human life; worshiped in different forms. In Indian mythology, balancing between contentment and worldly desires to pursue the ultimate goal of human life described as 'Moksha' is regarded as solo cause of human life. It shows that from thousands of years, Indian culture and tradition has inherent value for the protection and sustainability of the environment, which include both intra as well as inter generational equity.

The father of the nation Mahatma Gandhi had propounded the socio-economic theory of 'Trusteeship' which implies judicious use of natural resources and moral duty to ensure bequeath to the future generations a healthy planet. Gandhi had clear vision that we should not build the islands of the prosperity in the ocean of the poverty. Gandhi believed in 'Sarvodya' (welfare of all) which was the bedrock of his thinking and philosophy. Gandhi's idea of the 'Sarvodya' was the idea of betterment of all, fulfillment of basic needs of all and welfare of the human being by avoiding all sort of exploitation. Although, Gandhi had not given any structural model for environment and its sustainability, but by interlinking all his thoughts together, we can extract environmentally sustainable development model, the world striving for.[15]

The legacy of Indian cultural heritage of welfare for all echoed in Mrs. Gandhi's speech at Stockholm in 1972. Mrs. Gandhi emphasized that environmental issues could not be seen in isolation; they interlinked with poverty and population. Mrs. Gandhi said that 'poverty is the greatest polluter' and hence, development to eradicate poverty would be India's preference. India was the first

country who demanded equal right of development for its billions of people living in poverty. Many acts were introduced after Stockholm conference namely Wildlife Act (1972), Water Act (1974), Air Act (1981) and Environment Protection Act (1986). Furthermore, several programs were initiated to clean rivers including the Ganges and the Yamuna. India signed the Stockholm declaration and by 42nd constitutional amendment, incorporated two articles to provide constitutional acknowledgement to the protection and improvement of environment.

## **5.3** Constitutional and Judicial Approach towards Environment Protection

Initially, the Indian constitution was not contained any explicit and specific provisions for environment protection and improvement. After Stockholm conference and in the light of increasing global awareness of environmental crisis, Indian parliament enacted 42nd constitutional amendment in 1976. This 42nd amendment inserted Article 48-A to the 'Directive Principle of the State Policy' (Part IV) and newly introduced Article 51-A of fundamental Duties. Article 48-A says:-

**"The state shall endeavor to protect and improve the environment and to safeguard the forests and wildlife of the country."**

The said amendment inserted to the chapter IV Directive Principle of state and thus, imposed discretionary responsibility on the state. By the 42nd amendment, a new part IVA was inserted after the part IV of the Indian constitution. The part IVA which deals with the fundamental duties of the citizens of India, contains article 51-A, with clauses (a-i)

**Article 51-A**, Clause (g) says:-

**"It shall be duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wildlife and to have compassion for living creature."**

Although, Ar.48-A and 51-A does not impose any legal obligations but, are important in moral context. Further, preamble of the Indian constitution mirrors socialist pattern of the society to ensure dignity of the individual, which essentially requires pollution free environment and decent living standards. The Indian constitution establishes a welfare state which exhibits from the provisions pertaining to the environmental protection. In this context, Article 47 states:-

**"The state shall regard the raising of the level of nutrition and the standard of living its people and improvement of public health as among its primary duties and, in particular, the state shall endeavor to bring about prohibition of the consumption except for medicinal purposes of intoxicating drink and of drugs which are injurious to health".**

Fundamental Rights, embedded in part III of the Indian constitution, guarantees fundamental rights to ensure proper, harmonious and optimum development of every individual, irrespective of race, place of birth, religion, caste, breed, color or sex. Thus, fundamental rights provide essential circumstances for the development of a person entitled by virtue of being human being alone. Healthy environment cannot be disassociated from these circumstances which every individual require living with dignity and decent living standards. The Indian judicial system has played a pivotal role in the development of environment as a part of 'Right to Life and 'Personal Liberty' under the articles 14, 19 and 21.[16]

In 1984, Bhopal Gas tragedy that took over 3500 life and injuring 200000 people surfaced the malady of the Indian legal system and executive response measures. This tragic incident, further, catalyzed Judicial Activism of Indian Judiciary to fill the legislative gap between development and enforcement of environmental laws associated with Mining, water and environment protection acts. Through Judicial Activism, Supreme Court of India worked case to case for making clean environment as a fundamental right and expanding its boundaries to formulate the right for compensation, clean water and air.[17]

Article 21 of the Indian constitution says,

**"No person shall be deprived of his life or personal liberty except according to procedure established by law."**

In 1978, the Supreme Court of India redefined the article 21 and expanded the scope of right to life given in article 21. In this regard, Meneka Gandhi's[18] case is a land mark which given broad interpretation to the Article 21 and thus, an entirely new perspective to the part III (fundamental rights) of the Indian constitution. Earlier of Meneka Gandhi case, the Article 21 was only against of arbitrary action of the executive but, this case extended the scope of Article 21 against the legislative action too. In the land mark decision, Supreme Court of India was held that 'personal Liberty' in article 21 is of widest amplitude and some of them are placed in article 19 of the constitution. It was also held that any governmental restrains on 'personal liberty' should be collectively examined against the spirit of fairness, non-arbitrariness and reasonableness that were inherent under article 14, 19 and 21 of the Indian Constitution.[19]

Hon'ble justice Bhagwati observed in Meneka Gandhi case that any law prescribing a procedure for depriving ' personal liberty' has to meet the challenge of article 19 and the procedure established by law in article 21 must answer the requirement of article 14. Thus, apex court of India developed the doctrine of 'inter-relationship of rights' which resulted 'substantive due process' in the language of article 21.[20] Consequentially, broad interpretation of Article 21 redefined the concept of 'right to life 'and 'personal liberty' and included rights, which had not been explicitly, accounted in part III of the Indian constitution. Justice Bhagwati observed, "We think that he right to life includes the right to live with human dignity and all that goes along with it."[21]

In context of the inter-relationship between fundamental rights and directive principles, the apex court of India has affirmed that both must be interpreted harmoniously for the establishment of a welfare state which is also enumerated in the preamble of the Indian constitution.[22] It was again reaffirmed in

Unni Krishnan, JP v/s State of AP [(1993)1SCC 645], Justice Jeevan Reddy declared that:-

"The provisions of part III and IV are supplementary and complementary to each other and not exclusionary of each other and that the fundamental rights are but a means to achieve the goal indicated in the part IV".[23]

With respect to above commentary it can be said that the supreme court of India affirmed the healthy environment as a fundamental right to life and government is under obligation to provide it. Over the course of years, Indian judiciary propounded some remarkable principles and doctrines in leading cases as:-[24]

1. **Doctrine of Absolute liability:** In Bhopal case Union carbide v/s Union of India[(1990, AIR273, 1989 SCC(2)540], Supreme Court concluded that any enterprise carrying dangerous activity, would liable, if any mishap or accident occurs and it has to repay everyone who gets affected of such accident.
2. **Polluter pays Principle:** In Vellore citizen's welfare Forum v/s Union of India case (AIR1996 SCC. 212), the apex court propounded that polluter has to pay to repair natural harm. The supreme court of India has declared that for sustainable development 'the polluter pays' principle should be followed adequately. It is also well acknowledged in international law that polluter party pays for the damage done to the natural environment.
3. **Precautionary Principle:** in Vellore Citizen's forum case, the Supreme Court propounded two concepts for the precautionary principles :-

   (A) Adequate environmental measures should be taken to anticipate, prevent and attack the causes of environmental degradation.

   (B) Any environmental measure should not be postponed on the basis of scientific uncertainty.
4. **Public Trust Doctrine:** In M.C. Mehta v/s Kamlnath and others (AIR 1997, SCC 388), the apex court concluded that certain resources like

water, air, forests and sea have such a great importance to people as a whole that I would be unjustified to make them a subject of private property.

5. **Doctrine of Sustainable Development:** The issue of environment and development firstly arrived in Rural Litigation and Entitlement Kendra v/s State o U.P.(AIR 1987 SC 1037), the court held that natural resources are the permanent assets of mankind and not to be exhausted in one generation. Again in Vellore Citizen's Forum case (AIR 1996,5 SCC 647) the court observed that sustainable development is a viable concept to eradicate poverty and improve the quality of human life.
6. **The Right to Wholesome Environment:** In Charan Lal Shau v/s Union of India (AIR 1990,1480) case, the Supreme court said that wholesome environment is a fundamental right guaranteed by article 21 of the Indian constitution .Furthermore, in Damodharlal Rao v/s Municipal Corporation Hyderabad(AIR SC 1037), the Kerala High court relied upon article 48A and 51A(g) and stated that environment pollution is a violation of article 21 which guarantee right to life and personal liberty.

## **5.4** Foreign Policy Context

Aristotle said "The state comes into existence for the sake of life and continue to exist for the sake of good life." It is clearly implies that each sovereign state is under supreme duty to satisfy the need of its people. The realism theory suggests that state is a unitary actor and want to be self-reliant, of course, in the world of interdependency. It is no longer supported; In fact interdependency is prominent incontrovertible character of international relation. Due to the interdependency, each sovereign state establishes, economical, political, diplomatic, cultural, and educational and trade relation with other state. These relations are conducted and exercised with a meaningful direction, objectives, and goals to achieve maximum benefits in a mutually co-operative manner. These objectives and goals can be define as national interests of a state and thus, national

interests are formulated and adopted in context values, ideological traditions, socio-economical and geographical factors of a state.

In international relations, the pursuant of national interests by means of adopting a set of principles, decisions and means collectively defines as foreign policy of that state. National interests are defined by foreign policy and then secure, maintain and maximize through the exercise of national power. In the realm of international relegations, behavior of state is usually anticipated by its foreign policy. The foreign policy of state is intertwined with national policy of that state and exercised within the limits of external international environment and domestic internal determinants.

### **5.4.1** The concept of Foreign policy defined in the literature of International Relations

**George Modelski** defines it as "The system of activities evolved by communities for changing the behavior of the other state and for adjusting their own activities to the international environment".[25] Modelski definition is more focused to the existing behavior of states, infect foreign policy is dynamic to the extent to serve the goals of national interests.

**Paelfor and Lincoin** defined "Foreign policy is the key element in the process by which a state translates its broadly conceived goals and interests into concrete course of actions to attain their objectives and pressure its interests."[26]

**C.C. Rodee** "Foreign policy involves the formulation and implementation of a group of principles which shapes the behavior of a state while negotiating with (contacting) other states to protect or further its vital interests."[27]

Thus, Foreign policy of a state can be summarized as:

- Foreign policy is a set of policies, principles and decisions conceived and followed by the state.
- National Interests which are to be secured.
- Actions and means used to secure goals of national interests.

- National values, decisions, ideologies and broad policy principles for maintain and conduct international relations.
- Assessment of failure and gain of the state in context of objectives of national interests.
- Action-Programmes, policies and decisions for status quo or change or both in international relations.

In conclusion it can be said that foreign policy is a set of decisions and principles. A comprehensive action plan and a well deliberated thought out course of actions conceived, adopted an applied by state for conducting relations with other states and all other international actors (inter governmental organizations) with an approach to secure maintain and maximize the defined and preferred objectives and goals of national interests.

## **5.4.2** Determinants of Foreign Policy

In international relations, the behavior of a sovereign state is the reflection of foreign policy of the state. Three important principles which determine the foreign policy are:[28]

- Sovereignty
- Inter-Dependency
- National and International Circumstances

Sovereignty is undetectable condition to the existence of the state and hence, safeguarding the territorial integrity is a basic principle of foreign policy. Bargaining principle in foreign policy stems from the interdependent nature of international system. In all circumstances, each state seeks to secure, promote and maximize its gains through bargaining principle. Dynamic national and international circumstances profoundly determine the status quo or change in the foreign policy to the extent to adjust with domestic or international change in circumstances.

In brief, Determents of foreign policy are:-

1. **Size of Territory:** Territorial size of a state is an important factor of foreign policy. Big Size country with large human and natural resources always tends to be big powers in international relation. The importance of territorial size can be observed in the foreign policy of the US, Russia, Brazil, India and China. However, territorial size is not an independent factor, resources and capabilities along with other factors make it important element of foreign policy.
2. **Geographical Factors:** It is comparatively the most permanent and stable element in international relation. The location, the climate, topography of land and its fertility are important geographical factors which affect foreign policy of a state.
3. **Economic Development:** The level and nature of economic development is crucial factor in effectiveness and success of foreign policy. Highly industrialized and developed countries have financial tool in term of reward, aid and economic sanctions to influence other state. The military power and capabilities of a state heavily rely upon economic development of that state. The foreign policy of the U.S and China are mostly used their economic and financial development as a tool to pursue their national interests in international relations.
4. **Cultural and Historical factors:** The goals and objectives of national interests are formulated in context of cultural, historical tradition and experiences of a state. For instance, bitter experiences of imperialism and colonialism caused most of the newly sovereign states to incline towards Non Alignment policy as a foreign policy. The shadow of history and past experiences clearly visible in the foreign policy interaction of India, with Pakistan and China. The characteristics of India's cultural heritage are enshrined in the foreign policy of India. The fundamental principles of India' foreign policy believes in peace, non violence, international cooperation co- existence, world fraternity, Panchsheel and humanism.

5. **Social Structure:** The social structure of society also influences the foreign policy of a state. The degree of conflict and harmony among various social groups certainly affects values and norms of foreign policy. India's foreign policy has been greatly shaped by values like secularism, justice, fraternity, equal right of development, international peace, and non violence. These values are stemmed from unique and diversified social structure of India.
6. **Government Structure:** The structure of government and the agencies involved in making and implementation of foreign policy is another important element of foreign policy. In centralized and authoritarian system, foreign policy generally remains isolated from public opinion while in democratic systems, foreign policy always take a note from public opinion. Again, in democratic system, the presidential and parliamentary form of government works differently in conducting foreign policy. Further, bureaucratic structure and position also influences in formulation of foreign policy and its goals.
7. **Internal Situations:** Internal situations of a state also affect foreign policy of that state. Sudden changes, disorders and disturbances that occur within the state greatly affect foreign policy of state. For instance, in Pakistan when military rule takes over democratic system, foreign policy of Pakistan becomes more aggressive and anti Indian.
8. **Values, Experiences and Personality of Leaders:** Foreign policy of a state is always mirrors the values, experiences and personality of its founders, executive leaders and diplomats. The personal values, knowledge, liking, disliking skills, attitude, vision and the world view of decision makers are vastly affect the foreign policy. The US foreign policy decisions have been different due to the different attitude and personality of president and their secretary of state. The Indian foreign policy is vastly often called Nehru's foreign policy till 1964, later marked by aggression of Mrs. Indira Gandhi. The foreign policy during the period of Mr. Rajiv Gandhi ad P.V. Nashima Rao was more oriented towards modernization and economic development. The

Congress government lead by Mr. Manmohan Singh was more aggressive on economic development and tuned with the US as a strategic partner. Modi government is further enhancing the economic reform agenda and projecting India as a global power with tough posture and more aggression. This factor is not independent always guided by legacy and National Interests.

9. **Accountability:** The accountability of political system is an important factor to be always considered before foreign policy decision. In democratic political system, which is highly accountable and responsible to the people, this factor attains greater influence over foreign policy. While, in Totalitarian and authoritarian which lack of accountability, public opinion has marginally or no influence over foreign policy.
10. **Ideology:** Foreign policy of a state always pursues the national interests and seeks reorganization and support from other nations. This support and reorganization gathered under the umbrella of common ideology. Every foreign policy has often some ideological content to support and criticize other state's foreign policy. The conflict of ideologies during cold war (1945-1990), had shaped the foreign policy of super powers and other nations under their umbrella of ideologies.
11. **Diplomacy:** Diplomacy is the dynamic instrument of foreign policy to establish foreign relations and conduct them with other actions according to national interests of a state. Foreign policy is conducted through diplomacy to serve the goals of National interests. Diplomacy also provides important feedbacks in form of inputs to the makers of foreign policy to adjust with the external and internal dynamic circumstances in conducting foreign policy. Morgenthau regards diplomacy as a best instrument of power management among states. As there are many nuclear powers today, the role of diplomacy in maintaining peace is attaining greater influences.
12. **International Power Structure (Global Strategic Environment):** In international relation, every state establishes relations with other states

for the sake of national interests. Acquiring crucial power position according to the respective capabilities is a predominant national interest of each state, thus, in totality international relation forms a power structure in which the more powerful nations are in better position to play a more crucial, vigorous and leading role in securing their objectives of foreign policy. The prevailing power structure defiantly influences the foreign policy of nations. After two world wars, weakening of the European states provided ground to the US to change its isolation stance and seure the leadership role in international power structure. This change in power equations in favor of the US brought the USSR in counter to balance the power equation which resulted in ongoing cold war between two super powers. During the era of cold war, newly independent states like India adopted Non Alignment policy to have equally balanced relations with the super powers. Again, the bipolar power structure collapsed with the dissociation of the USSR and unipolar power structure begun to emerge with the rise of large developing nations. China and India are important emerging power in context of international power structure. China is reflecting itself as a challenge for unipolar power structure by replacing Russia as a counter to the US. This new development is pushing India to align itself with the US to counter Chinese threat. In context of the new power structure, apparently India is changing its foreign policy by aligning itself with the US Japan, Taiwan and Israel to counter Chinese dominancy in the Asia.

13. **Public Opinion:** National and international public opinion vastly affects the foreign policy o a nation. The policy makers of each state have to respect the public opinion in formulation of their foreign policy. Especially in democratic countries like India, public opinion is very important inputs for foreign policy.
14. **Technology:** The advanced technological development equips a nation to influence other nations and always keeps it on high side of the international relations. The ability to provide technological support and

assistance, position a nation at forefront to conduct its foreign policy with the greater effects over the receiving country. Technological development affects the military and economical capabilities of a nation and thus its role and status in the international system. The US, France, Germany, Japan China and India can be cited as a classic example of the technology influence over the foreign policy. Earlier, India's foreign policy was compromised due to the lack of advanced technology, especially dual use technology. However, India's steady progress in information technology, military, atomic and space, certainly has been providing strength to the foreign policy of India.

15. **Alliances and International Treaties (Bilateral and multilateral):** In the international relations alliances are make to amplify strength of common national interests. An alliance serves as an important instrument to pool the powers of different nations who share their common goals of their foreign policy. Alliances and treaties were emerged post 1945 as strategic tools of foreign policy; when the US and the USSR recognized and formed several alliances and treaties to consolidate their respective positions. During the cold war era WARSAW pact and NATO had been important determinants of foreign policy of the US and the USSR and their respective allies. After demise of WARSAW pact, NATO is still alive to serve the foreign policy goals of the US in the Europe. Apart from military alliances, economical regional and international organizations, trading blocks and agreements are also formed to secure the goals of foreign policy. The European Union, SAARC, ASEAN, APEC, NAFTA, SCO and several other organizations ad treaties have vast influence over the foreign policy of members. The foreign policy of state is subject to adjust change under pressure of NPT, CTBT WTO and UFCCC. India's align towards the US to get NSG membership without accepting the NPT is a clear example of international treaty pressure on foreign policy of a country.

16. **External Environment:** International external environment is an always prone to important and frequent situational changes. These situational changes provide necessary inputs to foreign policies of states and accordingly adopt and adjusted to these changes. Dissolution of the USSR is an important example which affected almost all nations including India. Indian foreign policy has been always adopted international environmental changes. The Bangladesh war, the Afghanistan crisis, Chinese alliance with Pakistan, Have been inputs for Indian foreign policy. Terrorist activities impetus nations to take collective measures. Again China and Pakistan two sided fencing of India encouraged India to incline with the US, Israel and Japan more involvement in rebuilding the Afghanistan. Furthermore, new international economic order, issues of proliferations, international terrorism, the issue of climate change has been major factors in foreign policy making of India As well as other nations.

## **5.5** India's Foreign Environmental/Climate Policy

India's foreign environment policy or climate policy is not independent of broader foreign policy of India. Indeed, the core values of broader foreign policy also reflect in the foreign climate policy of India. Even, on several occasions' climate policy used to achieve goals of broader foreign policy and vice versa. Prior to INC negotiations the climate change issues was discussed in broader term of Environment issue. Later, as the climate change regime developed, border Environmental issues more precisely began to express in climate context. For this thesis Environmental policy and Climate policy is used interchangeably but in foreign policy context. Every foreign policy is based on certain core values and traditions. Similarly, foreign climate policy- which is indeed functions under the broader spectrum of foreign policy but with specific goals in climate regime- also derives its core values from the heritage of broader foreign policy. As far as India's foreign climate policy is concerns, it has been largely resulted by tradition and values and decision making process. It has also influential effects of various determents of broader foreign policy, discussed above.

### **5.5.1** Traditions and values in Indian Foreign Climate Policy

India is a country of rich ancient culture and it has a treasure of heritage of values and traditions. These values and traditions can vividly be seen in social, political, cultural economical dimension of the country and hence they have been vastly shaping the Indian foreign climate policy. The concept of foreign climate policy derives its core fundamentals from the broader foreign policy concept. It can be said that foreign climate policy is associated with the specific national interests of country that has to be secured in international climate regime. As far as India's foreign environment or climate policy is concerned, according to Dr. M.G. Rajan two main sources can easily be identified, first, Orthodoxy established by Indira Gandhi and second, Legacy of India's foreign Policy[29].

#### **5.5.1.1** Orthodoxy established by Indira Gandhi

The orthodoxy in Indian foreign policy by measures stemmed from Indira Gandhi's speech delivered in Stockholm Conference 1972 and prevailing in India's foreign environment policy. Mrs. Gandhi said:

> "We do not wish to impoverish the environment any further and yet we cannot for a moment forget the grim poverty of large numbers of people, are not poverty and needs the greatest polluters? ...How can we speak to those who live in villages and in slums about keeping the oceans, the rivers and the air clean when their own lives are contaminated at the source? The environment cannot be improved in conditions of poverty nor can poverty be eradicated without the use of science and technology."[30]

Mrs. Gandhi was clear that "The environmental problems of developing countries are not side effects of excessive industrialization but reflect inadequacy of development". Thus, Mrs. Gandhi had explicitly underlined the fact that for India (and hence generally for developing countries) poverty was the greatest polluter and problem of environmental degradation and poverty were only be solved by the development. Mrs. Gandhi further argued "will the growing

awareness of ‘one earth’ and ‘one environment’ guide us to the concept of one humanity? Will there be a more equitable sharing of environment casts and greater international interest in the accelerated progress of the less developed world?”[31]

Mrs. Gandhi said that the developing nations would cooperate with developed countries to conserve and protect the global environment. But developing nations reserved their sovereign right to determine their own priorities and preferences with regard to environment protection. Mrs. Gandhi was very clear that developing countries had their own sovereign right to decide their priorities and should not be twisted for cooperation by putting political and trade restrictions. Mrs. Gandhi said, “Many of the advanced countries of today have reached their present affluence by their domination over other races and countries, the exploitation of their own masses and their own natural resources. They got head stare through sheer ruthlessness, undisturbed by feeling of compassion or by abstract theories freedom, equality or justice.”[32]

Mrs. Gandhi criticized developed nations by saying that rich countries exploited the nature ruthlessly and now they are warning us against their own methods and pressing the poor to live continue in poverty. Mrs. Gandhi criticized the pronouncement of the North that the rapid growth in population of developing countries caused environmental degradation and poverty. She argued that concern with population was a narrow perspective to define the environmental degradation and prior to accusing the developing nations and their population as a culprit of environmental degradation at least, it was important to draw a needful thought of consumption pattern and lifestyles of the poor, particularly when compared to the consumption pattern and lifestyle of the rich. In her own words:

> “It is an over-simplification to blame all the world’s problems on increasing population countries with but a small fraction of the world population consume the bulk of the world’s production of minerals fossil fuels and so on. Thus we see that when it comes to the depletion of natural resources and environmental pollution the

> increase of one inhabitant in an affluent country, at his level of living, is equivdent to an increase of many Asians, Africans or Latin Americans at their current material levels of living."[33]

Mrs. Gandhi's approach towards global environmental issues can be traced back into her political preferences and vastly influenced by the Founex Report (Switzerland 1971).

**Political Preferences:** Mrs. Gandhi won the general election in 1971 on the populist socialist slogan 'Garbi Hatao!' (Eradicate Poverty). She had a clear view that poverty could be addressed through the development. Accordingly she had taken socialist actions for instance nationalization of banks and insurance companies, instituted poverty alleviation schemes and abolition of privy purses. Mrs. Gandhi's speech was reflection of India's sovereignty and solidarity with the third world.

**Founex Report (1971):** In 1971, a seminal meeting of policy makers and experts were held at Founex, Switzerland. The Founex Report later served as the intellectual platform for the Stockholm Conference I 1972. The Founex Report, explicitly laid down difference between environmental problems of developing countries and those of developed countries. The Report highlighted 'development' as main culprit for the environmental degradation in developed courtiers, while 'poverty' and lack of development in developing countries. According to the Founex Report "The current concern with environmental issues has emerged out of the problems experienced by the industrially advanced countries. These problems are themselves very largely the outcome of a high level of economic development." [34]

The Report further Concluded, "However, the major environmental problems of developing countries are essentially of a different kind. They are predominantly problems that are of importance in developing countries are those that can be overcome by the process of development itself."[35]

Mrs. Gandhi had reflected the central idea of Founex Report in her Stockholm speech that "not merely the quality of life but life itself was endangered by the poor quality of water, housing sanitation, and nutrition and by sickness, diseases and natural disasters."[36]

The critical question that Mrs. Gandhi were raised at Stockholm that developing nations should embrace the 'development' as a key to solve local environmental issues remain at the central of India's narrative on the issue of environment and climate change even today. India adopted the 26 declaration principles of Stockholm conference and accordingly Mrs. Gandhi established the 'National Conference on Environmental Planning and Co-ordination in 1972. After her re-election in 1981, she established the "Department of environment and Forest" that was elevated to become the 'Ministry of Environment and Forest' (MOEF) in 1985.

### **5.5.1.2** Foreign Policy Legacy

During the emerging era of climate change regime, Indian foreign climate policy was resulted as a product of orthodoxy developed by Mrs. Gandhi and legacy of foreign policy of India. Since Indian independence in 1947, three generations of Nehru-Gandhi family set the core values and traditions of Indian foreign policy The Ministry of External Affairs was handled the environmental issues without expertise. Again, owing to the lack of policy planning and institutionalized thinking, foreign climate policy was made and executed according to the core values and traditions of Indian foreign policy. It can be said that India's foreign environment or climate policy was adhered to foreign policy and mostly followed the legacy of foreign policy of India.

At least four relevant aspects of Indian foreign policy which dominated the Indian foreign environment policy can be mapped as:

- A concern for sovereignty
- A concern for equity
- A concern for solidarity with Third World

- A concern for India's international image and high degree of self esteem

Sovereignty has been a core valuable tradition of India's foreign policy due the past experience of colonization. India always voiced for sovereignty of Asian and African countries on various international platforms. India has been great believer of democratic international system with sovereign right of each country. Many instances can be cited to indicate the importance of sovereignty in Indian foreign policy. From economic perspective, India has followed the policy of diversification of sources of aid, trade and economic collaborations. India stance on the Non-proliferation Treaty (NPT) and the CTBT are explicit examples of India's sovereign concern.

India has been consistently denied to accept the NPT and the CTBT in present format which limits India's capabilities in nuclear development. Due to the rejection of NPT India was denied for nuclear fuel and technology for energy programs. Despite the inevitable danger of criticism and trade restriction, India did nuclear test fire Pokaran-I (1974) and Pokaran-II (1998). These nuclear tests clearly reflect India's concern for sovereignty.

Equity in international relation has been important aspect of India's foreign policy. India has been consistently supported the UN which acknowledged equality and sovereignty of all nations and one vote principle for one state. India always supported to the idea of the universal membership of the United Nations and even advocated inclusion of China in the UN, despite the border conflict with China in 1962.

Solidarity with developing nations (Third World) has been prominent and consistent feature of Indian foreign policy. The reason behind this solidarity was very obvious. India was the first major developing nation to secure independence from Britain after the II world war. After independence, India strongly advocated decolonization at the UN platform and voiced for Afro-Asian solidarity at Bandung in 1955. India gained a leadership role in Third world and thus solidarity with Third World became consistent aspect of India's foreign policy. The

Common history of colonialism, economic exploitation, high and dense population, poverty, underdevelopment in third world further impetus solidarity within Third World, which was materialized as Non-Aligned movement (NAM) under the leadership role of India. During the era of cold war NAM provided the platform for newly emerged Asian and African countries to voice for their common interests.

In international scenario, generally, India regarded as representative prominent voice of the South. In 1970, during the North-South debates over 'New International Economic Order' (NIEO), India pressed hard for the elimination of structural inequalities in international trade which were unduly tilted in favor of developed countries. India had played a prominent role in articulation of Third World opinion over various issues during NIEO debates. India demanded for abolition of Northern non-tariff barriers to developing world exports, enhancement of aid flow and debt relief. Solidarity with Third World was indeed in self interest of India as it shared many common interests with other developing nations. Enormous support from Third World nations had made India able to play a prominent role in world's multilateral economic forums (UNCTAD, GATT) to safeguard its own economic interests.[37]

Concern for international image and high degree of self-esteem has been consistent feature of Indian foreign policy. After freedom, India adopted an independent Non-Aligned policy in context of prevailing conflict between Capitalism and communism. India explored and expressed itself as an independent and balancing actor in the world affairs. India's independent image further intensified with the huge support of the Third World. India has been always regarded as a country who believes in international peace and cooperation on the basis of 'Panchsheel' principle. However, India has been very keen in protecting its international image of emerging power, high degree of self-esteem and national interest, especially in the regional context.

In the history, there are several occasions, when India exercised its power capabilities and forcefully secured its national interest and territorial integrity. For

instance, India armed intervention created Bangladesh in 1971, forceful acquisition of Goa in 1961 and deployment of army in Shri Lanka in 1987. It is also important to recognize that self-esteem in India's case has traditionally been related to a strong desire to be seen as a responsible and trustworthy member of the international community. According to Nayar's opinion in diplomatic history "India has been moderate rather than extremist, pragmatic rather than adventurist, deliberate rather than hasty, restrained rather than proactive, pacifist rather than warlike".[38]

## **5.5.2** Policy Making

In a democratic country, ideally it is expected that policies should be emerged from the consensus of popular public opinion. In representative democratic system the inclusion of public opinion is apparently obtained through the elected representatives of public. As far as India is concerned, the government has ultimate power and authority to shape draft and execute the policies of the country. However, parliament, media, political parties, business interests, NGOs and environmentalist groups also play an important role in influencing the policy making process. Baring the government, involvement of other actors is depends on their interests, subject and public awareness regarding the subject of policy.

As far as India's foreign environment Policy or climate policy is concerns, it has not been focal point of mass debate. Hence other actors, generally has little influence in shaping India's foreign environment policy. It is also pertinent to mention that after 2007 awareness regarding foreign environment policy, specifically climate change policy-deals with India's bargaining position, policy stand and national interests at international level (UNFCCC)- attracted attention but still, it is limited to the discussion table of intellectual upper class.

During the early years of evolution of climate regime, climate change was not a talking point, even in political and bureaucratic sphere. It was the year of 2002 when 8$^{th}$ Conference of Parties was held in Delhi and Mr. Pachauri was elected as a Head of the IPCC. Media coverage of the conference brought up the

issue of climate change in limelight but public connection was absent. Cop 15 in Copenhagen witnessed stormy political debate and heated up the climate issue which affected every country and India was not the exception.

### **5.5.2.1** Exclusive Powers of the Government with respect to Decision Making

The Policy making in India is exclusively executed and implemented by the Government of India, more specifically central executive. Although, being a democratic country, government is quite sensitive to receive public opinion, perception and feedback before proceeding for a crucial policy decision. But, as far as the issue of climate change is concerns, governments have been least interested to sensitize the issue in public domain. The Indian government has been enjoying autonomy in policy making and dealing the climate issue at international level

The issue of climate change and India's policy response to the issue has not been much discussed in public domain. It could not yet captured the essential public awareness and never been the important part of election campaigns and election manifesto of any political party. In absence of public awareness and debate, elected governments fully enjoyed autonomy in making of policy to conduct India's international position and stand with respect to climate change issue.

Secondly, bureaucratic framework and arrogant attitude of government's top official have always been reluctant to include other prominent nongovernmental voices in framing the foreign climate policy. Indian bureaucracy itself is a powerful elitist group, function as a super brain and there is no respect for public opinion. Treating administration as a secret is one of the most undesirable occupational characteristics of the Indian bureaucracy.[39]

Thirdly, autonomy of government in policy making and entering into international treaties and agreements is rooted in the constitution of India. In India the central government can sign any international bilateral or multilateral treaty

and unlike the US, which does not required any approval from the Parliament. However, to incorporate any international treaty obligations into national law, legislation to be made by the parliament for the execution of a international law resulted from such treaty. The autonomy of the government in making policies which deals with foreign affairs (climate change) is grounded on the constitutional provisions that can be further understood by making distinct between formation of treaties ( An executive action) and implementation of treaties(legislative action).

Formation of treaties is an executive action and Article 73 of the Indian constitution says "the executive power of the union shall extend to the matters with respect to which parliament has power to make law" and according to article 53 this executive power of the Union is "vested in the President and shall be exercise by him either directly or through officers subordinate to him in accordance with this constitution". Article 246 (1) of the Indian constitution conferred exclusive power to the Parliament to make laws on the subject under List I (The Union List) of schedule VII. Further, entry 14 of the Union List provides:

**"Entering into treaties and agreements with foreign countries and implementing of treaties agreements and conventions with foreign countries".**

Thus, by reading article 53 and 73 with entry 14 in the Union List conclusion can be drawn that the exclusive power of the president to make international treaty extends to any and all the matters on which Parliament has power to make laws.

Implementation of treaties: The power of implement international treaties by central government is mainly derived from article 253 and entry 14 of the 7$^{th}$ schedule of the India constitution. Article 253 states:

**"Notwithstanding anything in the forgoing provisions of this chapter, parliament has power to make any law for the whole or any part of the territory of India for implementing any treaty, agreement or convention with**

**any other country or countries or any decision made at any international conference, association or other body."**

It is pertinent to mention that apparently article 253 is overrides the principle of federalism contained in article 245 and article 246(3) and conferred the exclusive power to the parliament for the legislation with respect to implementation of international treaties. In other words, article 253 conferred and extends the power of legislation over a subject falls within the competence of state legislature (State List) to implement a treaty, convention or agreement with foreign country.[40]

It has been well established from the functioning of the Indian Parliamentary system that the legislative power of parliament is ultimately controlled by central executive due to the party system. Again article 253 do not circumscribe the executive power conferred by article 73 unless the exercise of the executive interfere, restrict or infringes the fundamental rights (Part III) or modifies laws, no legislation is needed to implement international treaty.[41]

### **5.5.2.2** Political Parties

In India, generally, contribution of political parties to the development of foreign policy in not significant. It has not been easy to spot the official party line on international issues. An election manifesto of political party can only be taken up for the official position of a political party on various issues. As far as environment policy or more preciously climate change policy is concern, it has not been in the priority list of election agenda of political parties. Failure of Green party of India can be understood in this context.

Two largest national political parties, Bhartiya Janta Party(BJP) and Congress (INC) both had been included environment in their respective election manifesto of year 2009 and 2014. Both the parties were predominately focused on domestic environmental policy rather than foreign policy with respect to climate change. In 2009, BJP's election manifesto endorsed the principle of "common but differentiate responsibility" and emphasized on the financial and technological

transfer from developed countries.[42] On the other hand, Congress party was focused on National Action Plan for climate change and proposed credible actions in balancing development and climate protection.

Similarly, in 2014 Loksabha election, BJP election manifesto mentioned the environment protection as 'safeguarding our tomorrow'. The BJP election manifesto was mainly focused on the environment protection and protection of Himalayan glacier and rational use of natural resources. The manifesto was silent with respect to India's international climate policy and position.[43] The Congress manifesto was contained with the brief policy indication that it would strongly advance and protect India's interests in international climate change negotiations.[44] The Congress manifesto was also mainly focused on the domestic actions to protect environment.

It is clear from the study of the election manifestoes of two largest political parties of India that climate change has not been a campaign platform in general Loksabha election and therefore policy inputs from political parties to the India's international climate policy is not significant. The environmental issues in India are framed and thus raised as a local issue at political platforms and mostly confined to the specific area. In India, the global perspective of climate change is not yet connected to the common people of India and hence the issue of climate change is not regarded as a mass mover election agenda.

### **5.5.2.3** The Parliamentary Response to Climate Issue

Theoretically, India parliament as considerable powers to influence the foreign policy of the country but in practical foreign policy is exclusively exercised by central executive. Barring criticism, opposition has no other tool to influence foreign policy of the country. Due to the majority of ruling party, legislature power of parliament is procured by central executive therefore members of parliament are not keen to discuss foreign policy matters. As far as India's foreign climate policy is concerned, it has not been regarded as electoral movers and therefore members of parliament are least interested in discussion of the climate policy. Again, the policy matters are regarded as solo executive

business of central executive and hence individual MPs are not interested in moving new bills or amendments to the proposed bills.

In India any international treaty does not required to be ratified by the parliament. The Indian executive can sign any treaty, convention or document without any mandate or subsequent ratification from anybody.[45] Further, limited time periods for discussion and defined party position, limited knowledge of the subject are some reasons that climate change policy has not been that much in lime light during parliamentary discussions. The parliamentary debate on climate change is very different from other countries. It is mostly focused on domestic issues of the environmental problems like floods, river erosion droughts etc. The issue of climate change is rarely discussed in context of India's policy position, role and stance during the negotiation process for climate deal.

Mostly, the extensive discussions are hosted by parliamentary Standing and Consultative committees. These committees are in discussion with individual ministries and support the function of the ministry. Firstly, during 14th Loksabha a Parliamentary forum for climate change was formed and in 2009 parliament widely discussed India's foreign climate policy in both the houses. The discussions were held before and after Copenhagen summit with respect to India's negotiating position. In Loksabha session XV-III (19 Nov.-18 Dec.) under rule 193, during short discussion MPs M.B. Rajesh, Prem Das Rai(Sikkim), B.Mabab(Cuttack), Jayant Choudhary(Mathura) Dr. Tarun Mandal( Jayanagar) raised questions regarding government policy during UNFCCC negotiations. Similarly, in Rajya Sabha Session 218(22 Dec. 2009) with opening statement of Environment Minister Jayram Ramesh, government policy was taken up under furious debate . Arun Jaitely criticized government's u-turn during Copenhagen summit.[46] However, it can be said that after, the Copenhagen Summit, Indian parliament has been taking the note of international climate policy of India.

#### **5.5.2.4** Environmental NGOs

There has been phenomenal growth in the numbers of NGOs working in different aspects of environment. Most of the NGOs are small in size and

resources and working at gross roots level, especially for the conservation of wildlife, forest, sanitation and health. Some of them, which are comparatively well organized and positioned, dependent on government aids in terms of sponsorship and project financing for their functionality. Their area of working is mostly pre-defined or focused on particular issue (like Narmada Dam) so as their contribution to the foreign climate policy is not significant. In India, effectiveness of NGOs, as a pressure group has been compromised due to the lack of unity. Further, these NGOs are politically divided under the influence of political ideologies or political personalities which circumscribe their input ability to the climate policy of India.

According to the World Wide Fund (WWF-India) website there are 31 core environmental NGOs working in India. It is pertinent to mention that despite the various shortcomings some have been, albeit limited, provided remarkable inputs to the India's foreign climate policy. These include the Tata Energy Research Institute (TERI), The Centre for Science and Environment (CSE) and WWW-India. The CSE and TERI are two prominent NGOs providing technical and policy inputs to the government of India for the international negotiations since 1992. The CSE is known for its high quality policy-related work. It has been facilitating sharp analysis and world class reports on various dimensions of environment.[47]

The CSE is the most vocal proponent of 'Per Capita' norm to differentiate mitigation obligations between developed and developing countries. India's official position on equity and right for development is based on the 'Per Capita' norm which was suggested by the CSE. It is pertinent to mention that in 1991, Washington based private research group 'World Resource Institute' (WRI) published a report blaming developing countries for climate change. The CSE published a counter report named 'Global Warming in Unequal World' and criticized the WRI report for faulty interpretation of data to frame developing countries responsible for climate change. The CSE report mentioned that "the WRI report is based on less on science and more on politically motivated and

mathematical jugglery". The conclusions drawn in CSE report was the core argument of India during the 'Earth Summit' held in 1992.

### **5.5.2.5** Business and Private Sector

In early 1990, Economic crisis led India o open up its economy and embraced privatization, globalization and liberalism as a new economic policy mantra. This paradigm shift in business and economic scenario placed the Indian industry at the cutting edge of international competition. With the small opposition from minor business groups, this was well taken up by Indian corporate and India saw a tremendous steady GDP growth in between 1991 to 2010. Tarun Das rightly pointed out that:

> "This changed context for industry has coincided with greater Indian and global business engagement with the environment. In 1991, the business council for Sustainable Development was established with a Swiss CEO as the chair, and with one representative from India, Ratan Tata. He was supported in this work b the Confederation of Indian Industries (CII), through a new environment committee, led by the late Avinider Singh".[48]

In early years of climate change regime, defensive position of Indian Government led the industry with the perception that India would not take any mitigation measure and they could do their business as usual without opting carbon reduction measures. The incorporation of Clean Development Mechanism (CDM) in the Kyoto Protocol (1997) changed the said perception of Indian industry. The CII asked a policy framework to participate in CDM to attract foreign investment. A prominent voice of industry, Federation of Indian Chambers of Commerce and Industry (FICCI) prepared a report based on UFCCC CDM policy dialogue. This report presented key inputs regarding CDM policy hurdles with the recommendation to eliminate them.

India is second largest CDM project holder after China and along with China collectively hosting 70% of the total CDM projects operating across the

globe. The Indian Designated National Authority (DNA) has approved 2355 CDM projects of which 860 approved by the UNFCCC. [49] In 2009, India announced emission reduction goal of 20-25% by 2020, shocked the CII but after due calculation, CII assumed that it would be easily achievable. Indian industry has been seeing tremendous growth potential in alternate energy sector under National Action Plan, especially in solar energy, which has huge investment opportunity in India.

### **5.5.2.6** Media

The media is called the fourth pillar of democracy. It is the only common source of information about government functioning and therefore plays a significant role in making public opinion and awareness regarding various issues the government dealing with. Broadly, media can be divided in electronic and print media. In recent years, electronic media has witnessed a revolutionary changes attributed to the DTH TV, penetration of internet through mobile phone and computer devices. Even, print media is also digitally available on electronic devices through internet. The print media is still reliable and authentic source of information rather than electronic media as exact source of information in electronic media is always not possible to locate.

The issue of climate change has not been popular subject of reporting in Indian media, especially in electronic media, which is TRP driven and hence mostly neglected the subject due to the lack of public interest. According to the study of Centre for Media Studies (CMS, 2014), climate change was largely neglected by Indian television news channels in between 2009-2014. The CMS analysis of six Hindi-English news channels (Aaj Tak, DD News, ABP News, ZEE News, CNNIBN and NDTV 24*7) in between 2009-2014 during prime time slot (7 PM-11PM) revealed that 0.8% minutes were allotted to the environmental news. In 2009, 1.5 % minuets were allotted to environmental news which fell to 0.2 % in 2014.[50]

The Print Media is also not exceptional; a similar trend of environmental news reporting is revealed in various studies. According to the website of News

paper Registrar, up to 2015, 15000 news papers and 90000 periodicals were registered. However, despite the huge publications, the environment and climate change has not been substantially covered by the Indian Print Media. A study by Billett concluded that four Indian News papers (The Times of India, The Hindu, Hindustan Times and Indian Express) had published 248 articles in between January 2002 to June 2007, stating global warming real.[51] In another study 27 countries were compared on the basis of news paper coverage of climate change in between 1997 to 2009, including two Indian News papers( The Hindu and Times of India). The study found that in India Climate change coverage has increased by a factor 2.9, far less in comparing of 10.5 in Australia and 16.4 in Indonesia.[52]

### **5.5.2.7** Government Machinery

The Ministry of Environment and Forest Climate Change is a nodal agency in dealing with environmental issues. Besides from MoEFCC, India's negotiation strategy is a part of broad foreign policy of India and needs to be seen in larger canvas of foreign relations. Therefore, the Ministry of External Affairs (MEF) also involved in crafting India's foreign climate policy. In addition to these two ministries other ministries like Power Coal, Finance and Planning Commission also provide inputs to the policy through Inter-Ministerial Meetings. It is pertinent to mention that Prime Minister Office(PMO) also monitor the Indian Foreign Policy matter through the high level committee PMCC chaired by Prime Minister of India.

**The Ministry of Environment Forest and Climate Change (MoEFCC):** Firstly, in February 1972, under the Department of Science and Technology (DST), a National committee on environment planning (NCEPC) was formed. The NCEPC was mainly advisory in nature rather than executive. In 1980 Mrs. had been re-elected as Prime Minister and she appointed a committee under the chairmanship of N.D. Tiwari to recommend institutional and functional mechanism for the environment protection. The Department of the Environment (DoE) was duly established on 1 November 1980 under the chairmanship of

Prime Minister as the cabinet Minister. The DoE was expanded as the Ministry of Environment and Forest (MoEF) in 1985.[53] The MoEF was renamed in May 2014 as the 'Ministry of Environment Forest and Climate Change' (MoEFCC) in context of prioritization of climate change.

Besides the legislature and regulatory measures, the MoEFCC is a nodal agency for the United Nation Environment Programme (UNEP), International Centre for Intergraded Mountain Development (ICIMOD) and South Asia Co-Operative Environment Programme (SACEP). It also serves as nodal agency for United Nation Conference on Environment and Development (UNCED) and Global Environment Facility (GEF). Indeed, the MoEFCC is a primary nodal agency to deal with all matters pertaining to the environment.

The administrative structure of each ministry is more or less common, headed by a Cabinet Minister and a top Civil Servant (IAS) as secretary to the Ministry. The Secretary is assisted by Additional secretary followed by Joints, Deputy Secretaries. The policy matters are mostly resulted from the coordination between the Minister and senior officials and technically supported by other bureaucrats and subordinated staff and specialized scientists.

**The Ministry of External Affair:** The Ministry of External Affair (MEA) is responsible for the policy matters pertaining to the foreign affairs. Since the issue of climate change is a multidimensional issue and just not confined, merely, to the environmental problem; it is equally a development issue, which demand equity in development right. In other words, it is bargaining process to secure maximum carbon space for the development and hence the whole negotiation process has multiple dimension, involves India's foreign relations and hence, it has to be seen in broader context of foreign relations.

Indeed, India's foreign climate policy can't be disassociated from the broad foreign policy of India. It also follows the same core values and traditions which led the Indian Foreign policy. Therefore, from 2004, a representative of the MEA has started to join the negotiation team of the country. The MEA follows the same administrative arrangements. The Ministry is headed by The Cabinet

Minister with two State Ministers, a foreign secretary with four secretaries, Additional Secretaries and Head of Divisions.

**The Prime Minister Council on Climate Change (PMCCC):** In 2007, Prime Minister Dr. Manmohan Singh constituted a high level committee on climate change and appointed former Foreign Secretary Shyam Saran as a special Envoy on climate change. The PMCCC was formed with the mandate to co-ordinate and assess National Action Plan. It was also mandated to provide policy inputs in dealing with climate change negotiations. It was comprised of 18 members, 13 members were government serving and retired officials.

The PMCCC included Ministers for MoEFCC, MEA, Agriculture, Water Resource and Science and Technology. Besides R.Chindambaram (Principal Scientific Advisor to PM), M.S. Ahluwalia (Dy. Cairperson Planning Commission), .Krishna Murthy(National Manufacturing Council), Ajay Mathur (Chairperson Bureau of Energy Efficiency), C. Rangrajan (Economic Advisory Council, the Foreign Secretary, MoEFCC Secretary and the Principal Secretary to the PM as Convener of council. The PMCCC were also comprised of some non-official members included R.K.Pachauri, Prodipto Ghos, Sunita Narain, Chandrashekar Dasgupta, Ratan Tata, Raj Chengappa (Executive Editor, India Today )and R. Ramachandran ( Science Editor, Frontline).[54]

The first meeting of the PMCCC was held on 13th July 2007 and decided to prepare a report by compiling the measures taken and proposed actions to address the climate change. The PMCCC met again in mid-2008 and discussed the draft of the National Action Plan on Climate Change. The draft proposal of NAPCC was approved on 30th June 2008 and later made public for implementation. Thereafter, the PMCCC met only to approve missions under the NAPCC. Finally, the PMCCC met in 2011and it was again reconstituted on 5th November 2014 by changing some members.

**Inter-Ministerial Cooperation and Coordination:** At domestic level, implementation of India's climate policy requires cooperation and coordination among various ministries. It is inevitable with respect to the volunteer commitments made out by India to the UNFCCC. Therefore, to achieve GHG mitigation targets, India offered in INDC, involvement of other ministries like Coal and Power, renewable, Food and Agriculture and Finance Ministry is necessary. Inter Ministerial discussion facilitates exchange of various ideas and provides necessary inputs to the foreign climate policy of India.

## **5.6** India's National interests in Climate Change Regime

In international politics, achieving, maintaining, securing and enhancing the national interests is an ultimate goal of foreign policy and therefore foreign climate policy is not an exceptional. The foreign climate policy also executed with the aim to secure, maintain and enhance the national interests associated with the international climate regime. The climate change regime has also been turning as the conflict of national interests of countries. Climate change is real; its certainty is well established and unanimously accepted by the world. Despite this fact, different national interests of countries are big challenge for global collective efforts. The success of the climate regime is largely depends on the compromisation and articulation of different national interests in the regime.

Often, national interests are defined as the goals of foreign policy in international relations. However, it is always difficult to precisely define and identify national interests of a country as they are dynamic in nature and subject to change under the influence of international circumstances. The climate change regime is also a battlefield of national interests where each country is marching to achieve the common and unanimous goal of protecting the earth from getting dangerously warm, but their efforts are vary in intensity and predominately guided by their enshrined national interests. It is relevant here to examine the concept of national interests, albeit in brief.

**Van Dyke** defined national interests "as an interest which the states seek to protect or achieve in relation to each other."[55]

**Morgenthau** defined as "National Interest is the political tradition and the total culture context within which a nation formulates its foreign policy".[56]

In its simplest form, the national interest is the perceived needs and desires of one sovereign state in relation to the world policies, nations competing and opposing each other for power .Each country pursue to protect their physical, political, economic and cultural identity against intrusion by other countries.[57]

The definitions mentioned above, collectively draw a conclusion that national interests are goals of foreign policy that have to be secure, maintain and enhance in relation to other countries. India's foreign climate policy cannot be assumed as working in isolation rather it has to be seen in broader context of foreign policy. Therefore India's foreign climate policy is aiming to secure its specific interests associated with the climate regime. In context of climate change regime, India's national interests have not been officially disclosed by government and it is difficult to explicitly identify and isolate them from the broad spectrum of national interests of the country. However, fair indications, in this regard, can be drawn from the Indian position, role and stand in global negotiations under the auspices of the UNFCCC.

## 5.6.1 Development

Climate change is well established fact and various IPCC reports have been proved it beyond any reasonable doubts that it is attributed to anthropogenic emission. The Western model of development is GDP driven and economic growth is fuelled by intensive use of fossil fuel which resulted in huge carbon stock in the atmosphere. The Southern countries, which are commonly referred as developing countries, home of billions of poor people, still struggling to provide basic human needs to their citizens. For developing countries, economic growth is inevitable to provide an essential minimum level of living standard. Therefore the

issue of climate change is closely linked with development and to avert climate change drastic reduction in GHGs emission is the only solution.

Apparently, the equitation looks quite simple but, indeed, very complex in nature, especially in context of developing countries. Mr. Srikant has rightly pointed out in his words:-

> "While achieving 'Development' remains as major challenge of the developing countries; most of them are not in a position to ensure basic need such as food, shelter, clothing and minimum 'standard' of living to all of their citizens. Getting rid from poverty, employment, literacy, lack of basic access to primary health care and education, free from malnutrition, stabilizing population, reduction in infant mortality rate, ensuring safe drinking water and sanitation; still remains far off for the more than the 90% population of the world today."[58]

From Indian perspective, it was well recognized that development should be the primary concern rather than climate change. Mrs. Gandhi said "poverty is the greatest polluter" this statement was recognized as the voice of developing countries and laid down the foundation stone of India's foreign climate policy.

From the beginning of climate change regime, India's foreign climate policy has been consistently focused on the development and economic growth to eradicate poverty and for social development. The Former Prime Minister Dr. Manmohan Singh Said, "For a poor country like ours, development and eradication of poverty is the supreme concern. So we have to marry the concern of management of global climate with the concern for development, for removal of poverty."[59]

India is the home of around 17.5% of the world population, while accounts only 2.4% of the world surface area. Around 30% of global poor houses in India; around 24% of global population without electricity living in India; around 92 million people have no access to safe drinking water. In 2011, the annual

consumption of energy (average) was merely 0.6 tons of oil equivalents (toe) per capita as compared to 1.88toe of global average in terms of per capita.[60] The domestic economic and social aspects of development (life expectancy, education level and incomes etc.) are denoted by Human Development Index (HDI) which globally ranked India at 135 positions out of 187 countries with a HDI of 0.586 in 2013. The Human Development Report released on 24th July 2014 by the UNDP said that India was the lowest performing country among the BRICS in all categories except life expectancy which was lower in S. Africa due to the HIV epidemic. The report placed India under medium human development group with HDI 0.614> India HDI 0.586; again the South Asian average 0.588 was also greater than India's HDI.[61]

According to the World Economic Outlook (2015) released by International Monetary Fund (IMF), in 2014, India's GDP (nominal) per capita was $1627 compared to $1508 in 2013. Despite the fact that India is 9th largest economy of the world, it was ranked 145 position on the basis of GDP (nominal) per capita due to its huge population around 1026 billion. India's per capita income is 6.69 times lower in comparison of world's average of $10880.

India is 9th largest economy of the world; however, wide social and economical disparities still exists amongst its regions and people. Around 30% of population (363 million) live in poverty, around 5% of the population (aged 15 year and above) have no employment and around 1.77 million people is homeless. India has only 917Kwh electricity consumption per capita which is barely 1/3 of the world average consumption.[62]

India is a rapidly growing country and it is expected that its population will substantially increase in coming years. The increase in population will put pressure on every sector of economy. From agriculture production to electric production and infrastructure, every sector has to grow to meet the need and demand of population. Therefore, enormous development is the only solution to meet the increase demand of growing population.

Following key micro indicators denotes the future needs of India with growing population and urbanization.

**Table 5.1: Population Growth, GDP and Growth in Electric Demand**

| **Indicators** | **India2014** | **India2030** |
|---|---|---|
| Population(billion)[a] | 1.2 | 1.5 |
| Urban population(million)[b] | 377(2011) | 609 |
| GDP@2011-12 price(trillion)[c] | INR106.44, USD 1.69 | INR 397, USD 6.31 |
| Electicity Demand(Twh)[c] | 776(2012) | 2499 |

Sources: a-population Foundation of India, b-Un World Urbanization prospects, c-Government India. Data quoted in INDC.

The predictions are very clear that India will be large in every aspect of development and to support this huge requirement of development and economic growth, India needs consistent and secure energy supply. In fact, economic growth in term of GDP is inevitable for the development of every human aspect and economic growth depends upon energy availability. Thus, economic growth, development and energy security are correlated. This correlation is explored in following section.

### **5.6.1.1** Energy Development Linkage

Energy and development are strongly correlated to each other, in fact , energy is a prerequisite to the development and economic growth. Every aspect of development; housing, infrastructure, manufacturing, education, life expectancy, health,, mining, transportation, agriculture require energy. Energy can be produce from various sources; broadly divided into conventional sources like coal, wood and oil (emission intensive but cheaply available) and non conventional or renewable like solar, hydro and wind (expensive but nearly zero emissions).

The common form of energy which is widely used is electricity and largest part of fossil fuel is used to produce electricity. Therefore, to explore the linkage

between development and energy, data related to electric consumption, development (in HDI) and economic growth (in GDP) is significant, presented below in a table.

**Table 5.2**: **Correlation of Electric Consumption with HDI and GDP (nominal) 2014**

| **Country** | **E. Consumption(Kwh) Per Capita*** | **HDI**** | **GDP in $US per capita***** |
|---|---|---|---|
| Canada | 15546 | 0.919 | 50397 |
| USA | 12987 | 0.918 | 54596 |
| Australia | 10059 | 0.937 | 61219 |
| Germany | 7035 | 0.924 | 47590 |
| France | 6938 | 0.894 | 44538 |
| UK | 5130 | 0.908 | 45653 |
| S.Africa | 4198 | 0.665 | 6482 |
| China | 3927 | 0.734 | 7589 |
| Brazil | 2601 | 0.754 | 11604 |
| India | 806 | 0.615 | 1627 |

Sources: *Statistctimes; **World Bank; *** World Bank

The data presented in table 5.2 clearly shows that countries with higher per capita electric consumption have higher HDI and their GDP per capita is also on higher side. On the other hand, developing countries are on lower side of per capita electric consumption with lower HDI and lower per capita GDP. It becomes clear that these three indicators are positively related to each other. Girish Sant and Ashwin Gambhir has elaborated these correlation as:-

> "These linkages are strong but also somewhat flexible. It is correctly argued that GDP growth in itself is an insufficient measure of development. Special policies are required for eliminating hunger and poverty from the lives of large section of the population, however, an increase in GDP is an important part of poverty reduction. Productive employment is associated with increased income and increased consumption of goods and services, both of which require increased energy use."[63]

It is estimated that in 2030, India's population will be around 1.5 billion and approx 609 million people will live in urban areas. In this scenario, consistent energy supply is necessary to support India's future growth. In Indian perspective, which is fairly relevant to other developing countries also, the real challenge is associated with the emission of energy sources as most of the developing nations heavily rely on the fossil fuel for their energy demand.

### **5.6.1.2** Development/ Economic Growth and Energy Emission Linkages

It is well established correlation that energy is inevitable for the overall growth of a country. The Western model of development-energy intensive and largely fuelled by fossil fuel- is mainly responsible for the climate change. This fossil fuel based model of development is commonly followed by the most of developing countries including India. Fossil fuels are relatively cheap and easily available therefore, developing countries not willing or adamant to shift on non fossil fuel based energy sources due to the excessive cost and lack of technology.

India is not exceptional; India is mostly depends on fossil fuel for its energy needs. It is anticipated that India will grow rapidly in coming years and in the new policies scenario a dramatic and fundamental shift in the energy matrix is unlikely.

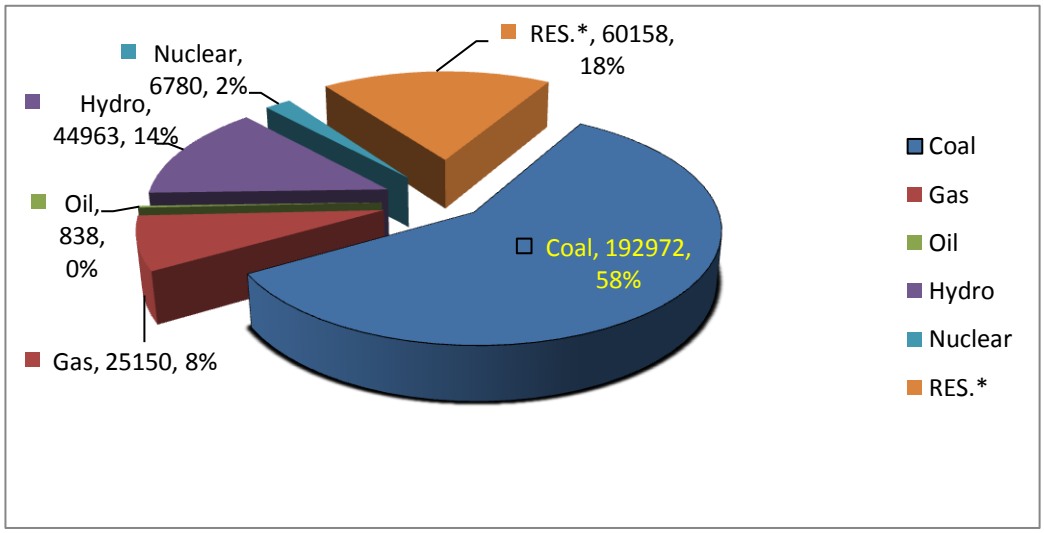
**Table 5.3: Primary Energy demand by Fuel in India in the new policies Scenario (Mtoe)**

| **Energy Source** | **2000** | **2013** | **2020** | **2030** | **2040** | **Share in %** | | **2013-2040** | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | **2013** | **2040** | Change | CAGR |
| Oil | 112 | 176 | 229 | 329 | 458 | 23% | 24% | 282 | 3.6% |
| N.Gas | 23 | 45 | 58 | 103 | 149 | 6% | 8% | 104 | 4.6% |
| Coal | 146 | 341 | 476 | 690 | 934 | 44% | 49% | 592 | 3.8% |
| Nuclear | 04 | 9 | 17 | 43 | 70 | 1% | 4% | 61 | 7.9% |
| Renewable | 155 | 204 | 237 | 274 | 297 | 26% | 16% | 93 | 1.4% |
| Fossil Fuel Share | 64% | 72% | 75% | 78% | 81% | 72% | 81% | 8% | N.A. |
| Total | 441 | 775 | 1018 | 1140 | 1908 | 100% | 100% | 11.33 | 3.4% |

Source: India Energy Outlook, IEA 2015

It can be concluded from the table 5.3 that coal will remain at central position in energy matrix of India, increasing its overall share from 44% (2013) to 49% (2040). India was 3rd largest producer of coal in 2012 with 7.0% of global reserve.[64] Coal is an important source of energy and mostly used for power generation as production cost is 2.5-3.5 Rs per Kwh which is cheapest in comparison of other sources like wind (3.5-5.3Rs.) and solar (11-12.5Rs.). In India, coal fired power plants produce most of its installed power capacity as shown in figure 5.1.

**Figure 5.1: Installed Power Capacity by Source**



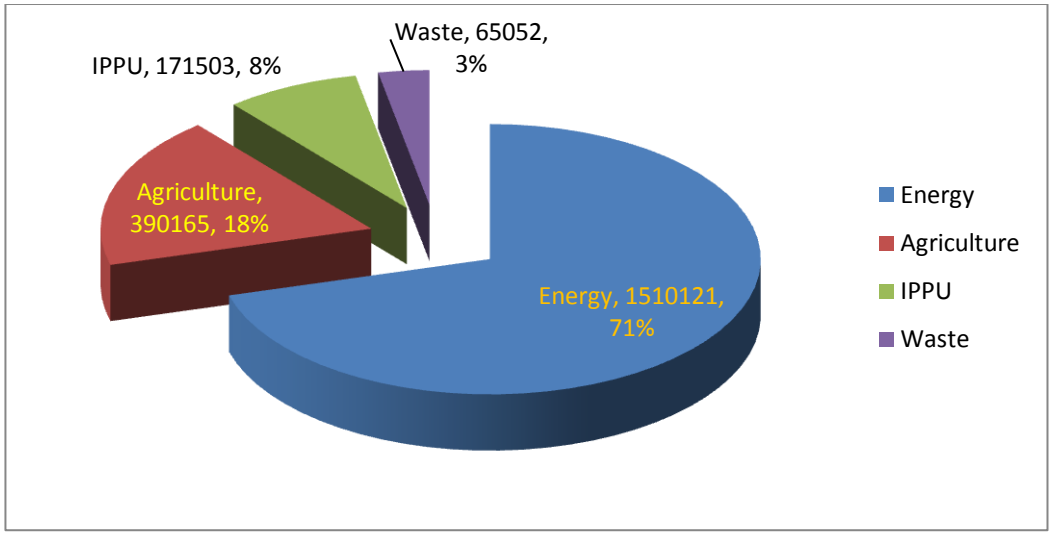

Source: Central Electricity Authority (installed capacity as in 2017)

Above figure 5.1 shows that in 2017, coal alone produced 58% of India's installed power capacity which is about 192972MW of total installed capacity 330861MW.

The real challenge for India stems from these coal fired power plants as coal is highly GHG emission intensive source of energy. According to the first Biennial Update Report (BUR) submitted by India to the UNFCCC, in 2010, India emitted 2136.84 million tones $CO_2$ eq. GHGs. The largest contribution was come from energy sector around 71% (Fig.5.2). The energy sector is comprised of mainly electricity generation which is largest contributor of GHGs emission due to the intensive use of coal as a primary source to produce power. Another sectors

contributed in total inventory of GHGs are agriculture (18%), Industrial process and product use (8%) and waste (3%). (Figure 5.2)

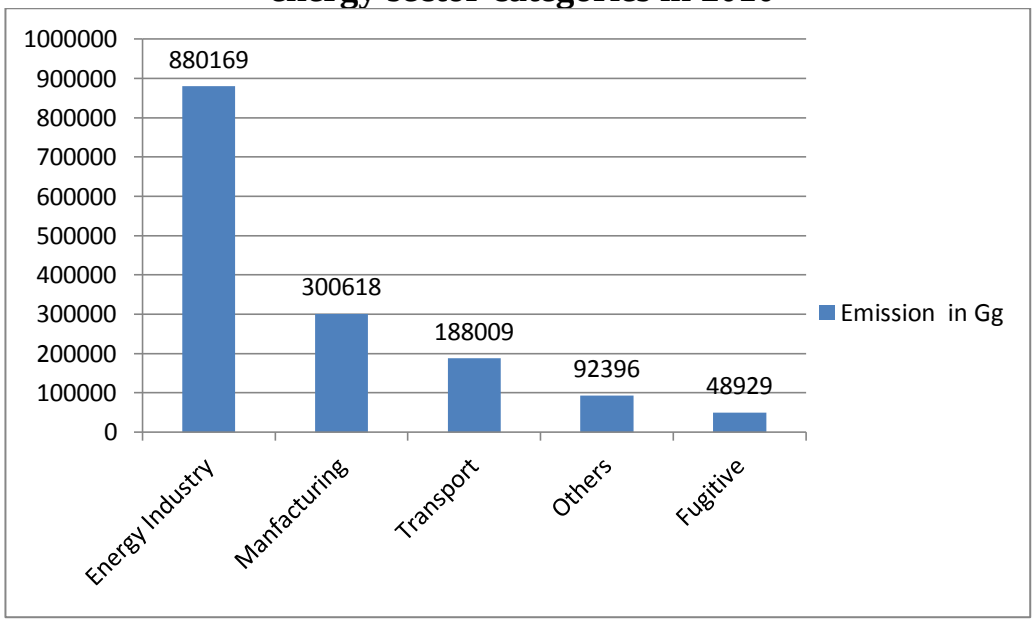
**Figure 5.2: GHG emissions by sector, 2010 (Gts $CO_2eq$)**




Source: First Biennial Update Report2015 to the UNFCCC, MoEFCC, GoI.

The energy sector which is vital for economic growth of India is comprised of energy industries, manufacturing, transport, fugitive and other emission. It is shown in figure no 5.3.

**Figure 5.3: Distribution of CO2eq emissions (Gts) across the energy sector categories in 2010**




Source: Biennial Update Report2015 to the UNFCCC, MoEFCC, GoI.

Conclusively, it is very clear from above analysis that in climate change regime, the right of development is first priority of India to eradicate poverty with the sustainable economic growth. India is not willing to take any imposed mitigation efforts that can interfere with its economic development. However, being a responsible member of international community, India has pledged to reduce its GHGs emission 20-25% of its GDP intensity by 2020 compared to 2005 level. Before Paris conference, India further raised its ambitious goal to reduce the emission intensity of GDP by 33-35% by 2030 from 2005 level.

## 5.6.2 Equity and Climate Justice

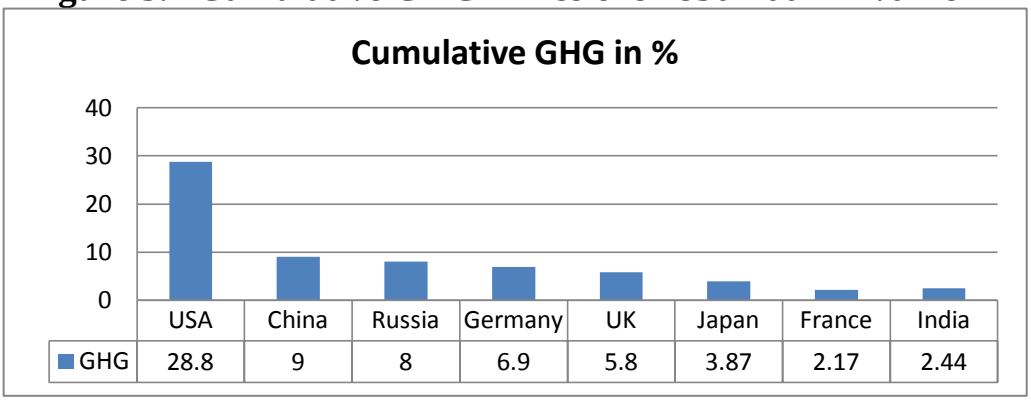
India has been a prominent country advocating for the equity issue in climate regime. The issue of equity is core of India's foreign climate policy. Right from the Earth summit, officially India is emphasizing that any global treaty or agreement should be based on the principles of equity, especially, distribution of mitigation efforts must be coupled with national circumstances and respective capabilities. In climate change regime the real challenge has been associated with the equity issue and it is still, a focal point of international negotiation. India, as a second largest populous developing country and 3$^{rd}$ biggest GHG emitter, find itself in a sticky position on the issue of equity.

The equity issue can be understood in five dimensions (discussed in chapter III), now, how India's national interests are served by the most contentious issue of equity? It can be understood by analyzing the each dimension of equity with respect to Indian perspective.

**Responsibility:** With regard to assigning responsibility of climate change, India has crystal clear view that developed countries are responsible for the cumulative stock of carbon in the atmosphere hence primarily responsible for the mitigation efforts. Since Industrial Revolution, The Northern countries abundantly used fossil fuel for their developmental needs and still emitting more than their

fair share on per capita basis. The historic emission in percentage term is shown in figure 5.4

**Figure 5.4 Cumulative GHG Emissions 1850-2007 in % Term**




Source: WRI, USA

In contrast to historical emission, big chunk of future GHG emission would be from large developing economies like China and India. If the historical emission data compared on the basis of per capita , India stands nowhere in the top emitter list. India has always emphasized and referenced the historical cumulative emission of developed nations and argued that developed nations have to drastically reduce their GHG emission to vacate the carbon space for the absorption of developmental emission of developing nations. India has further argued that the historical emission is a debt to developing nations and that should be pay back as financial and technological assistance to the developing nations.

**Equal Entitlement:** The fundamental of India's equity perspective is basically implies the equal right of every individual to the global common of atmosphere. It translates into the equal right to utilize the globally common natural resources for the sake of development. India has a long and very clear stand that emission responsibility and emission right should be decided on the basis of per capita. The per capita argument is the bedrock of India's foreign climate policy and has been strongly supported by other large emerging economies like China, Brazil and South Africa.

It is well established by the IPCC that there is a finite limit of carbon accumulation, the atmosphere can hold to keep the average temperature rise

within the $2^0$ C limit. This finite limit is commonly regarded as available safe carbon space that can be used by the world to check the temperature rise within or around $2^0$ C. In other words, the gap or difference between the current world GHGs emission and the threshold GHGs emission that atmosphere can hold to keep the average temperature rise within the range of $2^0$ C.

The most contentious issue in the climate change regime is how this available carbon space should be utilize or distributed amongst the countries? India has been consistently demanded and pursued the equal entitlement as an equal development right on the basis of per capita. India has tried to frame the equal per capita right to carbon space as a 'climate justice'. India is second largest populous country and any allocation of carbon space on the basis of per capita would provide the maximum space for its emission. The per capita emission of India is very low; India is poor country on the per capita GDP basis and most of the HDI indicators are lower side therefore, India needs emission space for its development and that can be ensured by the equal entitlement.

**Capability:** Indian stand point of equity is closely related to the capabilities of a country to cope with the climate change. This dimension of equity implies that mitigation efforts should be allotted on the basis of economic, social and geographical circumstances and capabilities of a country. The capability dimension is more significant in context of adaptation to the adverse effects of climate change. India is keen to measure the economic capability in term of per capita so that the developed countries could be pressed for financial and technology transfer to the developing countries.

**Basic Needs:** In climate change regime, India has consistently argued that developing countries are under obligation of providing essential minimum living standard to their citizens. On account of under economic development, huge population of these countries still deprived of basic human needs. Further poverty, unemployment, poor health- sanitary services, and illiteracy are serious issues that have to be addressed by these developing countries on the priority basis. India has strongly demanded that "Luxurious Emission" and "Basic Needs Emission"

should be differentiated. The GHGs emission in developing countries should be seen as the emission which is essential for their economic development to provide basic needs to their citizens.

**Comparable Efforts:** India has clear approach towards comparable efforts undertaken by the nations to tackle climate change. India has argued that dichotomy between developed and developing countries on the historical responsibility in aggravating climate change should be taken in consideration. Again national circumstances are different in different countries; therefore, obligations should be comparable in context of respective capabilities and national circumstances of nations.

Conclusively, all five dimension of equity concept has been enshrined in the principle CBDR regarded as basic principle of the UNFCCC. Since the inception of international negotiations over climate change, the principle of CBDR has been consistently referenced as to ensure the equity during conference of parties. It has been ethical and moral voice of developing countries for climate justice and exercised in Kyoto Protocol as a clear dichotomy between Annex I and Non Annex countries with respect to mitigation obligation to curb climate change.

## 5.6.3 Solidarity with Third World

India's foreign climate policy has been deeply rooted into the foreign policy of India. After independence, India's national interests were conceptualized on the democratic socialist pattern of development with the goal of poverty eradication and modernization through economic development. Post independence and during the era of cold wear, India's foreign policy was mainly centered to safeguard its infant post colonial sovereignty through autonomous actions and independent policy decisions to attain the rightful position in international order. India played a pivotal role in articulation of the national interests of developing countries, especially new born African and Asian countries, under the auspices of Non-Alignment banner and called for South-South solidarity. India aligned itself with the G-77 and with support of G-77, successfully secured its interests in line

with other developing countries during the negotiations for NIEO and Montreal Protocol.

In the early 1970, with the emergence of global environmental issues, developed nations attempted to frame the environmental issues as a need to limits to the growth. India along with other developing nations took it as a new form of colonialism to hinder development aspirations of developing countries. At Stockholm conference, Indian Prime Minister Mrs. Gandhi explicitly portrayed the northern attempt as an attack on sovereign right of developing countries in choosing their developmental model, policies and resources. India had reframed the environmental issues as a developmental issue and called for the solidarity within theThird World.

It had been well understood within Indian Government that any international agreement to restrict GHG emission could negatively change the economic destiny of the country. Hence, India prioritized development over environment issues and laid down it as a foundation stone to the solidarity of Third World. Mr. Sengupta pointed out another factor, he wrote,

> "In 1991 India was in economic crisis, the cold war had just ended and the US-led Western World was at the peak of its 'unipolar' moment. Under these unfavorable circumstances, it was entirely rational for India to use principled arguments based on equity and justice, and adopt Southern coalition strategies, to ensure a climate regime that had minimal obligations for India."[65]

It was inevitable for India to consolidate Southern co operation under the slogan of 'solidarity' to avert any attempt of the West to impose mitigation obligation on India.

The Third World solidarity was grounded on the G-77 and China, however, this group is highly heterogeneous with divisive interests of members with respect to climate change regime. The divisive interests apparently broke out during the Copenhagen (2009) and the Cancun (2010) CoP meeting. Specifically,

The AOSIS and the LDC group demanded binding commitments from India and China. In Wiki leaks disclosures, released in December 2010, claimed that the US used 'strong arm' tactic and financial support as a bribe right from 2009 to crack the solidarity within G-77. The US targeted the AOSIS and the LDC countries to pressurized India and China to accept binding commitments.[66]

Since Copenhagen Summit (2009), India has been aligned itself, specifically with BASIC group rather than representing the large canvas of G-77 group. The Copenhagen Accord, which was merely a political agreement, negotiated between the US and BASIC group in the backdrop of the conference. This broke the rank with G-77, indeed splintered the group as AOSIS and LDC felt betrayed.[67] It was become clearer from the statement of India's Environment Minister who painted the emergence of BASIC group as 'a single biggest achievement' of Copenhagen Summit.

Post Copenhagen, the Chair of G-77 and a representative from AOSIS and LDCs/Africa group cordially invited to the meeting of Environment Ministers of the BASIC which has been organizing every quarter since Copenhagen summit to exchange the views of member countries. In fact, the BASIC, itself does not want to be seen as broken from parental group G-77, instead, hypocritically continue to claim the South-South solidarity.[68]

The BASIC is now a powerful group of large developing economies contributed 32% to the global total of $CO_2$ from fuel burning in 2010. Therefore, the role of the BASIC is crucial and decisive in climate change regime. India has departed from its 1991 image of a poor country to a powerful large economy and a global player of climate regime. Being the 3rd largest GHG emitter, India's interest cannot be secure only with G-77; that's why India's foreign policy is not that much oriented towards the Third World solidarity as it was earlier in 1991. India is now more focused on its own national interest rather than the Third World. However, it is also fact that, still India is largely supported by Third World countries and regarded as a prominent voice of the global South.

## 5.6.4 Business and Trade Interests

The economic dimension of climate change regime is important as any significant deviation from the traditional high carbon intensive economy to lower carbon economy involves huge cost addition over current production cost of the economy. Therefore, no country willing to lose its competitive advantage of lower production cost. The US withdrawal from Kyoto Protocol was based on the same ground that the quantified mitigation obligation would adversely affect its economic competitiveness, especially with China and India as these countries have lower production cost and they had not been under any legal mitigation obligation. In the KP, developed nations (Annex I) were under obligation of quantified, legally binding emission mitigation target by 5% below of 1990 levels in between 2008-2012. Three mechanisms were induced to facilitate the developed nations to achieve this target; clean Development Mechanism (CDM), Joint Implementation (JI) and Emission Trading (ET).

Initially, India opposed the inclusion of flexible mechanisms in KP as India thought that these flexible mechanisms would give escape to developed nations from their mitigation commitments. However, India took complete U-turn from its initial position in Marrakesh CoP in 2001. India's U-turn was greatly attributed to the feedback from the TERI and the CII. Both the institution calculated the potential economic benefits of CDM in terms of foreign investment and access to the new technologies.[69] The CDM Authority of India, established in 2003, hosted "Carbon Bazaar 2009" in collaboration with Germany, in Delhi to facilitate direct meeting between buyers and sellers of CERs. By May 2013, the NCDMA had approved about 2800 projects of which 40 percent are registered with the UNFCCC, with the investment of around INR 1.6 Trillion.[70]

In a press released on November 2, 2015, Shri Ashok Lavasa, Secretary to MoEFCC, claimed that by 24$^{th}$ April 2015, 1564 projects from India were registered by CDM Executive Board and 191 million CERs were issued to these projects which are nearly 13.27 % of total CERs issued globally.[71] India strongly advocated for the enforcement of the KP II after 2012, but major players of carbon

market Japan, the US, Australia and Russia were not agreed to be the part of KP II, hence after 2012 CERs prices tanked and the shine of carbon trading is diminished as there are a few buyers of CERs.

In addition to CDM benefits, India has been getting financial assistance from the World Bank, ADB and Multilevel climate fund to finance the clean energy projects and for the capacity building to tackle climate change. India has set ambitious target of 175GW power generation from the renewable energy sources by 2020 that includes 100GW from solar alone. India signed a US$98 million loan agreement and US$2 million grant agreement with the World Bank to finance solar capacity in India.[72]

Just before Paris Summit in 2015, India and France launched the "International Solar Alliance" (ISA) to make collective institutionalized efforts to ensure financial and technological support for clean energy generation. This was strategic move from India to strengthen its position in Paris Summit. With the launch of the ISA, India established itself as a global leader in renewable solar energy and conveyed the inherent signal that India is aggressively undertaking mitigation efforts to curb GHG emission. Secondly, India strongly reputed the statement of John Kerry (Secretary of State, US) that labeled "India as a challenge in CoP-21". Thirdly, through the launch of the ISA, India galvanized its efforts to pressurized developed nations for their commitment of US$100 billion fund for mitigation and adaptation efforts in developing nations. Fourthly, India always advocated that GHG mitigation efforts by developing countries must be coincided with financial and technological supports from developed nations. With the ISA, India proactively established its credibility to pressurized developed nations to fulfill their commitments.

With the ISA, India is eyeing to the funding that can be accessed through the ISA platform. In a joint declaration with ISA, the World Bank acknowledged the requirement of US$1000 billion fund by 2030 for the investment in solar projects.[73] Similar joint Declarations were also made with EU Bank and other Climate Funding Facilities of the UNFCCC.

India's Clean Energy mission cannot be envisioned without Nuclear Power. Currently, less than 3 % is coming from Nuclear Power to the total power capacity of India. India has set a target of 14.6GW by 2020 and 27.5GW by 2032 from Nuclear Power. The Indo-US civil Nuclear Deal in 2008 followed by Civil Nuclear Cooperation agreements with The US, Russia, France and Australia paving India's way to achieve the targeted capacity of Nuclear Power.

## 5.6.5 Economic Benefits

India is 3rd largest energy hungry country, largely depended on the imported oil and coal and natural gas. India's import bill is predominately dominated by these fossil fuels. It is expected that India's energy consumption to grow by 4.2% annually. In 2017, India's net import bill stood around $150 billion, expected to surge up to $300 billion by 2030. India imports around 80% of crude oil and 18% of natural gas of its need. India is aiming to reduce 10% of its energy import by 2022 and by 2030 aiming to cut it by 50%.[74] According to Economic Survey 2017-18, it is estimated that a $10/barrel hike in international oil prices reduces growth by 0.2-0.3 % points and raises the WPI inflation by around 1.7% points and adds pressure on Current Account Deficit (CAD) by around $9-10 billion dollar.[75] Nomura, a leading financial and investment firm elaborated this equation as:-

> "At the macro level, with imports of 1575 million barrel of crude oil on an annualized basis, a dollar increase in prices on a permanent basis would increase the bill by roughly $1.6 billion or 10000 crore on an annual basis. In FY2017, the oil import bill was $86 Billion……. If prices do reign at above $60/barrel, then there would be pressure on the import bill by around $8-10 billion."[76]

India has pledged to reduce emission intensity to its economy by 30-35%; this decision is vital to sustain long term growth with steady pace. Crude oil is a volatile commodity and sharp fluctuation in crude prices directly impacts the economic scenario of the country. All major economic indicators Inflation, Rupee

Dollar exchange rate, interest rate, Stock Markets along with investment sentiment affects due to the high oil prices. Hence, India is focusing to curtail its oil import by gradually shifting the economy on Green Energy.

India has been taking a numbers of measures to reduce oil import. The Ministry of Road Transport and Highways made 'Bharat Stage-IV (BS-IV) compliance for 4wheelars from 1st October, 2015 to improve fuel efficiency and reduce emission. Other policy efforts include Phasing out old vehicles, discouraging diesel vehicles, promoting CNG run vehicle, strengthening public transport and importantly, promoting and encouraging electric vehicles. India's EV Mission 2030 aiming to make India as a hub of electric vehicles under the mission 'Make in India'. The NITI Aayog estimated a $300 billion domestic market for EV batteries by 2030, a gigantic economic opportunity which will impetus Green Development.

## 5.6.6 Tackling Climate Change Matters for India

India is especially vulnerable country to the adverse effects of climate change. Its Geographical, Ecological, social and Economic circumstances and diversities places it on the list of worst affecting country due to the climate change. It has 7500 Km long coastline, high rural agriculture based population; lack of pure drinking water; falling ground water level; huge population in cyclone prone areas; fragile ecosystem; low laying river deltas; melting of Himalayan glaciers, which contribute 70% of rivers; likelihood of massive displacement due to the submerge of around 5700 Sq.Km costal area on the rise of 1 meter sea level; water dispute with neighboring countries and illegal migration. These circumstances and implications peculiarly make India vulnerable to the climate change.

India is now 3rd largest GHG emitter in the world; this has caused the poor air quality across the country. Especially, in highly dense urban areas air quality is at its worst and crossing the dangerously alarming level of air pollution. The

World Health Organization (WHO) placed 10 Indian cities in the category of worthy polluted cities of the world.

According to the census 2011, in India, out of 121 crore, 83.3 crore population lives in rural areas predominately depended on agriculture and related activities .Indian agriculture sector is largely dependent on Monsoon, seasonal wind pattern full with water vapor, nearly 60% of India's agro land is rain dependent. The climate change could be a disaster for Indian agro sector in two ways, one, rise in average temperature can severely affect the crop yield, cereal production could decrease, second, alteration in rain fall pattern can cause drought and flood like situations which could affect millions of people of the country.

There are numbers of implications can be counted that may stem from adverse effects of climate change. Conclusively, it is in India' national interest that there should be a comprehensive legally binding treaty or agreement to curb GHG emission to avert climate change. India cannot be isolated itself from the global effect of climate change, hence, India's role in climate regime is crucial and its national interests will be best served by such a global treaty that include the equity principles of the UNFCCC.

## 5.6.7 Aspiration for Esteem and World Leader Image

Acquiring esteem image in the international system is very common aspiration amongst all countries. Every country, in the world order, seeks recognition and respect from other countries. This is an important factor which drives or influences foreign policy of a country and frequently regarded as a national interest. After independence, acquiring the recognition and esteem position were the forefront objectives of India's foreign policy. India, under the auspices of the Non- alignment Movement, apart and independently from the both the power pole, acquired a credible position as a Third World leader. By articulating the interests of Third World, India had given the edge to the voice of African, Asian and Latin developing countries. India successfully defended the

interests of the Third World during the negotiations of NIEO and the Montreal Protocol and gained the leadership position in the Third World.

In the climate change regime, India has been playing a crucial role since the formation of the UNFCCC. The inclusion of CBDR-RC as a guiding principle of the UNFCCC which was later incorporated into the Kyoto Protocol manifested India's leadership quality. By 2009, India was under immense pressure for its refusal to accept any GHG mitigation obligation. Further India was painted as a stumbling rock in the way of global emission treaty. India changed its long holding stance and committed to reduce its emission by 20-25% and later by 30-35% to its economic intensity. India repositioned itself by adopting the emission cuts to its economic intensity and thus retained its frontline position in climate regime.

It is estimated that China's GHG emission likely to peak around 2030 and then decline from there. It could also happen before 2030 due to the decreasing economic growth of China. On the other hand, India's emission is estimated to grow further, in this scenario, the future of historical 'Paris Agreement' lies in the hands of the US, China and India.

The US President D. Trump's announcement of exit from Paris Agreement posed the threat to the credibility of the deal. However, India and China assured that they will honor their commitments made to the Paris Agreement. In June 2017, during the Berlin visit, Indian Prime Minister Narendra Modi stood alongside Angela Merkel and pointed out the US intention of withdrawal as "a morally Criminal Act". The US withdrawal from Paris Agreement could jeopardize the financing and technological mechanism for mitigation and adaptation efforts by developing countries. However, two big emitters of the world , China and India are likely to foster the execution of Paris deal by sharing the knowledge instead creating super funds.[77]

Amidst of the US announcement of exit, India is posed to step up in the existing climate leadership. This is evidenced from the statement of Mr. Piyush Goyal, India's Energy Minister that India would stand committed to its mitigation

pledges made to the Paris Agreement irrespective of "what happens to the rest of the world". It is further made clear by India's Prime Minister Narendra Modi by affirming that India would go "above and beyond" the Paris Agreement. This statement has signaled the world that India is gearing up to take decisive leadership role in the climate change regime. India set the shining example of climate action along with development. India has strongly defended the equity in the Paris Agreement by inclusion of "differentiated responsibilities" in the agreement text.[78]

Amid of the present leadership impasse, India is poised to steer the climate regime in a way that can safeguard the national interests of the country. Further, the present leadership void in international climate change governance presents a golden opportunity for India to assert its long standing demand of permanent seat in the UN Security Council and the NSG.

Conclusively, India has been consistently playing crucial role in the making of global treaty. India's stance and position in climate change regime is mainly derived from the national interests of the country. From 1991 to 2007, India was focused to its development agenda rather than climate change. During this period, India was played its role as a leader of Third World and at policy front, exerted enormous pressure on developed world to take the mitigation responsibility. India had poised itself as victim of the climate change and fought for the financial and technological assistance from the developed world. India's national interests are enshrined in the principle of CBDR-RC, hence, India is consistently emphasized the reference of the CBDR in every CoP and international platform.

From the no mitigation commitment to the affirmative mitigation actions, India has been safeguarding its national interests. In current scenario, India is gearing up to lead the climate regime by opting the path of Green Development but still want to ensure the Carbon space for its emission, which is expected to grow due to the high energy demand.

## **5.7** India's Position and Role in Climate change Regime

India has been a key player since the beginning of Climate change regime. India's active engagement in climate regime can be attributed to its unique national circumstances. India as a developing country, coping with substantial poverty issue, it has negligible historical contribution to the accumulated global carbon stock and its per capita GHG emission is still, relatively lower in comparison of developed nations. On the flip side, India has transitioned into a fast growing economy, now it is 3rd largest GHG emitter, it is estimated that India's GHG emission is likely to surge in future due to its growth oriented policies.

India is intriguingly positioned in the climate change regime. On the per capita basis, India has substantial lower emission, lower electric consumption and lower income. But on the aggregate basis, India stands to higher side of said indicators, especially aggregate GHG emission. With the 1.2 billion populations, India stands in the list of the countries who will suffer vastly due to climate change. Paradoxically, India's rising GHG emission can potentially undermine the global efforts of GHG reduction. Thus, India's position and its role in climate change regime can be characterized as an attempt of balancing between 'deal breaker' and 'deal maker'. However, India has been affirmatively positioned itself as a dealmaker within the ambient of climate diplomacy.

The issue climate change is merely not an environmental issue; it is politically charged issue and emerged as a battlefield of national interests over the time. India is not an exception; its position in the climate change regime mirrors its national interests and over the time accordingly changed to adjust with dynamism of the regime. From the Rio (1992) to the Paris (2015), India's position and role in the climate change regime went through a mix character of consistency and dynamism. Although, it is difficult to clearly draw a differentiating line to identify its change in position, but, from 2007 and more specifically from

Copenhagen Summit, positional flexibility is clearly exhibited by policy and stand.

The Copenhagen Summit 2009 was the occasion when India deviated from its long holding position of "no commitment" to the commitment. The Copenhagen Accord was an important turning point of climate regime, indeed, it did not produce any legal agreement, but it changed the basic nature of negotiations. The Copenhagen Accord adopted the bottom up approach for mitigation commitments on voluntary basis and thus, the equity principle CBDR-RC has started to fade away. However, India still refers the CBDR-RC, but the gravity of the CBDR is definitely compromised to some extent.

The root of climate change regime goes back a long in the History; however, for the analysis of India's position and role, three blocks of time period are taken. The criteria of time block selection is only based on the important outcome resulted at the end of each block.

**Table 5.4: India's Positional Indicators in Climate Regime (1972-2015)**

| No. | Conferences | Years | India's Positional indicators |
|---|---|---|---|
| 1 | Stockholm to Rio(Earth Summit) | 1972-1992 | Geopolitical threat, Equity, Growth first, Per Capita Notion, Northern Responsibility, Stone wall commitments, |
| 2 | Berlin- Kyoto-Nairobi | 1995-1997-2006 | Equity, No commitments, Co-benefits, Indication of flexibility towards mitigation |
| 3 | Bali- Copenhagen-Paris | 2007-2009-2015 | Voluntary commitments(NAMA), Bottom up pledges, Rise of BASIC, Fading of CBDR-RC, INDC referencing Equity principle, |

Source: Author Compliance

## 5.7.1 Stockholm to Rio (Earth Summit)

Prior to the Rio Summit, in 1972 at UN conference on the Human Environment, Indian Prime Minister Mrs. Gandhi laid down the intellectual tradition of the Indian climate policy. The seminal speech by Mrs. Gandhi formed the basic architecture of Indian stance which prevailed nearly two decades of climate regime. Three important narratives from Mrs. Gandhi's speech which later determined Indian position are; first, Environment protection is a geopolitical threat to Indian interests; second, socio-economic development and poverty eradication are priorities of India; third, the developed nations historically responsible for the environment degradation, hence they should take the lead in the efforts of environment protection.

From Stockholm to Rio, the period was marked as divisive perspective of the global South and the North towards the issue of climate change. The G-7 meeting at Paris in July 1989 had raised the political temperature of the issue. Developed nations explicitly denied acknowledging any historical responsibility of environmental degradation and sharing of the costs of global measures. During the NAM meeting in September 1989, Indian Prime Minister, Rajiv Gandhi, implicitly placed the condition of technological and financial support in order to ensure environment friendly development in the developing nations. Mr. Gandhi suggested a 'Planet Protection Fund' to make the eco-friendly technologies available for developing countries at a reasonable cost. This Indian proposal was unanimously supported by other developing countries at the Common Wealth meeting in October 1989.[79]

In absence of any reliable GHG emission data, Indian position was largely determined by the traditional approach of India's foreign policy. The southern coalition was the prominent feature of the Indian foreign policy and it had been clearly appeared at the conference of Select Developing Countries in 1990, at New Delhi. The India's approach towards climate change was echoed from the

paper prepared by the GoI for the conference. In brief, Indian Government argued[80]:-

A. Developed countries caused the threat of climate change and they are primarily under obligations to reverse the situation by capping their GHG emissions.
B. Even though, GHG emissions in developing countries increasing, historically their contribution was masculine in comparison of the developed countries. Developing countries need environmental friendly technologies to ensure their development with due regard to environment.
C. Responses to the climate change must vary according to the factors like stage of development, geography, perception. More importantly, the developing countries accept specific responses only when such responses would not interfere with their development and their choices of resource selection to fuel such development.

India was positioned itself as the voice of the global South and adopted 'coalition' strategy to counter the Northern pressure. It was evidenced by the discussions during the 4th plenary session of the IPCC held in Sweden from 27 to 30 august, 1990. In the plenary session, India strongly pressed for the replacement of a phrase "common responsibility" with the phrase "main responsibility" of the developed countries to combat climate change. Amidst of the strong resistance from USA and UK, compromised text appeared as; "Common but differentiated responsibility" in dealing with problem of climate change and its adverse effects.[81]

India and other developing nations were not satisfied with the functioning and structure of the IPCC and they were not represented adequately. The IPCC was allegedly biased towards the developed countries. India, along with Brazil, pressed hard to shift the convention negotiations to the separate forum under the direct authority of the UN General Assembly.[82] Thus, the UN General Assembly accepted the Indian demand in its Resolution 45/212 on 21 December, 1990 and

established a single Intergovernmental Negotiation Committee (INC) under its authority to ensure and provide full participation to all nations.

First INC session adopted the general procedure and rules for proceedings of the INC. Prior to the II session of the INC in June 1991, two important development were took place. One, amidst of critical weakness of Indian economy, negotiators were instructed for caution to avoid any isolation during negotiations. Second, the CSE report which criticized and reputed the WRI report's finding that equally accounted developing countries for climate change. The CSE report exposed the critical methodological deficiencies of the WRI report and raised the questions over its biased outcomes. The CSE report argued that emission comparison of countries would be illogical without considering the population size and needs of that population. Thus, CSE suggested the 'per capita, notion which morally acknowledged the equal share of each human being to the global common of environment.[83]

The CSE report was, then, armed the Indian negotiators with a mathematical weapon and the 'per capita' notion. The policy input from the CSE report was clearly displayed in the Indian position at II session of the INC. India came up with a 'non-paper' which emphasized the notion of per capita. The head of the Indian delegation, Mr. Dasgupta stated the Indian position as:-

> "The problem of global warming is caused….by excessive levels of per capita emission of GHG gases…developed countries with high per capita emission levels of greenhouse gases are responsible for incremental global warming. …the principle of equity should be the touchstone for the judging any proposal. An equitable solution can only be found on the basis of significant reduction in levels of per capita emission in developed countries, so that over a period of years these converge with rising per capita emission in developing countries".[84]

Dasgupta further denied any legal responsibility for developing countries and said that developing countries might consider for taking feasible corrective

measures in accordance with their national development plans and objectives provided that full incremental costs involved were met by provision of new and additional financial resources from developed states.[85] India's 'non-paper' call was generally welcomed by developing nations but, resisted by developed nations, especially the US. The EU and Japan presented the 'pledge and Review' proposal. India opposed it by raising the concern for sovereignty and possibility of interference with national plan of development.

During the III session of INC, India advanced its same position that had been adopted in the II session of the INC. But in a meeting of secretaries of MEA and the MoEF, prior to the III session, a slight flexible positional stance was suggested to the Indian negotiators in the backdrop of the economic and financial crisis.[86]Indian position on climate change was explicitly emerged through the cabinet meeting held on 3 of December 1991, just before the IV session of the INC. In the meeting the cabinet approved the MoEF note containing the main positional stands in India's foreign climate policy. The main elements included were, the notions of per capita, opposition to the review of national developmental policies, acceptance to contractual commitments and call for separate funding under the direct authority of the convention.[87]

During the IV session of the INC that was held in Geneva from 9-20, December, 1991, witnessed the continuity of head fight between the North and the South over the issue of "main responsibility", technology transfer, financial assistance and the obligations for developing countries.

With the differences on the key issues, the INC negotiations entered into the V session on 18 February, 1992 in New York. The US was emerged as a stumbling block during the V session by rejecting to provide new and additional financial resources to the developing countries and it also rejected to accept any time bound measures for the GHG emission stabilization.[88] In the communication to the Indian government, C. Dasgupta reported, "Nevertheless, it is possible that a last minute efforts will be made to bridge the differences between the US and the EC by adaptation of an ambiguous formulation concerning stabilization and

reduction of emission of developed countries. This could be the basis of an attempt to shift the balance of responsibility from the North to the South. Our delegation would have to be prepared for this eventuality."[89]

The US and the EU talks in Washington in May 1992 resulted in the formulation riddled with ambiguities hiding the key points of differences. The agreed draft between the US and the EU was incorporated in the Chairman's text that tabled at the resumed V session of the INC. The head of Indian negotiator Mr. C. Dasgupta pointed out the artful ambiguity of the text and described it as a legal 'striptease'.[90] The debate upon chairman's text was kept confined to an enlarged bureau including 25 key players. It had been done according to the chairman's suggestion to speed up the negotiations. India took part in the crucial bureau debate and secured its national interests to a substantial extent.

From Indian perspective, the final package had both, positive as well as negative outcomes. India was keen to include inadmissibility of specific review of its national development policies and plan. India ultimately successfully and evaded all references to a review of the efforts of developing countries in dealing with climate change.[91]

The Indian demand of new and additional financial resources was incorporated in the Article 4, para 3 of the convention as:-

> "The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12…".[92]

India pleaded hard for the transparent financial mechanism under the direct authority of the CoP, it was met by article 11 of the convention as "It shall function under the guidance of and be accountable to the Conference of the Parties".[93]India's demand of equity and justice was also met by inclusion of the CBDR-RC as a guiding principle of the UNFCCC. It was placed explicitly in

article 3 under the title of 'principles' and in Article 4.1of the convention. The principle has been consistently legitimating Indian position and serving as bedrock of the India's foreign climate policy.

Mr. C. Dasgupta, who laid the Indian delegates during the INC negotiations, highlighted specifically paragraph 7 of the Article 4, India was able to secure only after very hard and protracted negotiations, as a crucial victory. Article 4.7 says:-

> "The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties."[94]

Article 4.7, reflects the Indian position and stance during the INC negotiations and in subsequent negotiations. Mr. C. Dasgupta elaborated the Indian position in context of article 4.7 of the convention as;

> "The Framework Convention conforms to our position concerning the voluntary and non- negotiable nature of the actions taken by the developing countries without international support. Developing countries have no obligation to implement mitigation measures involving incremental costs, unless these are met in full by the developed countries. When thus supported, developing countries assume a contractual or conditional commitment but unlike the binding commitments of the developed countries."[95]

India singed the UNFCCC on 10th of June 1992 and ratified the convention on 1 November 1993. After the UNFCCC negotiation, India's basic position in the climate change regime consistently revolved around the

fundamental principle of equity (CBDR-RC). The core element of India's position was to defend the 'differentiated' structure of the regime. India's climate position encountered with the challenges in first Conference of Parties (CoP-1) at Berlin in 1995. The US led coalition (JUSCANZ) and the EU pressed the 'more advanced' developing nations (India and China) for the mitigation obligation. Thus, the US had attempted to create a new category beyond the Annex I/ Non Annex countries.[96]

## 5.7.2 Berlin to Nairobi

The main agenda before the CoP-1 was to discuss the adequacy of commitments pertaining to the Article 4.2(a) (b) of the UNFCCC. The AOSIS and Germany presented a 'Protocol' mechanism and that was partially supported by India and China along with G-77 nations. In a separate meeting of G-77 and China, India proposed a draft decision by referencing the article 4.2(a) (b) of the convention to guide the deliberation on commitments of Annex-I contraries. The G-77 meeting was resulted in a deadlock due to the opposition of OPEC nations for strong binding commitments of developed nations (Annex-I). Later, India conveyed a meeting of 72 Like Minded Countries excluding the OPEC-referred as GREEN Group- drafted a paper by highlighting a 'strong legal protocol' for Annex-I countries but opposed any additional commitments for Non Annex countries.[97]

India leveraged enormous support from the climate NGOs to pressurize for strong legal protocol for developed countries. Eventually, India succeeded to get the EU in its support and the US led JUSCANZ had to drop its proposal of mitigation commitments for advance developing nations. Thus, the final outcome of CoP-1 the 'Berlin Mandate' noted that the process for a 'protocol' would not impose any new commitments on Non Annex countries. The Berlin Mandate was a great success for India as India ensured that it would not be under any binding mitigation commitment. Thus, India's coalition strategy with G-77 and China worked out in a meaningful way and India evaded any possibility of GHG

mitigation obligations in proposed protocol which had to be finalized by CoP-3 in 1997.

The CoP-2 was held from8-11 July in 1996 at Geneva. The CoP-2 sent out a political signal. The Ministerial Declaration noted and accepted the IPCC Second Assessment Report (SAR) and called for 'legally binding' commitments. An important development the CoP-2 witnessed was the dramatic shift in the US stance. The US supported a 'legal protocol' or other legal instrument.

The historical CoP-3 was held from 1-11 December 1997 at Kyoto, Japan. The COP-3 adopted the 'Kyoto Protocol' which was contained the commitments of Annex-I parties to reduce six GHGs by at least 5% below to 1995 levels between the period of 2008-2012. Ad Hoc Group on the Berlin Mandate (AGBM) was met 8 times to draft the 'protocol' before the CoP-3. At the beginning of the final session of ABGM-8 from 22-31 October 1997in Bonn, the US president Bill Clinton in Washington demanded the "meaningful participation" from the developing countries. The US president singled that the US acceptance of the commitments would be linked to the participation of more advanced developing countries like China and India. In response, the G-77 and China opposed any new commitments for the developing countries. This AGBM-8 suspended until the CoP-3.[98]

During the CoP-3 deliberation, India mostly followed its long holding positional stance. India clearly supported the time bound and quantified emission reduction by developed countries (Annex-I). India was skeptical about the concept of the Emission Trading which had been introduced by the Brazilian proposal and hugely supported by the US. India objected the emission trading by stating that it would not be relevant in context of the objectives of the Berlin Mandate and convention itself. India's position on emission trading was supported by the G-77 and China. Thus, India demanded the deletion of paragraphs pertaining to the emission trading. Later, India suggested amendments to the paragraph (draft3.10) to include a definition of rules "for equitable allocation of initial entitlements for such emission trading". Thus, to develop comprehensive structure, rules,

principles, modalities and methodology the concept of emission trading was handed over to the SBSTA and SBI.[99]

The issue of voluntary commitments for Non Annex-I parties was the contentious issue. This issue had been again raised by the US before the commencement of the CoP-3. During the CoP-3 deliberation, the draft of protocol included the Article 10 which had provisions pertaining to the voluntary commitments for Non Annex parties (developing countries). India strongly objected by stating that the proposed draft article 10 would create a new category of parties beyond the convention's fundamental dichotomy of countries. India's position was hugely supported by the G-77, China and other developing countries. Finally, provisions related to the voluntary commitments were dropped due to the non consensus between parties. [100]

From India's perspective, Kyoto protocol reflected Indian position by keeping the time bound quantified emission targets only for Annex-I parties and Non-Annex parties were left without any voluntary commitments. India was successfully derailed the emission trading deliberation in Cop-3 for future discussion. However, despite the continued resistance, India and China could not keep off the inclusion of flexible mechanism in the protocol.[101]

The CoP-4 was just a step ahead in drafting precise rules and norms to implement the Kyoto Protocol (KP). The issue of voluntary commitments for developing countries had been again attempted to put on discussion table and this was again strongly opposed by India, China and the G-77 members. However, the CoP-4 president Maria Julia (Argentina) included it in the provisional agenda and suggested informal discussion between interested parties. A fault line appeared in G-77 when Argentina announced to take on voluntary commitments. Argentina's move partly attributed to its aspiration to join the OECD and close relation between the president Menem and Clinton. The US singed the Kyoto Protocol within 24 hours of the Argentina's announcement. The US welcomed the Argentina move with the hope that this would dismantle his opponent's unity on the voluntary commitments.[102]

The Cop-5 held from 25 October to 5 November 1999 at Bonn went with technical discussion on the operational and procedural rules pertaining to the KP. The CoP-6 held 13-25 November 2000 but it was adjourned due to the non consensus on the issue of sinks. The resumed session of CoP-6 held from 16 to 27 July 2001 at Bonn, Germany amid the uncertainty stemmed from the official rejection of the protocol by the US on 27 March, 2001. The Cop-6 II produced the 'Bonn Agreement' mainly political in nature, containing package of issues. In an important decision the Cop-6 II recognized the need for "new and additional funding" and three funds were proposed accordingly.[103]

The CoP-7 held at Marrakesh, Morocco from 29 October to 10 November 2001 went off with the technical discussions pertaining to the operational aspects of the KP. It is pertinent to mention here that by 2001, India took complete U-turn on the CDM issue as India realized that it could significantly gain from this Kyoto Mechanism.

The CoP-8 held in Indian capital from 23 October to 1 November 2002. The CoP-8 adopted the "Delhi Declaration on Climate Change and Sustainable Development" which was mainly published the Indian approach towards climate change. The para (b) of the declaration says "Parties have a right to, and should, promote sustainable development policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each party and should be integrated with national development programmes taking into account that economic development is essential for adopting measures to address climate change." Further the Para (d) recognized the principle of CBDR-RC to achieve the sustainable development.[104] The Delhi Declaration, however, could not produce any substantial solution to the key issues of the KP; it was just forwarded the issues to the next Cop.

During the CoP-8, India reiterated its long holding position on the climate change. This was expressed from the speech of Indian Prime Minister Shri Atal Bihari Bajpayee that had been given at high level segment of Cop-8.He said that India is fully committed to address the climate change according to the principle

of CBDR-RC. He emphasized that adaptation and sustainable development are priorities for India. However, he arguably denied any mitigation obligation for developing countries by saying "there have been suggestions recently that a process should commence to enhance commitments of developing countries on mitigation climate change beyond that included in the Convention. This suggestion is misplaced for several reasons." He argued that India's per capita GHG emissions are only fraction of the world; second, India's per capita income are very small of those of developed nations; third India's GHG intensity of the economy is low.[105] Thus India republished its long holding position during the Cop-8.

The Cop-9 held from 1-12 December 2003 at Milan in Italy. In the opening session, India's joint secretary for Environment and Forest C. Viswanath (on behalf of T.R. Balu, president of CoP-8, India) called the Annex-I countries to lead the efforts in dealing with impacts of climate change. He demanded the financial and technological supports from Annex-I parties to tackle climate change. He further rejected the concept of commitments for developing countries. The CoP-9 was called as a 'Forest Cop' because of significant consensus on the issue of Sink under the CDM.[106]

The Cop-10 held from 6-18 December 2004 at Buenos Aires, Argentina. The Cop-10 was commenced in the backdrop of Russian ratification to the Kyoto protocol. The Russian ratification dispersed the dark clouds over the uncertainty of the KP. Russian move was welcomed by all parties including India. During the panel discussion, A. Raja, environment Minister of India said that for poverty eradication and to achieve sustainable development, emission of developing countries has to grow. He also said that no new category should be attempted in proposals for future action in climate regime. In closing plenary, India proposed the amendment in the decision text pertaining to the proposal of a seminar. India, supported by China, Saudi Arabia and G-77, pressed for the insertion of a clarification text that the proceedings of the seminar would not lead to any negotiations for further commitment by developing nations (Non Annex parties). Amendment was accepted and decision text altered accordingly.[107]

The Cop-11/MoP-1 held from 28 November to 10 December 2005 in Montreal, Canada. It was an important event as it was also serving as first 'Meeting of Parties' to the Kyoto Protocol after its enforcement on 16 February 2005. With All other outstanding issues mainly pertaining to the implementation of the protocol, the CoP-11 initiated the deliberation on the article 3.9 of the KP for consideration of future commitments for Annex-I parties. Three proposals were submitted. Among three, one was from G-77, China and supported by India. The proposal advocated for an open–ended Ad Hoc working group to discuss future commitments for Annex-I parties. However, the proposal was negative to any new commitments for Non-Annex parties under the KP. On the other hand Japanese proposal called for review of the UNFCCC and involvement of all parties. Finally, the CoP-11/MoP-1agreed to an open-ended Ad Hoc working group to discuss emission commitments by Annex-I parties beyond 2012.[108]

The Cop-12/MoP-2 was took place in Nairobi, Kenya from 6-17 November 2006. The CoP-12 was mainly focused to the long term action after the KP. Under the Ad Hoc working group (AWG) the EU and Australia propose that future framework should include all major GHG emitters. India, China on behalf of G-77 opposed by arguing that AWG should limit its discussion to the protocol article 3.9 only. Conclusively, in AWG decision (FCCC/kp/AWG/2006/L.4), it was agreed that further commitments by Annex-I nations should be directed by the ultimate objectives the UNFCCC. In the joint High-Level segment, India pointed out towards some key Annex-I parties for defaulting in fulfilling their commitments under the KP. India strongly reacted to the proposals which were advocating emission mitigation commitments for developing countries in post 2012 climate regime. India described such attempts as "shrill", "surreal" and threat to poverty alleviation efforts.[109]

## 5.7.3 Bali to Paris

Before the Bali Conference, the G8+5 summits had been held in Heilgendamm Germany in June 2007. Indian Prime Minister Dr. Manmohan Singh reiterated that India's per capita emission would never cross that of

developed countries. This unilateral and voluntary statement implied that India is free to grow its emission till it converges with per capita emission of the developed world. This statement by Indian Prime Minister later called the 'Singh Convergence Principle' (SCP). On micro analysis, the SCP indicates that if developed countries drastically cut their per capita emission, the difference between per capita emissions would get narrow and put an automatic constrain on the growing Indian emission. However, no such possibility of universal emission convergence exists yet.[110]

The SCP implicitly signaled a contractual condition that India could take on quantified GHG mitigation commitments only when its per capita emission converge with that of developed nations. Thus, the SCP placed the developed nations under pressure to cut their GHG emission level drastically before making any such demand to developing countries. Through the SCP, India presented a conditional offer to developed countries to get major developing emitter on the board of mitigation efforts. This conditional approach of Indian position was also exhibited in CoP-13 at Bali, Indonesia.

The Cop-13 was an important event took place from 3-15 December in Bali, Indonesia. The CoP/MoP was concluded with the significant outcome as a 'Bali Road Map' to finalize a post Kyoto protocol (2012) climate regime by December 2009. Negotiations were conducted mainly under the aegis of the convention as "Dialogue on long-term cooperative actions to address climate change by enhancing implementation of the convention" and under the AWG-KP for further commitments by Annex-I parties beyond 2012.

During the negotiations, the US tried hard to derail the negotiations as the Bush administration sought a weak deal or no deal at all to legitimate its withdrawal from the KP and make its parallel negotiations at the centerpiece of the regime. The day before final plenary, Al Gore, former vice president of the US, blamed the US "principally responsible for obstructing progress" and urged to reach an open-ended deal so the US could lead the process again, in case the Bush leave the President office in coming election.

The US obstructed the negotiations by demanding the deletion of some texts in the preamble of the decision draft which was referencing the IPCC 4th Assessment Report (AR4). The AR4 had called developed world for collective aggregate emission reduction of 25-40% below the 1990 level by 2020. In contrast, the EU wanted to retain the AR4 reference text in the preamble of decision draft. On 14 December, Saturday Morning at 2:40 am, the US and the EU reached to an agreement. The EU agreed to the deletion of AR4 reference from preamble and the US agreed to retain the reference as a footnote (1) as "contribution of working Group III to the AR4 of the IPCC, Technological Summary, Page 39 and 490 and Chapter13, page 776". Thus, the US significantly weakened the Bali Decision by amending the preamble text that otherwise would have been imposed a quantified and time bounded mitigation obligations on the developed countries.[111]

The second contentious issue was related to the paragraph pertaining to the mitigation obligations for developing countries. The US and Canada insisted for stronger language on developing countries obligations. It was strongly resisted by China, India and G-77. India proposed an amendment to the draft decisions text of article 1(b) (ii). Initially, the draft decision had sentence as "measurable, reportable and verifiable nationally appropriate mitigation actions by developing country parties". India demanded that this part (which was first part of sentence in draft) should come at the end of paragraph. By such shifting of sentence, India sought to link "measurable, reportable and verifiable" to the "supported and enabled by technology, financing and capacity building." This Indian amendment was strongly supported by China, G-77 and other developing countries.[112]

The subtle change in the sequence of the sentence was going to shift the emphasis from mitigation actions to financial and technological support. Thus, the mitigation actions by developing countries then would be proportionally depended and coupled with "measurable, reportable and verifiable" financial and technological support from developed countries. The US strongly rejected the Indian amendment while the EU supported the Indian amendment.

On 15th of December at 8:30 am, when plenary reconvened, the deadlock appeared between India and the US and apparently the negotiations were on the brink of collapse. Indonesian President Yudhoyono followed by the UN Secretary Ban Ki-Moon appealed to reach a compromise. The head of the US delegation Paula Dobrinansky indicated that the US would not agree to the text proposed by India. After this indication the US was heavily criticized and booed by many developing countries. The strongest criticism came from Papua New Guinca. The delegation head Kevin Conrad said "United States, if you cannot lead us, then get out of the way and let those that would, do so". The US was in isolation as no noticeable support emerged from its allies in the Umbrella Group. Finally, the US gave up its resistance to the Indian amendment and the article 1(b) (ii) amended as India had proposed.[113] The Bali Road Map established an Ad Hoc Working Group for long term cooperation actions (AWG-LCA).

The CoP-14 was took place from 1-12 December 2008 in Pozan. During the negotiations, India said that there should be no review of adequacy of the developing countries actions. In high level segment, India proposed for the Regional Technology Centre. India firmly rejected the idea of differentiations amongst developing countries. The centerpiece of the conference was AWG-LCA which had to conclude its deliberations by 2009. The Cop-14 did not go through a decisive breakthrough, however ended with optimistic note on the newly elected US president Barack Obama who had signaled positively to lead the climate regime.

By early 2009, the international negotiations were going in full swing under AWG-LCA and AGW-KP. In India the year was full of surprising events and radical changes in India's traditional climate position. The indication of flexibility in India's traditional position was first observed in July 2009, at the G8+5 summits that was held in L'Aquila, Italy. The meeting of the 'Major Economic Forum' (MEF) on Energy and Climate Change was also held alongside of G8+5 summits. The MEF declaration which India had signed stated "we recognize the broad scientific view that the increase in global average temperature above pre –industrial level ought not to exceed $2^0$ C". The declaration further

stated that "major economies need to undertake quantifiable actions to collectively reduce emission significantly below business-as-usual (BAU) by a specified year".[114] By singing the declaration, India implicitly agreed to limit its own emission to keep the global temperature under $2^0$ C.

The change in India's traditional climate position was clearly become visible under the leadership of Mr. Jairam Ramesh, who took over the charge as Minister of State (Independent) at MoEF on 20th of May 2009. Mr. Ramesh attempted to redefine the core principles of India's climate position with an internationalist approach. In an interview to the Mint, he said that 25-40% emission cut below 1990 level by 2020 from developed world would be the starting point of any agreement. He signaled that India's mitigation actions should not be necessarily supported by international finance and technology. He also indicated that India should permit international scrutiny to the actions supported internationally.[115]In his words, he said:-

> "We have to think differently than we have been thinking so far. India should have a leadership position. We should not be defensive. We are aligning ourselves with India's requirements. We need to be a part of the solution and not be seen as an obstructionist player. The per Capita argument is essential, but we need to go beyond it. This is a Per Capita Plus approach."[116]

However, Ramesh's initiatives of reframing Indian position with internationalist approach were came under the furious attack of opposition party 'BJP', NGOs and even Indian Media aligned itself with the critic camp. Even in PMCCC, serious differences were erupted. Viham wrote, "Unofficially, it has been reported that the minority 'internationalist' in the PMCCC frequently clashed with 'stonewallers' and 'realistic' in the meetings. This move generated much heat in the parliament, as the opposition questioned the change in stance".[117]

In the meanwhile, Jairam Ramesh's confidential letter (dated 13 October 2009) to Manmohan Singh was leaked into the media. In the letter, Ramesh suggested that India should see itself as a member of G-20 biggest economies

rather than as a member of G-77. India should take on mitigation actions without any counter support, by its own cost and such actions should be permitted by India to the international scrutiny. Ramesh pointed out the advantage of changing position- a permanent seat on the Security Council and better alignment with the US. Just a week before Ramesh's letter, India along with China and G-77 had resisted the 'Australian Proposal' (single legal instrument for all parties) in Bangkok Climate Talks. India rejected any review of unsupported domestic actions under any agreement.[118] It became apparent that Indian position was on the brink ambiguity. Lack of synergy was clearly exhibiting between the Environment Minister and members of negotiating delegates.

Two prominent member of Indian negotiating team, Chandrasekhar Dasgupta and Pradipto Ghosh publicly admitted their differences with the Minister of Environment and Forest Mr. Jairam Ramesh. Both the member made their apprehension regarding the unilateral concession without obtaining any reciprocity and international verification to the unsupported domestic mitigation actions. Even, both the members, initially signaled unwillingness to attend the Copenhagen, but after several meetings with Jairam Ramesh, eventually they changed their mind. Sunita Narain of the CSE pointed out the lack of synergy between political leadership and negotiators. She also said that apprehensions of the negotiators must be considered by the political leadership.[119]

Amidst of the ambiguous and contradictory environment regarding the direction of India's climate position and role, the issue was intensely discussed in Loksabha. In response to 18 member's statements of questions concerning Indian Climate policy and changing position, Mr. Jairam Ramesh responded in length. It is pertinent here to quote the selected portion of Minister's clarification statement regarding the changing position of India. He said in Loksabha:-

> "Per capita is an accident of History…. It cannot be the only point…we are going to Copenhagen in a positive frame of mind…we will work overtime with like minded countries… to ensure that there is a comprehensive and equitable agreement.

> …We want to be recognized as world power but having global aspiration and assuming global responsibilities are two sides of the same coin….. There are some non-negotiable for us at Copenhagen. First one is, India will not accept a legally binding emission reduction cut. Second, we will not accept under any circumstances an agreement which stipulates a peaking year for India. Third, we would not like the un supported actions to be subject to the same type of scrutiny that the supported actions are subject to..." [120]

Importantly, first time Jairam Ramesh announced voluntary cut in 'emission intensity' of India's GDP by 20-25% by the year 2020 compared to 2005 level. The announcement was made in the backdrop of Chinese cut of 40-45% in emission intensity of its GDP. Brazil and Indonesia were also announced an overall cut of 38%and 26% respectively.[121]

Amidst of enormous hope, the CoP-15/MoP-5 took place from 7-19 December 2009 in Copenhagen, Denmark. Despite the several rounds of negotiations under AGW-KP and AWG-LCA, the final drafts were full of brackets. In the beginning , the Danish Presidency attempted to introduce its own proposal of draft as a compromised formula and that was opposed by the developing countries as it had already been leaked by the UK based newspaper 'The Guardian' into the public domain. Further, 'Danish Text' had allegedly prepared by some selected developed countries before CoP-15.Consequently, the developing nations rejected the Danish draft by saying undemocratic. Instead, the developing countries insisted that the negotiations should be conducted on the basis of drafts prepared by the both Ad Hoc Working groups. India, also advocated that the negotiations would only be guided by the drafts prepared by the AWGs as those drafts had already been discussed by the associated parties.[122]

A small group of nearly 26 countries was attempted to reach a meaningful conclusion, albeit, consensus were not emerged on several issues. It was reported that the ultimate decision was brokered between the US president and the Heads

of the 'BASIC' countries. The agreed draft was presented to the final plenary to the CoP-15, however, The AOSIS and Latin American countries refused to accept the 'Accord' by blaming the whole process undemocratic. Finally, the 'Accord' was not formally adopted as a CoP decision, instead taken as a 'note' for future negotiations.[123]

At CoP-15, India aligned itself with other three advance developing economies (China, Brazil and South Africa) and together they emerged as a strong negotiating block of 'BASIC'. The rise of BASIC was largely attributed to the mounting pressure from the North led by the US. The BASIC strongly opposed the 'Danish Text' which had been attempted as the basis of deliberations. The 'Danish Text' was, allegedly, drafted according to the Northern intention of binding developing countries under the quantified reduction target with peaking year of their emissions. The BASIC further resisted the Northern attempt to undermine the KP. For the BASIC, the KP was the only breathing architecture of 'differentiation' for that time and the BASIC was keen to preserve the basic firewall of differentiation enshrined in the KP.[124]

The emergence of the BASIC coalition during the Copenhagen summit was an important development from India's perspective. With the coalition strategy, India succeeded to save its three 'non-negotiable' that had been promised by Jairam Ramesh to the Loksabha before the Conference. In addition to this, on the issue of MRV, India suggested the 'Internal Consultation and Analysis' to review the domestically supported mitigation actions. Together with BASIC countries, India succeeded to ensure that the 'Copenhagen Accord' must be embodied the basic and fundamental principles of the UNFCCC. The BASIC as bloc, succeeded in obtaining the extended negotiation mandate for AWG-KP and AWG-LCA.[125]

Although, the Copenhagen Accord was a political agreement, it changed the basic nature of negotiations; from 'top down' approach to 'bottom up' approach. The Accord shifted the negotiation towards self determined reduction targets for all nations. It was like a win-win situation for both developing as well

developed countries, but certainly it undermined the global aspiration of a legally binding treaty to effectively curb the GHG emission for the future of the Earth. The Accord did not speak about the reduction targets for developed countries; it only acknowledged that the rise of global average temperature should be under $2^0$C and for that the Accord just recognized deep emission cuts from all nations.

The Cop-17/MoP-6 was took place in Cancun, Mexico from 29 November to 11 December 2010. Apart from the Copenhagen Accord, The Cancun summit was mainly focused back to the two track negotiation (AWG-LCA & AWG-KP) that had been established in 'the Bali Action Plan'. At Cancun, the global aspirations for a comprehensive legally binding treaty were negligible. The Cancun CoP was just a step ahead, however, it was successfully restored the environment of trust which had been absent in Copenhagen.

It was apparent by the Cancun that the climate regime was progressing with a new approach, slowly and steadily, the advance major developing economies were coming on the board of mitigation actions through NAMAs. They had already announced their voluntary emission targets before Copenhagen Summit. Instead, developed countries, especially the US, were reluctant to appear with explicit mitigation targets. At Cancun, the AWG-LCA had 20 operational paragraphs on mitigation actions by developing countries. Thus, the Cancun agreement set up a new system in which the differentiations between the commitments of developed and developing countries were going to diminish.[126]

As far as India's role and position at Cancun is concern, India's gesture was firm, albeit flexible, with the face of global leader; India played a crucial role in Cancun. India successfully got the inclusion of the text "equitable access to sustainable development" in the section on 'shared vision' of Cancun Agreement. India stood firm against any quantified binding emission targets and a reference of peaking year by 2050. India ensured that the domestic mitigation actions subject to ICA would not be punitive and intrusive.[127]

The most critical statement with regard to Indian position was given by Mr. Jairam Ramesh during the high level plenary session at Cancun. He said that,

"All countries must take on binding commitments in an appropriate legal form" The statement was a big jolt for all and provoked a fiery storm of critics at domestic level. In India, it was perceived that India surrendered its national interests and political opposition accused Jairam Ramesh for selling India's position to please the US. The UPA government was on back foot in home, even Prime Minister Dr. Manmohan Singh had to undermined Ramesh's statement by saying that, "nothing much to see in the statement".

Jairam Ramesh was highly enthusiastic to establish India as a global leader in the regime, however Ramesh's bolder statement backfired and perceived internationally as well nationally as that India was ready to take on legally binding mitigation actions. The Minister's statement highly appreciated and appulated by developed countries, especially, the US welcomed the new Indian position. However, later, under immense domestic pressure, Jairam Ramesh clarified in media briefing that "a legally binding agreement is not acceptable to India at this stage". Ramesh disclosed to the media that India and china were under pressure to take on legally binding agreement and their BASIC allies, South Africa and Brazil had already indicated their consensus in this regard. India had to show some flexibility to keep its alignment with the BASIC. Ramesh further said that "there is no shift in position, only nuancing". Ramesh argued that the statement should be seen in attempt to find room for "maneuvers" due to the mounting pressure from its allies and the AOSIS, LDCs countries as well as its vicinity countries Nepal, Bhutan, Bangladesh and Maldives.[128]

It can be said that During the Cancun, Ramesh played a tactful card to see what developed countries could offer reciprocally. Ramesh statement was vague in respect that it called all nations to take on binding commitment in an appropriate legal form. But the statement did not indicated what would be the "appropriate legal form"? If the statement had not been reverted back, still it would have been ample of scope to define the "appropriate legal form" in terms of the CBDR-RC.

It has been already argued that India's foreign climate policy and thus, climate position has not been functioning in isolation, indeed, functioning in closer context of broader foreign policy of India. Pre Cancun development in Indo-US relations had circumstantial grounds to analyze the context of Ramesh's statement during Cancun conference. The Indo-US Civil Nuclear deal had just been concluded in 2008 and India got wavier from the NSG to trade with NSG member countries without locking itself under the NPT. It was an exceptional diplomatic achievement of Indian foreign policy as India was the only country who could trade in nuclear regime without being signatory of NPT and CTBT. It was materialized due to the strong arm tactic used by the US to pressurize other NSG members for the special wavier.

During the US president Obama visit to India in November 2010, in a joint statement with Indian Prime Minister Manmohan Singh, the US expressed its firm support to India's bid to join four multilateral export control regimes (NSG, the Missile Export Control Regime, The Australia Group and The Wassenaar Agreement). In addition, Obama reaffirmed its support to the permanent membership of India to the UN Security Council.[129] It is also pertinent to mention here that three other BASIC member, South Africa, Brazil and China were also members of the NSG and India needed their support to get in the NSG. Thus, on the basis of circumstantial analysis of pre Cancun period, it can be concluded that indication of flexibility in India's position was in India's national interest and its legitimacy exists in the larger context of foreign policy of India.

The CoP-17/MoP-7 took place from 28 November to December 2011in Durban, South Africa. The Durban conference was focused on the launch of a work plan on enhancing the emission reduction ambitions and further asked submission for higher pledges to fill the gap to achieve the $2^0$C threshold. The Durban conference established an Ad Hoc Working group in accordance of its decision "Durban platform for Enhanced Actions" to negotiate for "a protocol, another legal instrument, or an agreed outcome with legal force, under the convention applicable to all" by 2015 with the aim to be implemented by 2020.[130]

Implicitly the term “applicable to all” was undermined the differentiation of firewall between developed and developing countries. The only living architecture of differentiations, The KP, was under threat in Durban as Russia, Japan and Canada were opposing the second commitment period of the KP (KP-II), backing tactically by the US. The EU, who had committed for KP-II, surprisingly changed its stance and placed the condition that it would go with KP-II only if major developing emitters (mainly India and China) would commit to take on legally binding commitments under new agreement. The EU joined hand with AOSIS and LDC to build the pressure on BASIC countries. The EU was aware of the fact that KP-II would not survive without its commitment and China and India wanted the KP-II to harness the benefits of the CDM.

The divisiveness of BASIC countries was already on the board as South Africa and Brazil had already expressed their willingness to take on legally binding commitments. At Durban, amidst of China’s flexible posture, India’s negotiating red lines were under severe threat. Indian negotiators were under mandate of Indian Parliament “not to take any legally binding mitigation commitment”. Due to the inflexibility in Indian position, India was in isolation. India just could succeed in securing some room for negotiations on ‘equity’ and the CBDR-RC in future.

Till the final hours of conference, The EU and India were in discussion regarding the final draft term “legal outcome”. India was insisting on the inclusion of said term in the final text of the conference because the term “outcome” could have either meaning as “a legal instrument” or “decision of conference”. On the other hand, the EU wanted the term which could explicitly sound as “legally binding for all”. Finally, India and the EU agreed on more explicit but less binding term “agreed outcome with legal force”. It was clear from India’s perspective that the legal force would only be applicable when there would an ‘agreed outcome’. Rajmani wrote that, “Unlike the term ‘protocol’ and ‘another legal instrument’ the term, agreed outcome with legal force, does not reflexively signal a legally binding instrument.”[131] The term “agreed outcome” was important

for India as to secure room for maneuver in future negotiation to place the equity and CBDR-RC back on discussion table.

Although, India succeeded to make reservation for maneuver but, failed to secure any reference of equity and CBDR-RC in the 'Durban Text'. The failure can be analyzed in the light of three reasons. One, BASCIC as a whole was divided and failed to exert any influence during the deliberations. Second, two BASIC members South Africa and Brazil explicitly and China implicitly expressed their consent to take on legally binding commitments. Thirdly, developed countries strongly insisted that any reference of equity and CBDR-RC must be interpreted in context of "contemporary economic realities".

In last two conference, Copenhagen and Cancun, India closely worked with China but, in Durban, contrary to its leadership and proactive image, India presented itself as a poor country and attempted that it should not be seen as 'the next China'. China had already gone through rapid industrialization and in terms of per capita it was approaching to the Western European countries, while India was resembled to the LDCs in terms of per capita emission.[132]

The CoP-18/MoP-8 took place from 26 November to 8 December 2012 in Doha, Qatar. The Doha conference was marked as transition towards new system of climate regime. The conference produced 'Doha Climate Gateway' to embark for new legally binding agreement that would be adopted by the CoP in 2015. In important decisions the Doha conference terminated the AWG-LCA and AWG-KP. On the 8th December the CoP adopted the agreed outcomes of AWG-LCA as a part of 'Doha Climate Gateway' and outstanding issues were transferred to various bodies of the convention for further deliberations.

It is pertinent to state that in AGW-LCA final outcome which was adopted by the CoP as a part of 'Doha Climate Gateway', underscored the urgent need of deep reduction to keep the rise in global average temperature below $2^0$ C over pre-industrial levels and peaking of emission as soon as possible through equity based efforts and according to the principle CBDR-RC. It was important for India as through AWG-LCA agreed outcome the Equity and CBDR-RC back in the realm

of negotiations. Under AWG-KP in its 17th session, parties agreed for the second period of Kyoto Protocol (KP-II) from 1st of January 2013 to the 31st of 2020(8Years). The AOSIS, G-77 China, India and LMDC all advocated 'QELROs' to ablate emissions at least by 40-50% below 1990 levels by 2020.

The Ad Hoc Working Group on Durban Platform for Enhanced Actions (ADP) also held its first meeting on 27th of November 2012 under Co-Chairmanship of Jayant Moreshwar (India). Two work streams were established to discuss the new agreement. The Work stream-1 was to discuss the role of convention principles in the new legal agreement. And the Work Stream 2 had to focus on additional surplus pledges under KP II.

During the Doha conference, India's efforts were focused to bring the issue of equity and CBDR-RC in the deliberation as to shield its interest in the new agreement. The integration of agreed outcome of AWG-LCA with 'Doha Climate Gateway' was proven positive for India. It was also stated in a press release of MoEFCC which claimed that India protected its interests by bringing the issue of equity, IPR and unilateral measures. The press release stated that "The reassertion of the principle of the equity and CBDR which have remained muted since Copenhagen was the single biggest gain from Doha. The decision had also avoided quantitative target for global emission reduction or global peaking that could place a cap on emission of developing countries and restrict their development space."[133]

The CoP-19/MoP-9 took place from 11-23 November 2013 in Warsaw, Poland. During the Warsaw Conference, negotiations under the auspices of AWG-ADP were the centerpiece of the whole conference as ADP was the solo body to draft the "new legally binding agreement or instrument|" that would be implemented by 2020. The ADP was working in two Work streams; Work stream 1 was the important one as it was dealing with all contentious issues and responsible to draft the new agreement before or by 2015.

On 13th of November, 2013 during the deliberations under Work Stream 1, Fiji on behalf of G-77 and China, stressed for the Convention principles in new

agreement and called to avoid any reinterpretation of the principles. The BASIC and the LMDC group underscored that "applicability to all cannot be assumed as uniformity of application". During the closing plenary of ADP on 23 November 2013, India demanded that the terms "all parties" with the phrase "commitments" required the context "in accordance with the provisions of the Convention". India also stressed that 'differentiations' should be there in ADP outcomes. India called that "Enhanced Actions" would be appropriate term for developing countries and "commitment" for developed countries. India further supported the China and Philippines for their demand of a reference to Ar.4 (differentiation) of the Convention to ensure the reflection of basic differentiation should be there in new agreement. In resumed session of closing plenary of the ADP, India proposed amendment to the draft decision of the ADP. India proposed that the term "contributions" in place of "commitments without prejudice to the legal nature of the contributions". India further proposed to replace the phrase "parties in position to do so" with "parties ready to do so".[134]

In Warsaw, India's negotiating position was clearly aiming to ensure that the new agreement should have explicit differentiation with respect to the mitigation obligation. India was advancing its agenda through the LMDC rather than the BASIC. India skillfully articulated its position with LMDC and formed a common negotiating approach to restore the issue of equity and CBDR-RC in climate change regime. The LMDC group had just emerged before the Doha conference mainly comprised of China, India, Bolivia, Equador, Pakistan, Philippines, Saudi Arabia, Thailand, Malaysia, Nicaragua, Egypt, and Venezuela. In fact the group had no permanent membership it was subject to change according to the common approach.

The LMDC was an important grouping for India as the common position of the group was precise reflection of Indian position, indeed, India was successfully amplified its voice through the LMDC platform. It was clearly evidenced from the submission made by the LMDC to the ADP. In a joint statement LMDC stated:-

> "AWG-ADP is under the convention, and therefore, must adhere to the provisions and principles of the Convention, in particular the principle of equity and the CBDR. Hence any outcome under the AWG-ADP under the Convention applicable to all parties must be equitable such that universality of application is not uniformity of application and the prospect for achieving the first and overriding priorities of economic and social development and poverty eradication on the part of developing countries ensured."[135]
>
> The statement further stressed that "The decision of work-plan on enhancing mitigation ambition must recognize the differentiation of the nature and level of obligations of developed and developing countries, and of Annex-I and Non-Annex-I countries, in accordance with the principle of equity and CBDR and with relevant provisions of the Convention."[136]

In a formal submission to the Work stream 1 of the ADP, LMDC demanded that "All the principles of the Convention must fully apply in the work of the ADP in both Work Streams." The LMDC further stated that "the ADP negotiations must not replace, rewrite, restructure, renegotiate, nor reinterpreted the Convention and its principles, provisions and structure."[137] The LMDC group opposed the developed countries for their attempt to evade the historical responsibility in degradation of climate by stating that "Although the world has changed in a number of ways during the past two decades, the historical responsibilities of developed countries for causing climate change remain unchanged."[138]

Conclusively it can be argued that India was attempting to forge the new agreement according to the principles of the Conventions with the clear dichotomy of Annex-I and Non-Annex countries to avoid any legally binding mitigation commitments for developing countries and LMDC was just perfectly reflecting its position.

The CoP-20/MoP-10 held from 1-14 December, 2014 in Lima, Peru. By the Lima Conference it had been clear that the new agreement would be on the basis of self determined contributions recognized as "Indented Nationally Determined Contributions" (INDCs). The INDCs discussion was the centre piece during the ADP negotiations. Two important issues were under crucial debate. First, what would be the scope of INDCs, weather 'mitigation centric' or cover adaptation, finance and technology transfer. Further, would INDCs be in compulsory mitigation form or in conditional form supported by developed countries. Second set of debate was associated with likelihood of ex ante assessment of INDC once submitted.

Two versions of the draft CoP decisions were proposed by ADP Co-Chair Kishan Kumar. On 8th of December, first version of the draft CoP decision was proposed which provoked the difference between developing and developed countries. The developing countries and their respective groups demanded clear referencing of the Convention principles and provisions; principles of equity, CBDR-RC; sustainable development; temperature goal and procedures for INDCs. The Second version of the draft CoP decision was proposed by the Co-Chair on 12th of December 2014 also could not resulted in consensus. India, G-77, AILAC, LDC and LMDC all groups of developing countries demanded that the preamble of the draft CoP decision must have clear reference to the principles and provisions of the convention, especially, the CBDR-RC. They also called for clear differentiations between developing and developed countries in form of Annex-I/ non-Annex parties.[139]India also demanded that preambular text should have clear text of referencing as "in accordance with the principle of CBDR-RC and provisions under the Convention" instead of "guided by". On 14th of December, during the closing plenary, India highlighted the significance of clear referencing by stating "there will always be differences" and called not to suspend the contentious issues till the end.[140] Finally, both the drafts were submitted to the CoP president to be presented as President Draft during the closing plenary.

The Lima conference produced 'Lima Call for Climate Action" incorporating the two drafts with all sort of differences between developed and

developing countries. The key issues were still under debate. The LMDC group was continues to hold its position that differentiations should be maintained in both, in 2015 agreement as well as in INDCs in accordance with the principles of the Convention, equity and the CBDR-RC. The US was somehow agreed to the CBDR-RC but insisted that it should be seen in line with changing national circumstances. Another groups of developing countries-the AOSIS and LDC-opposed 'mitigation centric' approach to INDCs. They demanded the balance between mitigation and adaptation with provisions of financing at the heart of INDCs. Finally, the 'Lima Call for Climate Action" resulted, however, with options for discussions and Annexes footnoted as "These elements for a draft negotiating text reflect work in progress. They neither indicate convergence on the proposals presented nor do they preclude new proposals from emerging in the course of the negotiations in 2015."[141]

The Lima conference was held in the backdrop of the US and China bilateral agreement on mutual cooperation on climate change. Both the emitter giants came together to shape the future agreement. It was an important development from India's point of view as China was long ally of India. In the joint declaration made by the US president Barack Obama and Chinese president Xi Jinping, both the parties agreed on the CBDR-RC as an important principle in 2015 agreement, albeit, in light of national circumstances. China's announcement of its GHG peaking by 2030 was the main cause of concern for India as India was refraining to make such announcement.[142]

Indian Environment and Forest Minister Mr. Prakash Javdekar expressed satisfaction regarding the Lima outcomes. In a press meeting, during the conference, the Minister clarified Indian position regarding the review of the INDCs. He said that India would not allow any ex-ante review of INDC. He called the Lima as "CoP of Hope", however, enlisted some conditions as India's position. He said,

> "It should be able to address the genuine requirement of the developing countries by providing them equitable carbon space to achieve sustainable development and eradicate poverty."[143]

The Minister emphasized that the new agreement should be under the Convention, in accordance to the CBDR-RC and should include adaptation, finance and technology transfer.

The CSE criticized the Indian position on review of INDCs, its deputy director Chandra Bhushan said that Review of INDCs would ensure the effectiveness of CBDR-RC and the country like the US could be hold accountable, which pledged merely 12-14 percentage reduction in its GHG emission by 2025 from 1990 levels. Bhushan further argued that in absence of any alternate plan or option, India should support the ex-ante review of the INDCs to ensure transparency and accountability of INDCs.[144]

The CoP-21/MoP-11 was held from 29 November to 11 December 2015 in Paris, France. It was a land mark CoP as it resulted in 'Paris Agreement' a reflection of global endeavor to avert the climate change and keep the future of human kind alive through sustainable development. The Paris Agreement can be said compromisation of different interest of countries and their respective groups but, cannot be said as a consensual documents as operational rules and procedures are still underway of debate.

After the failure of Copenhagen summit, this was the second attempt to reach a global agreement and the host country France had invested tremendous effort to write the Paris CoP-21 as a history in climate change regime. To ensure the Paris CoP-21 as a great success, France had held a ministerial meeting on 8-10 November 2015 at Paris to provide an opportunity to bridge the difference and to build the necessary momentum for global agreement. Around 60 ministers were gathered to explore possibilities of convergence on various issues mainly pertaining to equity, differentiation, pre-2020 mitigation ambitions and financing after 2020.

In 2014, India had indicated to double its coal production by 2020. Ahead of Paris Conference, the western media was presenting India as a villain. At closing plenary of ministerial conference, Indian Environment and Forest minister Prakash Javadekar called to "keep the Paris simple". The Minister presented India's position by stating that "the Paris Agreement to be based on equity and CBDR-RC, but now operationalize it, is a matter on which we need to further work upon". The Minister further said, "There can be no action holiday in pre-2020 period. The question of finance post-2020 is fundamental to the success of Paris." The Minister clarified Indian position by stating that "The commitment to provide finance by developed countries is based on their historical responsibilities and not only on their economic capacities." The Minister added that "Any attempt, therefore, to enlarge the donor base by 'countries in a position to do so' or 'countries willing to do so', will not be appropriate from our perspective. To us, the shrinking of recipient base will amount to tinkering with the basic rubric of the Convention and that is, clearly, not what we intend to do". [145]

The Indian INDC submitted to the UNFCCC before the Paris CoP, estimated the requirement of USD2.3 trillion (at 2014-15 prices) for financing its mitigation and adaptation actions by 2030. India indicated that this would be new and additional to the domestic funding and would be sourced from developed countries through funding mechanism under the UNFCCC. India implicitly indicated that its mitigation actions would be reciprocal to the financial and technological assistance from developed countries. In contrast to Indian position, the US intended that the advanced emerging economies, especially India and China, should be on the donor side instead of recipient of financial assistance. It was clearly visible from the statement of Todd Stern (US), special envoy on climate change, during the online press conference in November 2015. He said, "Developing countries must take up more responsibilities including in financing mitigation efforts and this may not be music to India's ears.|" [146]

On 30 November 2015, the Leader Event was opened by President François Hollande, France, bringing together nearly 150 heads of state and Government to embark towards the universal agreement to address the climate

change. In his opening statement, Hollande emphasized that "the Paris outcome would be successful if it: determines a credible path to limit temperature rise below $2^0$C or $1.5^0$C if possible." The Un Secretary General Ban Ki-moon called for 'durable outcome' and emphasized balance between leading role of Northern countries and rising responsibilities of the Southern countries in context of their development levels. The 'leader Event' saw a common call for meaningful agreement to avert the rise in temperature by collective efforts. The developing countries emphasized on equity, CBDR-RC and adequate financial and technological assistance from developed countries.[147]

Indian position was represented by Prime Minister Narendra Modi. He addressed the Leader Event in evening at La Seine. Prime Minister Modi highlighted ambitious target of emission reduction by 33-35% of its economic intensity, below 2005 levels by 2030. PM said that by 2030, 40 % of India's energy would be produced by non fossil fuel and this would be achieved through the capacity addition of 175 GW of solar energy. PM Modi further emphasized for the climate justice and demanded that "developing countries should have enough room to grow". PM reiterated Indian position by stating that "The principle of equity and CBDR-RC must remain the bedrock of our collective enterprise across all areas." He clarified the concept as "equity means that national commitments must be consistent with the Carbon Space nations occupy." The Indian PM called developed countries to "mobilize 100 billion US Dollars annually by 2020 for mitigation and adaptation in developing countries.[148]

During the first week of conference, negotiations were took place under the ADP2-12. Various 'spin-off' groups were formed to negotiate on specific articles of the draft texts. A contact group was also constituted to receive the reports from various spin-off groups. The contact group was also responsible for the discussions over the residual issues which were not assigned to any specific spin-off group. Various issues were discussed under the auspices of contact group. During the course of discussions, India and LMDC demanded the deletion of a paragraph associated with the information for fairness of ambition of INDCs. India and China opposed the African group for their demand of differentiations

among developing countries. India and China opposed the inclusion of phrase "in light of different national circumstances" in the preamble of draft text. Divergences were emerged over the intrinsic relation between climate change, poverty eradication and sustainable development. On 3rd of December, the US and Japan argued that only vulnerable nations should have "partly conditional" INDCs. The US and Japan-opposed by India and China- wanted that only LDCs and SIDS should be allowed for financial assistance in their mitigations and adaptation efforts.[149]

Finally, during the ADP2-12 closing plenary (5th December, 2015), the Co-Chair presented draft agreement and decision text on work-stream 1 and Work-stream 2. The draft agreement had two Annexure, Annex-I contained decision text of Work Stream 1& 2 and Annex-II contained a "Reflection Note' on various textual suggestions made by parties during the negotiations. Despite the huge bracketing, the draft agreement adopted by the ADP2-12 and forwarded to the CoP-21 for further deliberations.[150]

In 5th plenary meeting of CoP-21 on 5 December 2015, the CoP formed an informal open ended consultation group "Comite' de Paris" to facilitate compromise on draft Paris agreement and decision that had been transferred by the ADP2-12. The "Comite' de Paris" held 7 meetings from 7-12 December 2015 and conducted informal consultations through minister led groups. The outcomes of Minister led informal consultations were reported to the Comite' de Paris on daily basis. In its 5th meeting on 10 December 2015, by incorporating inputs from parties, second version of draft was presented for further discussion. Finally, in 7th meeting on 12 December 2015, after technical and legal review the Comite' de Paris adopted the draft and presented to the CoP-21 for seal the deal. At 7:25 pm the CoP-21 president Fabius insisted to adopt the deal in the closing plenary of CoP-21 and without any objection the "Paris Agreement" hammered out at 7:26 pm on same day.[151]

In closing plenary of CoP-21, the Paris Agreement was generally welcomed by all countries. The UN Secretary Ban Ki-moon described the Paris

Agreement as a "monumental success" and underscored that Paris produced "solid results on all key points". India also welcomed the agreement, albeit said, "Could have been more ambitious, particularly on the fair share by developed countries." Amidst of all cheering rhetoric statements, Nicaragua indicated fundamental weakness of the Agreement which, however, went without any consideration. Nicaragua said:-

> "The Agreement should include a paragraph allowing for calculation of a global carbon budget in line with historical responsibilities and climate justice in case the result of the INDCs do not keep the global average temperature below $1.5^0$C from pre-industrial levels, and text allowing for the creation of a compensation fund based on historical responsibilities."[152]

## **5.8** Analysis of Paris Agreement from India's Perspective

Article 4.2 is the core of the Paris Agreement which obligates each country to prepare INDC. They aim to achieve in a successive progressive manner. The agreement adopted bottom-up approach for pledges that shall be regularly updated to the UNFCCC. Remaining important provisions of Paris Agreement already have been discussed in chapter 3 of this thesis, therefore, rewriting of similar content intentionally omitted. Here, only analysis of important aspects of Paris agreement in context of Indian position is presented.

### **5.8.1** Differentiated Responsibility

It has been long holding position of India that mitigation burden should be shared according to the historical contribution of each country to the global stock of carbon. Historically, India has not contributed that much to the global carbon stock so in any fair distribution of remaining carbon space, India should have more space to achieve its developmental goal to eradicate poverty and sustainable development. India has articulated its climate position around the equity and the principle of CBDR-RC and after the Durban Conference, India has been

consistently emphasized that the new agreement should be based on the Equity and CBDR-RC and in accordance of the provisions of the Convention.

The Paris Agreement has reflected Indian position by inclusion of Equity and the CBDR-RC in the text of agreement, albeit "in the light of different national circumstances". Article 2.2 says, "This agreement will be implemented to reflect equity and principle of CBDR-RC in the light of different circumstances." It is clear that the CBDR-RC has diluted in the light of different national circumstance. It remains unanswered that how the national circumstances would be decided to differentiate the responsibility? It is pertinent to mention here that the term "in the light of different national circumstances" was emerged from the bilateral agreement between the US and China in 2014. Thus, to some extent China is responsible for the dilution of the CBDR-RC in Paris agreement.

The Paris Agreement, unlike the Kyoto Protocol, completely discarded annex based firewall between developed and developing countries with respect to obligations. However, a weaker differentiation appeared in Article 4 which says, "Peaking will take longer for developing country parties." Article 4.4 says, "developed country parties continue taking the lead…..Developing country parties continue enhancing their mitigation efforts, and are encouraged to move over time towards economy-wide emission target or limitation target in the light of different national circumstances." Article 4.4 implies that developed country parties should lead and eventually developing country parties will have to opt for economy wide reduction targets. But, at the same time it also implies that for equal obligation developing parties should have that much capability as those of developed countries.

India, implicitly attempted to link its inscribed mitigation intentions in INDC to the global actions and global support in terms of financial and technological assistances from developed parties. The Indian INDC says, "The successful implementation of INDC is contingent upon an ambitious global agreement including additional means of implementation to be provided by developed parties."[153]

Comparatively, the Paris Agreement established a clear differentiation with respect to financial obligations. Article 9.1 says, "Developed country parties shall provide financial resources to assist developing country parties". However, Article 9.2 encouraged other parties to provide such support on voluntary basis. In Paris agreement, India successfully discarded the US and Japanese attempt to list as a donor country. But, analysis of article 9.1 and 9.2 indicates that in accordance to 9.1 developing parties will be provided financial support but other parties can also provide financial resources to the developing countries. If both the articles (9.1 and 9.2) interpreted collectively, three categories of the countries clearly identified. First, Donor countries (Industrial); Second, Potential Donor countries, albeit, on voluntary basis (emerging economies) and third, recipients (LDCs and SIDS).

Certainly, the article 9.1 and 9.2 could restrict financial assistance to India in its ambitious mitigation and adaptation efforts inscribed in its INDC. Indian INDC, however, made a safety valve by including the phrase "successful implementation of INDC is contingent upon additional means to be provided by developed country parties". In case if India is not provided additional means by developed nations then India would not be under obligations intended in its INDC.

### **5.8.2** The Temperature Goal and Equity

Article 2 of the Paris Agreement established the objective of the agreement as "Holding the increase in the global average temperature to well below $2^0$C above pre-industrial levels and pursuing efforts to limit the temperature increase to $1.5^0$C above pre-industrial levels." The pursuant target of $1.5^0$C was resulted due to the hard pressing of the LDCs and SIDC and AOSIS. Despite the fact that India is also profoundly vulnerable to the climate change, the $1.5^0$C target could severely hamper the development prospects of India. The pursuant $1.5^0$C goal of Paris Agreement seems to be nearly impossible in the current scenario of pledges made by parties in their INDCs. The UNFCCC secretariat found aggregate INDCs pledges are not sufficient to keep the average rise in temperature

below $1.5^0$C and even $2^0$C goal is difficult to achieve in the current scenario of emission trends.

Considering the current rate of emissions and after taking in all accounts of INDCs pledges, it is very likely that world is heading towards $4^0$C warmer above pre-industrial level by 2100. The IPCC has presented the calculation of 'Carbon Budget' that can be emitted between 2011-2100 to keep the Paris goal of $2^0$C alive. The IPCC defined the Carbon Budget as the specific cumulative amount of GHG that can be emitted to keep the rise in global average temperature less then $2^0$C above pre-industrial levels to avert the climate change. Three scenarios are presented by the IPCC in its 5th Assessment Report (AR5) in 2014.[154]

The budget is calculated for the time frame of 1850-2100. The total Carbon Budget was 2900Gt of $CO_2$ and by 2011 almost 1900Gt had already been exhausted.

**(A)** In 1000 Gt of Carbon Budget, 66% probability of less than $2^0$C rise in temperature by 2100

**(B)** In 1300Gt of Carbon Budget the probability drops to 50%

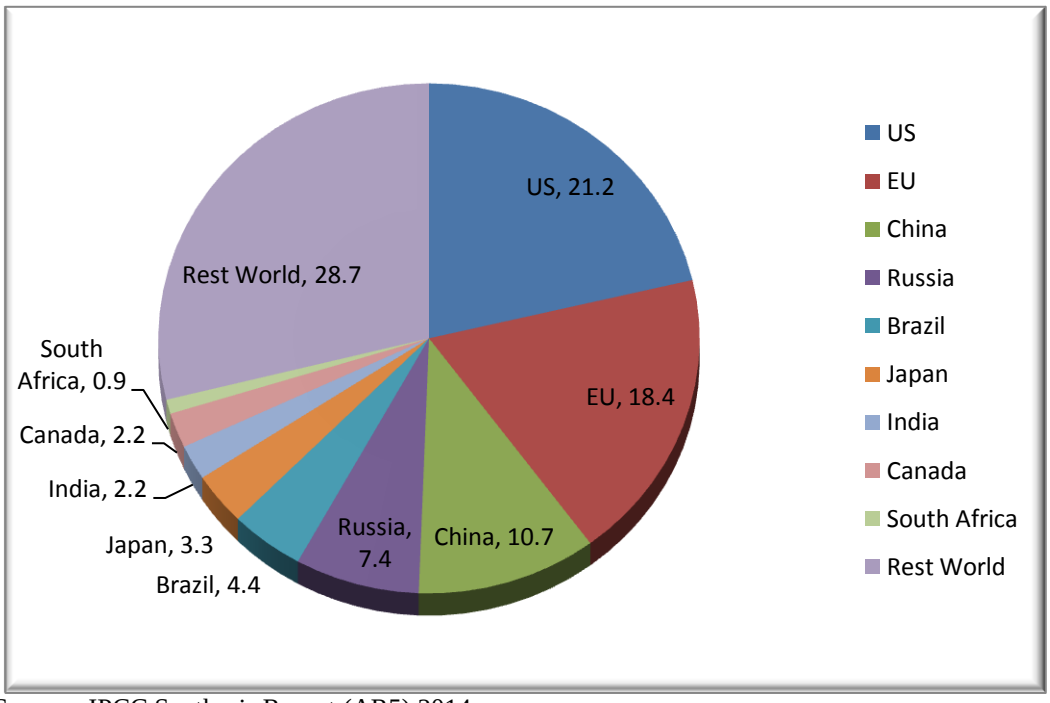
**(C)** In 1500 Gt of Carbon Budget the Probability further drops to 33%

If the $1.5^0$C goal is considered the Carbon Budget further shrink to 550Gt for 50% probability and 400 Gt for 66% probability. [155] According to the synthesis report prepared by the UNFCCC secretariat, after subtracting the pledges (INDCs) made by parties the world could still emit 750Gt of $CO_2$ just by 2030.It means that the 75% of estimated Carbon budget will be exhausted by 2030 and only 250Gt will be left for next 70 years under option A, 550Gt under option B and 750Gt under option C.[156] It can be easily assumed that if $1.5^0$C goal is taken the whole carbon budget will be consumed within next decade.

It can be argued that the developed countries had already been used more than their fair share of carbon Budget and still they are occupying more than their fair, just and equitable share on the basis of per capita notion. It is the basic

question that should have been addressed by the Paris Agreement. Without any precise calculation of fair share of each country or at least major emitters, the aim of $2^0$ C is difficult and $1.5^0$C looks impossible. It can be understood from the below figure 5.5

**Figure 5.5: Contribution to Global Accumulated $CO_2$ Stock in % (1850-2011)**



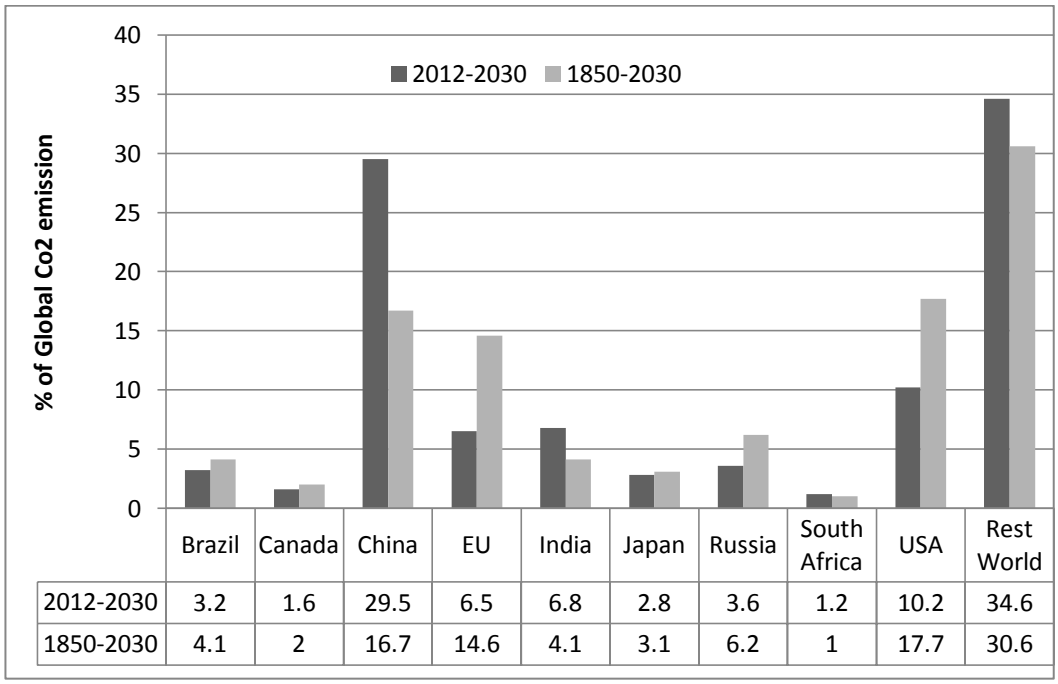

Source: IPCC Synthesis Report (AR5) 2014

It is clear from the figure 5.5 that from 1850 to 2011 bulk of the carbon space was used by the US, the EU and China. India has used only 2.2 till the 2011. The developed countries yet not ready to vacate substantially the occupied carbon space to accommodate the developmental and survival emissions of developing countries.

It can be further illustrated in the figure 5.6. The US will continue to occupy nearly 10% of the global Carbon space and importantly China will hold nearly 29.5 % while India 6.8%. It is the reason why China accepted its GHG peaking in 2030 while India has only small occupancy of Carbon Space and it will remain so. Hence, India has not accepted any peaking year to keep the option open to increase its emission for its development. India intended its ambition of

doubling its coal production by 2020 to implicitly message the world that the development still holds priority in its national interests with respect to climate regime. The validity and legitimacy of India's intention can be obtained from the figure 5.6, which shows that currently India is using far lower carbon space than of its fair share.

**Figure 5.6: Global Emission Scenario: Past and Future**




| | Brazil | Canada | China | EU | India | Japan | Russia | South Africa | USA | Rest World |
|---|---|---|---|---|---|---|---|---|---|---|
| 2012-2030 | 3.2 | 1.6 | 29.5 | 6.5 | 6.8 | 2.8 | 3.6 | 1.2 | 10.2 | 34.6 |
| 1850-2030 | 4.1 | 2 | 16.7 | 14.6 | 4.1 | 3.1 | 6.2 | 1 | 17.7 | 30.6 |

Source: IPCC Synthesis Report (AR5) 2014

In terms of Per Capita Norms, it is expected that the US and China will converge at 12 tones by the year 2030 and India will be at just 3.1 tones, well below of world average of 6.7 tones. Sunita Narain rightly pointed out:-

> "The aim of the INDC is to surreptitiously appropriate the Carbon Budget. The US, for instance, has already used up some 21% of the used carbon budget. Between now and 2030, as per its lackluster INDC, it will take up another 8-10%. In this way, the INDC is not just a country's commitment to reduce emission; it is its intention to occupy global carbon space. Once this space is taken, it is difficult to vacate. The only way now to operationalize equity is to make sure that all countries are required to take actions to reduce

emission based on the fair share of the carbon budget. But rich industrialized world do not want this discussion."[157]

The Paris agreement, indeed, silently given up the historical responsibility of the developed countries that could have been captured through the carbon budget approach and Paris agreement is quite on the carbon budget. Now, the developed and developing, both are on equal ground. It is a clear political gain for developed countries as they are, alike developing countries, under voluntary mitigation commitments which has been decided on voluntary basis through INDC.

Despite the established scientific assessment by the IPCC, the Paris Agreement failed to establish a creditable system to ensure equity and operationalize the CBDR-RC in context of mitigation actions. In Paris Agreement, the principle of CBDR-RC and equity are just empty shell as they don't have any operational legs and without assigning fair share concept to each country's emission, climate justice is just a moral call. There is no window in Paris Agreement to decide the fair share of a country in remaining carbon space. The extinction of firewall between developed and developing nations diffused the basic structure of the UNFCCC.

Although, INDCs are under periodic review in a progressive manner in terms of commitment, but, the Paris lacks on the action to be taken after defaulting in the INDCs. It is almost certain that it would be difficult to achieve the goal of $2^0$C without limiting the emission of a country according to its fair share in the global carbon space. And it would be almost impossible to achieve the $1.5^0$C goal in current emission scenario.

According to the Climate Action tracker (CAT) rating system which rated the INDCs in compliance with the $2^0$C goal, most of the developed nations fall in 'critically insufficient' and 'highly insufficient' categories.(Table 5.5) It is clear from the rating system of CAT that with most developed countries, some developing countries have not pledged sufficiently to ensure the rise in average temperature below $2^0$C. As the Paris Agreement is formed on voluntary pledges, it

does not have any mechanism to pressurized countries to raise their mitigation pledges. Although, Paris provisioned for progressive pledges through INDCs but, how it would happen, difficult to say at this juncture. It is visible from the CAT rating that honest efforts are still missing in climate regime. (Table 5.5)

**Table 5.5: Climate Action Tracker Rating (Based on INDCs)**

| Critically Insufficient | Highly Insufficient | Insufficient | $2^0$C Combatable | $1.5^0$C Paris Agreement Combatable |
|---|---|---|---|---|
| $4^0$ C+ World | $<4^0$ C World | $<3^0$ C World | $<2^0$ C World | $< 1.5^0$ C |
| Russian Federation<br>Saudi Arabia<br>Turkey<br>USA<br>Ukraine | Argentina<br>Canada<br>Chile<br>China<br>Indonesia<br>Japan<br>Singapore<br>South Africa<br>South Korea | Australia<br>Brazil<br>EU<br>Kazakhstan<br>Mexico<br>New Zealand<br>Norway<br>Peru<br>Switzerland<br>UAE | Bhutan<br>Costa Rica<br>Ethiopia<br>**India**<br>Philippines | Morocco<br>The Gambia |

Source: CAT Rating

It is clearly visible from the CAT rating of INDCs that majority of world still backing away from their grave responsibility of leading the climate regime. The US, as it announced the withdrawal from the Paris Agreement, is main defaulter in its obligation. India, on the other hand, has showed it commitment to the global endeavor of combating climate change. Indeed, has gained a well reputed position in climate regime that can be further utilized to attain other goals of foreign policy in terms of national interests.

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# Chapter 6

## Climate Change: National Security of India

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Security is the immanent to the life of individual, society and a nation. From the beginning of the human civilization, security has been fundamental element of the social life. In fact, the journey from animal or noble savage human to a civilized human is the journey of exploring security and more security. The lonely human life was full of insecurity; in fact the existence of one's life was on the mercy of other insecure humans. Thus, humans organized themselves into groups to get rid of insecurity and feel more secure, however, insecurity was still there; from outside, from similar groups. Thus, the need of security can be attributed to the origin of the social life. However, there were other reasons also which significantly contributed to the evolution of human as a social animal but security can be said as a primary reason behind the evolution of society.

These groups were organized further in villages and in tribal communities. At some point of time in the history, these smaller clusters of villages united and formed a larger unit which was political in nature with an authority. There are several theories of origin of state in political discourse and literature. But one common factor can be derived from all those theories is that they all have inherent factor of 'security' that legitimate the origin of state. By putting all things together in a simple context in words of Aristotle the state "comes to be for the sake of life, and exists for the sake of the good life" and a 'good life' cannot be envisioned without the environment of security.

A clear perception can be obtained from the various classical as well modern theories of origin of state that the emergence of state was certainly a journey of securing humans from various threats and institutionalized the security mechanism in such a way so that every individual should have a secure environment to develop himself to a desirable optimum levels. From the discussion it can be argued that the

state came into existence to provide security to its citizens and modern states are now functioning as a welfare state continue to provide positive security.

A brief discussion of various theories pertaining to the origin of state will facilitate to understand that how state is under principal duty of providing security. Broadly, theories of origin of state can be divided into two types: voluntaristic and coercive. The voluntaristic theories believes in the rationality of human nature and propounded that at some point of history, during the evolution of civilization, some people by the natural virtue of rationality, given up their sovereign individual rights to a supreme authority and united under that authority into larger unit. In turn of their dedication of individual sovereign rights they obtained security for their life and belongings from that supreme authority.[1]

The 'social contract' theory of origin of state is a classical theory which is voluntaristic and associated with Hobbes, Locke and Rousseau. In essence, the Social Contract theory can be described as a 'Security Contract' between the civil society and the sovereign authority. The sovereign authority guarantees the security of life, property and liberty to the civil society. Thus, the crux of Social Contract theory is security and it clearly exhibits in all three narrators' theories. On the surface, it seems that Hobbes created an absolute sovereign monster a "Leviathan" but, indeed, Hobbes was more concerned for the protection of individual's life. Ullman rightly pointed out "Security, for Hobbes, was an absolute value. In exchange for providing it the state can rightfully ask anything from a citizen save that he scarifies his own life, for preservation of life is the essence of security."[2]

In modern era, a widely accepted another voluntaristic theory is "automatic" theory, frequently argued by V. Gordon Childe .This theory is based on the assumption that production of surplus food created labor division in the society and formed a larger unit to coordinate and systemize the trade of grains. The need of security of tradable items and security of life pushed the autonomous communities to unite in a larger unit which was political in nature.[3]

The Coercive Theories or Force theories assume ‘warfare” as the basic causes of state origin. These types of theories have drawn their conclusion on the basis of “survival of fittest”. It implies that only fittest has right to live and others have to surrender him for their survival. Thus, the expansion of dominated areas was largely done by warfare. Conquered areas accept the supremacy of winner force for the security of their lives. The evidences found in several parts of the world like Mesopotamia, Colombia , India, Japan, Greece, Rome, central Africa, China, Peru, and Egypt that war played an important role in the origin of state. Aggregately, it can be argued that Coercive theory is closely intertwined with the security.

Although, no single theory is acceptable so far as the explicit interpretation of origin of state but one thing is common in all theories that they all are linked to the need of security to live the life in such a environment where no immense threat is present to the life.

The voluntaristic theories are mostly focused on the ‘Individualism’. The security concern is the common factor which brings all individuals and communities to form a larger union or unit. Therefore, it can be argued that the security need of individuals provides the basic impetus to the exercises which collectively create larger supreme authority. The consent of individuals legitimates the sovereignty of that supreme authority and remains the source of his authority.

Coercive theories are focused on the force or power to obtain the consent of individuals. These theories are mostly focused on the security of unit or whole or state which are created by the forceful exercises (war). These are predominately ontological theories which assume the concept of security in context of state rather than individual. These are basically concentrated on coercive power to attain the authority or consensus of individuals. The coercive power can take any form. It could be threat or actual strike to attain the perception of legitimacy. In other words, it is coercive theories believe in coercive legitimacy of state.

# **6.1** Defining the Concept of Security and National Security

## **6.1.1** Security

Similar to other political concepts, the concept of security is also defined in contested manner and in different context. The origin of term "security" can be traced in French and Latin language. It is assumed that the word derived from French word sécurité or Latin securitas.In almost all dictionaries and encyclopedias, the term "security" defined as freedom from threats of fear, danger and deprivation.

Buzan said, "Security is pursuit of freedom from threats".[4] Antom Grizald defined the security as "A conscious human endeavor to establish the state of security through social activity organized into an adequate system". He described the security as basic pre condition for the living organism. In his words, "From the evolutionary view point, security is embedded as a biological mechanism, as the tendency of an organism to survival, as an adaptation of the organism to the menace coming from the environment. Biologically speaking, security is the basic precondition for the operation of the basic life function (eating, human reproduction)."[5]

After World War II and during the era of cold war, the concept of security was predominately perceived as National Security and it was confined to the endeavor of elimination of military threats. During the era of Cold War, Nationalism was on the higher side, therefore, governments were obtaining absolute powers by highlighting military threats from other countries. In this scenario, individual security was dominated or eliminated to some degree by the National Security. In 1991, Barry Buzan expended the security concept; he argued three levels of security analysis- Individual level (Human Security), National Level (National Security) and International Level (Global Security).[6]

There are two confronting schools of thoughts- Traditionalist and Wideners or Non Traditionalist with respect to defining the security. Traditionalists are basically realist in their approach and particularly focused to the security of state by means of military force. This school of thought evolved during the era of cold war and defined the security in context of state security. Traditionalist approach is explicitly visible in the security concept of Stephen Walt. He completely narrowed down the security studies as "the studies of the threat, use, and control of military force" [7] His approach was confined to the war strategy and was focused on the elimination of military threats.

The second school of thought called "widener" or "Non traditionalist" expended the dimension of security in both directions horizontally and vertically. Barry Buzan has systematically described the Horizontal and vertical dimension of security. Buzan criticized and challenged the conventional wisdom of security which was exclusively confined to the state and predominately focused on the military strategies. He argued that horizontally, the security concept must be included other issues like economic, societal and environmental and vertically, it should include Individual, social and humanity (as a whole) along with National and International security.

### **6.1.2** National Security

There are four essential basic elements of state-Population, Government, Geographical territory and Sovereignty. Therefore, the existence of a state in stable condition is proportional to the stability of these four basic elements. However, it is debatable that which of these four one is comparatively more important for the existence of the state. Unanimously, it is assumed that 'sovereignty' is the important one. From this fact, it can be said that protecting the sovereignty is first priority of a state to remain alive with geographical integrity. The world has witnessed two world wars and they can be explained in the context of preserving, protecting and expanding the physical boundaries of sovereign state. A conclusive argument can be made as

that commonly, the concept of National Security is closely linked to the protection of four basic element of state.

The above mentioned perspective of National security is predominately belongs to the Old Traditionalist school of thoughts, basically realist in approach and defines the National Security in the sense of protection of its physical integrity and sovereignty. Some scholars opined that National Security is indeed, maintenance and protection of National Interests which originate from core principles, value, independency and physical integrity, social and economic protection. It implies that National Security essentially involves the protection, maintenance and enhancement of National Interests.

The Traditionalist approach was particularly challenged by the process of globalization. In 1970s and 1980s, the bedrock of Traditionalist approach- Sovereignty of Nation State- itself was challenged. The Traditionalist thought of National Security-exclusive and supreme right over its territory, people and natural resources- began to circumscribed or loosen due to the process of globalization and emergence of multilateral agreements like Montreal Protocol (1987), UNFCCC (1992), GATT (1994) and WTO (1995). The boundaries of individual states were disappearing and the entire world was moving towards a higher level of unification. In that scenario, the concept of sovereign state and thus classical concept of National Security went under horizontal and vertical expansion or widening.

The new, contemporary school of thought (widener) argued that the concept of National Security should be seen in a wider context, especially in nonmilitary aspects. Joseph J. Romm described two particular periods which underscored the need of redefining the National Security in border context. In 1970s "which saw the US failure in Vietnam, rising inflation, the growing economic strength of Europe and Japan and the first oil shock" compelled scholars to revisit the National Security concept in the light of contemporary circumstances.[8] Many scholars namely, Maxwell Taylor, Lester Brown, Mcnamara, Nwolise recognized non military aspects like

economic crisis, unemployment, hunger, poverty as greater threats to the National Security. Lester Brown discussed the "energy crisis as economic threat to security" along with inflation and migration and threat of climate change. By 1980, the temperature of Cold War began to decrease and scholars like Jessica Tuchman Mathews further suggested expansion of National security to include issues of resource, environment and demography.[9]

The phrase 'National Security' first officially can be traced in 1945, when the US Navy Secretary said, "Our national security can only be assumed on a very broad and comprehensive front". Afterword, it had been widely used in the US administration to justify the government military actions. In 1950, Harold Lasswell described the 'National Security' as a "coordinated handling of arms, diplomacy, information and economies". In 1962, Arnold Wolfers wrote the essay "National Security as an Ambiguous Symbol" and described the various approaches to national security.[10]

During the World War II and Cold war era, the term 'National Security' was generally echoed in term a call for protecting the physical integrity and sovereignty of the state in context of external military threat. It was the Traditionalist, who referred the National Security as the sovereign nation state in the sense of its physical integrity. Arnold Wolfer rightly described National Security as an ambiguous term as determining the threats to the national security is a subjective perspective. Barry Buzan also unescorted the ambiguity of the concept, he argued that ambiguity in defining the national security is particularly in interest of political and military elites because they can use the undefined national security to maximize their power, influence and control by setting aside other domestic affairs by invoking the national security issue.[11] Some definitions from Traditionalist view point as:

- Walter Lippmann, "A nation has security when it does not have to sacrifice its legitimate interest to avoid war, and is able, if challenged, to maintain them by war."[12]

- Arnold Wolfer, "Security, in an objective sense, measures the absence of threats to acquired values, in a subjective sense, he absence of fear that such values will be attacked."[13]
- Maniruzzaman, "National security as the protection and preservation of the minimum core values of any nation's political independence and territorial integrity."[14]
- International Encyclopedia of Social Science (1968), "The ability of nation to protect its internal values from external threats."[15]

Most of the traditional definitions are focused to the territorial and sovereign security of the state in context of external military threat. By beginning of 1970, Changing world dynamics and emergence of new economic issues in the international era propelled some scholars to see the concept of National Security beyond the traditional boundaries of national territory. Vojin Dimitijevic stated five features, he considered as pillars of National Security as:

- Existence of the state as a political Community;
- Territorial integrity (As basic right of state)
- Political Independence
- Quality of life
- Securing 'vital interest' of state in state's security policy[16]

Another Scholar, Mario Nobilo, who defined the national Security in modern international relations as:-

> "An intricate interaction between political, economic, military, ideological, legal, social and other internal and external social factors through which individual states attempt to ensure acceptable provisions to maintain their sovereignty, territorial integrity, the physical survival of its population, political independence and

possibilities for a balanced and rapid social development on an equal footing."[17]

The social aspect and mass issues are captured in the widener's concept of National Security. Nwolise rightly pointed out that "Any society that seeks to attain adequate military security against the background of acute paucity of food, population explosion, low level of production, low per capital income, low technological development, inadequate and insufficient public utilities and chronic problem of unemployment has a false sense of security".[18] Amin Hewedy defined the National security as an activity to protect identity, existence and interests in the range of social capabilities.[19]

It can be seen that the new school of thought, "widener" have more emphasis on social constructivism and significant attention towards individual deprivation from the basic human needs. Richard Ullman described both the dimension of National Security as "A threat to national security is an action or sequence of events that

**(A)** "Threatens drastically and over a relatively brief span of time to degrade the quality of life for the inhabitants of a state," or

**(B)** "Threatens significantly to narrow the range of policy choices available to the government of state or to private non governmental entities (personal, groups, corporation) within the state."[20]

Further, the concept of National security expanded with the inclusion of 'energy security' and 'economic security'. Lester Brown, in his paper wrote, "Since the World War II, the concept of national security has acquired an overwhelmingly military character, rooted in the assumption that the principle threat to security comes from other nations. Commonly veiled in security, consideration of military threat has become so dominant that the new threats to the security of nations-threats with which military forces cannot cope-are being ignored."[21]

She further wrote that "The new sources of danger arise from oil depletion, soil erosion, land degradation, shrinking forests, deteriorating grassland, and climate alterations. These developments, affecting the natural resources and systems on which the economy depends, threaten not only national economic and political security, but the stability of international economy itself."[22] Brown also identified the GHG effects or global warming as a severe potential threat to the national security.

Jessica Tuchnan Mathews, another scholar pointed out new challenges that were posing threats to the national security. She wrote, "Global developments now suggest the need for another analogous, bordering definition of National Security to include resources, environmental and demographic issues." [23]

She pointed out that increasing population-mostly centered in the developing countries- make new addition to the population living in poverty and strain on the natural resources. The relation between level of population and resource base is complex in nature. Large population leads to the higher fossil fuel consumption and more release of GHG emission in the atmosphere. Consequences are clear, environmental imbalance and change in climate. The manifestation of climate change is visible in natural disasters like flood, drought, acid rain and change in rain fall pattern. Thus, she summarized that resource, environment and demographic issues are interrelated and poised as new threats to the national security.[24]

She further explained that the nature of environment is interdependent and hence the new political and diplomatic cooperation and constrain can emerge and reshape the traditional foreign policy, decisively. Thus, National Security-prime objective of foreign policy- is now expanded to the environmental security and consequences of environmental degradation, more specifically; consequences of climate change are regarded as threats to the National Security.[25]

In 2001, a Group of Minister (GoM) was constituted after Kargil conflict (1999) between India and Pakistan to analyze loopholes in security preparation. The

GoM described the National Security as "A function of country's external environment and the internal situation, as well as their interplay with each other"[26]

After extracting the different approaches and perspective, Paleri concluded the concept of National Security as "The measurable state of the capability of a nation to overcome the multi-dimensional threats to the apparent well-being of its people and its survival as a nation-state at any given time, by balancing all instruments of state policy through governance, that can be indexed by computation, empirically or otherwise, and is extendable to global security by variables external to it." [27]

### **6.1.2.1** Elements of National Security

The conceptual clarity of a concept is relying upon the elements it comprised of. The concept of National Security is a multi-elementary concept. It is clear from the definitions that national Security is just not a military security or physical integrity of nation-state. In modern perspective, it is taken in broader context by including social aspects of security. A nation cannot be said secure if its citizens are struggling for the basic human needs.

Paleri wrote, "Elements of national security are identified from chosen parameters by examining their fundamental nature and characteristics in support to the vitality of national security governance."[28] He further argued that National security elements are not constant like periodic table of Chemical elements. They have periodicity and certain properties. They evolve and may lose their influence as an independent entity by association or disassociation in large framework of time. Regarding the hierarchy of the elements of national security, Paleri wrote, "Hierarchy of the elements can be determined by the period in which they were identified or with respect to their interactive superiority in a matrix."[29]

The list of elements is not decisive and subject to change by depending on the influential capacity of the particular element. The elements of National Security are

cohesive in nature and often influentially interactive and binding with each other. Generally, the elements can be seen in military and non-military perspective and their respective importance is also interchangeable. For instance, for a state with territorial threatening, military perspective takes the front priority instead of non-military and vice-versa in case where territorial integrity is in non-threatening situation.

Apart from military Joseph J. Romm described four elements of national Security which could threat the stability of a nation-state as illicit drug trade, economic security, environmental and energy.[30] Prabhakaran Paleri described 15 elements of National Security, as:-

- Military
- Economic Security
- Border Security
- Demographic Security
- Disastrous Security
- Geostrategic Security
- Informational Security
- Food Security
- Health Security
- Ethnic Security
- Environmental Security
- Cyber Security
- Genomic Security [31]

Briefly, each element of National Security is discussed below-

**Military security:** The Military Security is generally perceived as synonymous to the National Security. It is the oldest element of national security. It derived from the basic instinct of every living organism to defend itself from the life threatening danger. It is argued that it stems from the 'fear' embedded in human psyche. It simply implies the capability of a nation to defend or deter its boundaries and physical integrity from any external threat or invasion and proactive measures to

eliminate the probability of such threats. Earlier, it had been perceived against only nation-state, but, now it is taken in all form of armed threat from all source (external and internal) including by non-state actors. For instance, armed rebel against established government, terror attacks and proxy wars all are considered as military threats to the national security.

**Economic Security:** Economic Security is an important element of National Security as other elements are greatly dependent on economic strength of a state. Economic Security of a nation is independent to the Economic Security of its population. Therefore, achieving economic security for its population is always remains on the forefront of the economic policy of a nation. History is full of instances when states went in war for the economic gain.

Military Security of a nation also greatly depends on the economic capabilities of a nation. Pleri described the correlation of economic security and military security in a cyclical manner. He writes, " In a hypothetical situation, an economically weak nation is considered to be vulnerable to external pressure and therefore, embarks on upgrading its military security status(creating military and other armed forces and continuously upgrading them). In this efforts,itys economic security declines slowly. The cycle continues since its feeling of being weaker makes it spend more on the military."[32]

Paleri hypothesized a balancing equation termed as 'economic defense spending' (EDS) which implies "the optimum balanced spending for military security for a particular nation" variable in accordance with the economic capacity and security of military threat.[33] Violating the EDS, in other words, over spending on the, military security can cause the weakling of the economy and this becomes cycle which further detroit economic security and eventually the military security. The collapse of the USSR can be understood in context of overspending on military security. In 1980, the USSR was spending 27% of its GDP on military security, while the US was spending 7% of its GDP o the military security.[34]

Economic Security is not only supporting to military defense but also necessary to achieve offensive goals as a policy objrctive.. Offensive actions include wars that are economically profitable, proxy wars, and surgical strikes. Economic strength of a country is always having potential to be used as a weapon to serve national security. The 'carrot and stick' is an example of economic weapon. Another can be cited from cold war era, when the US supported Muzzhaddins in Afghanistan with anti air missile coasted 1billion dollar annually but that damaged the USSR helicopters 8 times.

Chinese financial aid to Pakistan is also serving the National Security of China. It is serving two purposes, using Pakistan to keep India under pressure, second, China sourcing land based transport system to reach to middle East through Pak occupied Kashmir(PoK) for its export. There are numbers of examples cited to prove that economically resilient and secure countries always use their economic strength to achieve their national interests in terms of National Security. Economically Secure nations are always in better position to secure economic security of its citizens and thus satisfy the basic needs of each section of their population. Economically Secure nations can perform their duties as a welfare state and eliminate any possibility or reduce any such possibility of unrest in any section of their population.

Therefore, conclusively it can be said that Economic Security is an important element of National Security. It is vital to ensure the Military Security internally as well externally and it provides essential strength for offensive action to ensure elimination of actual or anticipated threat to National Security.

**Resource Security:** Historically, resource security has been major cause of wars. Strong countries tend to take control of resource-rich countries by making them their colonies. British rule in India can be cited in this context. Britain sourced raw material from India as well as other colonial states to run manufacturing facilities in the Britain.

Scarcity of resources always leads to the conflicting and rivalry position and eventually become threat to the national security. Paleri wrote "Water is a major cause for the Arab-Israeli conflicts. Nearly half of Israeli water installations are located in areas that were not part of it prior to 1967."[35] The rivers originate from Himalayan glaciers and flow through Kashmir is major cause of conflict between India and Pakistan.

**Border Security:** For a nation, territorial sovereignty is non-negotiable substance for its national security. The old school of thoughts mainly perceived border security of a nation as national security. Border of a nation can be defined as internationally recognized geopolitical boundaries of its sovereignty. Therefore, protecting geopolitical boundaries is essential to uphold sovereignty of a nation. Thus, border security is an important element of national security.

**Demographic Security:** Demographic growth of a country can be positive or negative for socio-economic development of that country. Imbalanced and unplanned growth in population leads the resource scarcity and excessive exploitation of nature. Higher growth in population can cause unemployment, illegal migrations and crime. Such Consequences can disturb the social-economic structure of a nation and pose threat to the national security.

**Disaster Security:** Disasters cannot be officially defined but they can pose a great threat to the national security. Weather disasters occur naturally or human induced, they produce deep traumatic effect on people. Disasters can deeply put strain on economy, health resources and development of a nation and thus, pose threat to the national security.

**Energy Security:** Energy security is an important element of National Security. Development and growth prospects of country directly rely on the uninterrupted energy supply at reasonable price. Worldwide, Oil is chief source of energy; hence it becomes important security element for both, oil exporter and as well

as oil importer. The OPECs economy is heavily dependence on oil export and keeping oil prices on higher side is their prime national interest. The US policy in Middle East has always been predominately focused to secure constant oil supply to the US. The Gulf war and the US-Israel alliance can be understood in energy security context. Constant and secure energy supply becomes more important during the war. Hence, energy policy of a nation has strong consideration and emphasis regarding military security.

**Geostrategic Security:** Geostrategic Security implies the negotiation power or bargaining power of a nation by means which a nation secures its interests. Paleri explained Geostrategic Security "as a situation when it has to muscle its way through international agreement to retain its position of power without breaking the rules of international law".[36] In other word, it is an image building process to secure the objectives of national security.

**Informational Security:** It is debatable question whether the Informational Security should be accepted as a separate element of national security or not. But, in terms of intelligence capability of nation, Informational Security certainly scores to be accepted as an element of National Security. The "Informational Security is the protection of information and minimizes the risk of exposing information to unauthorized parties."[37] Paleri described "information that affects sovereignty, integrity, element of national security, scientific or economic interests, conduct of international relation, etc. may required to be reserved and secured."[38]

In contrast of Information Security, in democratic scenario, there is citizen right to information. Sometimes, this right may strike a discord with National Security. In a democratic country-where media is perceived as a reliable source of information- government has to manage information Security in a balancing manner to secure National Security and citizen right of information.

**Food Security:** Food is a basic need of every living animal for its survival. Therefore, securing food is an essential condition to the existence of life. The evolution of ancient human civilization near big river basin was mainly attributed to the need of secure and constant supply of food. The FAO states, "Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutrition food that meets their dietary needs and food preferences for an active and healthy life."[39]

Food insecurity or hunger can leads to social instability, unrest, conflicts, rebellion, riots, illegal migration and alarmingly terrorism. These all consequences can pose threats to the National Security of any country. Food self-sufficiency is also important factor to maintain sovereign right of a nation in international context. Dependency on imported food substances can compel a nation to make compromise on its national interests and thus, to National Security.

**Health Security:** Historically, health crisis has not been perceived as a major threat to National Security. But, over the past decades, policy makers have identified the health crisis as a major threat to National Security. Infectious diseases and epidemics may lead severe destruction of social, political and economic system of nation. Therefore, now, health is considered as an element of National Security.

Smith wrote that "Researcher demonstrated that acute and chronic changes in health status have direct and indirect impacts on security and that epidemics may lead to destabilization, political unrest, civil disorder or long-term deterioration of the economic viability of a country or region."[40] In addition to infectious diseases, life style diseases also may burn financial resources of a nation and negatively affect productivity of a nation. For instance, in India, it is estimated that by 2025, 300 million individuals shall be suffered from diabetes.

The development of Biological weapons and their use could be a disastrous threat. Such Biological attack can pose a severe threat to health security and thus to

National Security. A comprehensive National Security policy should have an emergency response mechanism in place to deal with such unprecedented Biological attack.

**Ethnic Security:** Paleri described ethnic "is taken as all matters of disparity that could be identified among people and usually used in comparison, often in relative terms of superiority-national, communal, cultural, racist, religious, tribal, caste, gender, origin, age, color, sex, etc." As far as National Security is concerns, ethnicity extents to all differences which classified humans. Ethnic groups emerge from the identified differences between one and another.

Historically, on many occasions, in almost all different regions of the world, ethnic groups were in rivalry position with one another and even with nation-state. An ethnic conflict may lead to the break-up of a nation-state if not properly dealt under the spirit of nationalism. "Ethno-nationalism, fundamentalism, militant secessionism, militarism, territorial disputes, national chauvinism, economic deprivation and gender-bias insecurity are all factors that affect ethnic security. There are millions of victims of such conflicts all over the world. The result of xenophobic nationalism that breaks into ethnic security is militarism and suppression. Ethnic security is when there is no marginalization within the human species."[41]

**Environmental Security:** According to Oxford dictionary environment can be defined as "the natural world, as a whole or in a particular geographical area, especially as affected by human activity."[42] Merriam Webster defined environment as "the complex of physical, chemical and biotic factors (such as climate, soil and living things) that act upon an organism or an ecological community and ultimately determine its form and survival."[43] It is simply implies that environment is a complex interdependence of surrounding in which a living organism survive.

Environment Security is the elimination of threats to a nation or individual those arise from the degradation of environment. Such threats can be potentially fatal

or may severely affect the quality of life of habitants. Environmental threats mainly include negative consequences or impacts of environment degradation attributed to the anthropogenic activities. From the industrial revolution, abundant exploitation of natural resources and carbon based development has degraded the environment and now, manifesting as environmental threats in form of water pollution, air pollution, soil pollution, deforestation, acid rain, depletion of ozone layer and more alarming climate change.

Romm[44] divided environmental security into two categories:-

**(1)** Transnational environmental issues that threaten a nation's security, such as climate change, which is a transnational problem and does not accept the geographical boundaries. It can significantly affect and degrade the quality of life in a state.

**(2)** Transnational Resource or environmental problems are threats to the national security; originate from the dispute over scare resources. Disputes over scare resources like water, oil, precious metal ores etc. can severely affect territorial integrity and political stability of a state. Resource scarcity may initiate mass migration and migrated refugees, thus imbalance the demographic structure of a region that can be resulted in social and communal violence.

Romm also highlighted a third category-environmental consequence of warfare. He writes that in Gulf war, Suddam Hussein used oil fires and spills to threaten allied forces. Romm explained this third category as "the hostile use of environmental modification techniques having wide spread long-lasting or severe effects as the means of destruction, damage or injury to any state party."[45] Paleri also put light on this third category by writing that "Environmental modification means deliberate manipulation of natural process over the composition of the planet and its sub-system-the dynamics, composition or structure of the earth, including its biota, lithosphere, hydrosphere and atmosphere or of outer space."[46]

In 1972, At Stockholm conference, environmental issues were recognized as global threats to the existence of the planet earth. Later, in 1992, specifically, climate change was accepted as a transnational issue which has multidimensional consequences to the national, international and individual security.

**Cyber Security:** in last one and half decade of information and technological revolution, almost every part of human life is virtually control by computers and internet. It can be said that we are living in a cyber world, where human life is completely integrated with the information and technology. Every sector like economic, banking, financial, space, health, defense-list is endless- is heavily rely on computers and internet for their functioning. This dependency makes all sectors vulnerable to the cyber attack. Indeed, by the click of keyboard and mouse, cyber attackers can unleash panic in the cyber world.

By hacking emails accounts important security communications can be stole by rival states. Serious fatal economic crisis can be induced by hacking banking and financial system and stock market of a nation. Computer viruses (small programs or applications) those can be easily circulated, steal sensitive information from devices. Conclusively, it can be said that cyber terrorism is a new form of terrorism that can seriously pose threat to the national security. Further, the fatal fact is that the cyber insecurity can severely disturb other elements of national security like military and economic security. Hence, cyber security is now, important element in assessing security scenario of a nation.

**Genomic Security:** With the discovery of Deoxyribonucleic Acid (DNA) in 1953, human knowledge successfully accessed to the genetic code of life. It was a remarkable discovery in the History of Medical science. From 1953 to the current centaury, the genomic research has made phenomenal advancement. Today, genomic science made it possible to alter genetic code in DNA. This development has opened up both positive and negative possibilities.

On the positive side, Biotechnology can produce more qualitative plants by changing the genetic structure of seeds. Various diseases which have root in genetic disorder can now be corrected at DNA level to some extent. On the negative side, dangerous viruses, bacteria, fungi and plants can be genetically designed to use as biological weapons. By human cloning, illicit trade of human organs cannot be denied. Further, human cloning may severely disturb the moral and ethical base of social structure.

Genomic Security has not been yet fully and precisely assessed. But, the scientific community has certainly questioned the safety of genetically modified plants and animal food. It is widely perceived that secret researches are still going on human genetic structure to produce super humans with super intelligence and physical stamina. It is quite certain that genetically modified humans and animals could disturb the delicate balancing in the nature. On ethical ground, genomic modification in humans have been attempted to control to ensure genomic security. Many thinkers, Philosophers, scholars and scientists have concern that genomic modification may displace the humanity from such humans. Further, scientists have firmed belief that such genomic modification once done, cannot be revert. They also feared that new sort of genetic disorder or alignment may manifest after genomic modification and that will be then, transferred in successive generations putting human race at risk of extinction from the earth.

## **6.2** Climate Change and Security Linkage

Scientifically, climate change is well established fact, albeit, its implications are controversial. The controversy is mainly focused on the magnitude, extent and likelihood of implications of climate change consequences. Some skeptics argued that implications of climate change would have only regional and localized effect. On the flip side, climate scientists and international security experts firmly believe that implications of climate change will be substantial and beyond the national territory of

states. They argued that the consequences of climate change and its implications are, still, not fully calibrated. They may be beyond the anticipation, complex, interdependent and interactive to the social-economical structure of a state.

From both the perspective- traditional and modern-climate change has wide spread security impacts. Many scholars, scientists, defense experts and policy makers have identified linkage between climate change and national security. Ben Wisher has identified this linkage as conflicts originating due to the scarcity of resources.[47] Ben Russell and Nigel Morris described:-

> "As we look beyond the next decades, we see uncertainty growing, uncertainty about the geopolitical and human consequences of climate change…… impacts such as flooding, melting permafrost and desertification could lead to loss of agricultural land, poising of water supplies and destruction of economic infrastructure."[48]

Linking climate change with security implication was attempted by the United Nation Security Council (UNSC) in 2007. Under the chairmanship of the UK, an international debate was initiated to discuss the security implications of climate change. Nearly 50 countries participated in the debate; however, the debate had not adopted any resolution due to the resistance from developing countries. Developing countries argued that the issue of climate change was a socio-economic security issue rather than a military security issue. Hence, UNSC was not an appropriate platform to discuss the climate change. They insisted that instead of UNSC, the security implication of climate change should be discussed under the auspices of the UNFCCC. A. Gupta and Sujit rightly mentioned:-

> "Although securitization of climate change is counter-productive, as this only increases the hiatus between the developed and developing countries, there is no denying that climate change can have security implications. Climate change is regarded as a non-

> traditional security threat. That is quite obvious even if the available analysis of the impact of climate change is patchy, incomplete and often monitored by the desire of the developed countries to shape a new security agenda."[49]

Securitization, as Dalby described 'is the mode of analysis of an issue'. He explained the analysis as "the active process of invoking security and setting in policies and actions on the basis of presenting matters as threatening".[50] It can be argued that the developed nations were more focused to securitize climate change in traditional or state centric context which emphasize military solution. On the other hand, the developing nations were more concentrated to socio-economic context of climate change which requires financial and technological assistance from developed nations. Irrespective of traditional or modern concept of national security, climate change does have security implications.[51]

The Security implications of climate change have been explored and charted by the UNEP. Various reports on Human Development have been released by the UNEP in this connection; however, predominately they were adopted human security and development context. The UNEP, in its 18 month long investigation in Sudan, concluded that 'Darfur Conflict' which took over nearly 200000 to 500000 lives, was driven by climate change and environment degradation. The Guardian reported that "The immediate cause was a regional rebellion, to which Khartoum responded by recruiting Arab militants the Jan Jaweed, to wage a campaign of ethnic cleansing against African civilians. The UNEP study suggests the true genesis of the conflict pre-dates 2003 and is to be found in failing rains and creeping desertification…. The Darfur conflict began as an ecological crisis, arising at least in part from climate change."[52]

In European Union, particularly in the UK, Denmark, Germany and Sweden, there are numbers of studies have been carried out by various institutions and organizations, such as German Advisory Council on Global Change (WBGU),

Swedish Defense Research Agency (FoI), The International Institute of Strategic Study (IISS) and The Royal United Service Institution (RUSI). Almost, all studies carried out by these institutions have confirmed the security implications of climate change.

In the US context, the link between climate change and security implications has been widely explored by various governmental and research institutions. Various reports from the US Department of Defense (DoD) have charted climate change as a potential risk for national and international security. In response to Congressional question, the US Department of Defense prepared a report in July 2015 with the conclusion that "measurable impacts on areas vulnerable to the impacts of climate change and in specific cases significant interaction between conflict dynamics and sensitivity to climate change. Although climate-related stress will disproportionately affect fragile and conflict-affected states, even resilient, well developed countries are subject to the effects of climate change in significant and consequential ways."[53]

In 'Quadrennial Defense Review Report' 2010, the US DoD assessed the security implications of climate change on its operations, roles, missions, facilities and military capabilities. The report acknowledged the geopolitical impacts of climate change that contribute to resource scarcity and thus, may spur or exacerbate mass migration. Further, the report says, "while climate change alone does not cause conflict, it may act as an accelerant of instability or conflict, placing a burden to respond on civilian institutions and militaries around the world."[54] Similarly, 2014's Quadrennial Defense Review Report says, "the projected effects of climate change ….are threats multipliers that will aggravate stressors abroad such as poverty, environmental degradation, political instability and social tension-conditions that can enable terrorist activity and other form of violence."[55]

In 2009, the united Nation General Assembly report[56] on security implications of climate change identified 'interdependence between human vulnerability and national security through five channels:-

1. Vulnerability: Food security, human health and extreme events.
2. Development: slowing down of development that could affect state's capability to maintain stability
3. Coping and Security: Migrations and scarcity of natural resources could provoke domestic conflicts.
4. Statelessness: Implications for security of the loss of statehood due to the disappearance of territory
5. International Conflicts: International conflicts may erupt due to the climate change's impacts on shared or undemarcated international resources.

Beyond this, the report indicated other climate change related threats "those appear highly likely, are large magnitude, may unfold relatively swiftly, and are unprecedented in nature, including: loss of territory, statelessness and increased numbers of displaced persons; stress on shared international water resources, e.g. with the melting of glaciers; and disputes surrounding the opening of the Arctic region to resource exploitation and trade. This is not an exhaustive list, as new challenges may warrant the attention of the international community in future."[57]

In India, some studies have been undertaken to explore the link between climate change and its security implications. In 2008, April, the Institute for Defense Studies and Analysis (IDSA) had organized a national workshop on the theme "Climate Change and National Security". A working group was established to explore the security implications of climate change in Indian context. The findings of report have been published by the IDSA in form of a book. The IDSA report summarized the security implications of climate change in Indian context with the socio-economic and traditional perspective of national; security.

Conclusively it can be said that security implications of climate change are very likely and already felt in different part of the globe. Africa, Pacific costal states and Asia are charted as most vulnerable part of the globe as these areas highly dense

in population and fall lower in human development indicators. Most of the countries are developing countries having least adaptation capabilities. Therefore security implications would severely affect these states.

In the assessment of security implications of climate change it becomes inevitably imperative to approach the security concept in a comprehensive manner. Studies that have been done by various institutions differ significantly in their approach towards the national security concept. For instance, the US is more focused to the traditional, state centric and military concept of the national security while, developing countries has wider approach toward the national security concept. They are more concentrated to the socio-economic context of the national security.

## **6.3** Climate Change and National Security: Indian Context

India is the land of diversity that exhibits in language, culture, food, attires, religion, and caste and in many aspects of life. These diversities are mostly induced by the geographical and climatic conditions of environment. Geo-physically, India is divided into six divisions:

(1) **The Northern/ Himalayan Mountains:** The Himalayan Mountains run in West-East direction, forming an arc of length of 2400km from Kashmir to Arunachal Pradesh. China, Nepal, Pakistan, Myanmar, Bhutan and Bangladesh are countries those share ecological and river system of Himalaya with India. Important rivers originates from Himalayan mountains glaciers include Gangs, Brahmaputra, Yangtze, Mekong, Salween, Xunjiang Red River (Asia), Irrawaddy river, Yellow river, Syr Darya, Chao Phraya, Tarim river. However, the rivers that not flow through Indian Subcontinent are not regarded as genuine rivers of

Himalayas. Important other rivers, which are regarded as typical Himalayan rivers include the Indus, Five sisters ( Jhelum, Chenab, Beas, Ravi and Sutlej), Saraswati, Gangs, Yamuna and Brahmaputra.[58]

(2) **The Northern Plain:** This Northern Plain is about240-320km broad and 2400km long and mainly divided into three plains i.e. Punjab, Gangs and Brahmaputra. This plain is agriculturally very productive due to the rich soil and adequate water supply.

(3) **The Peninsular Plateau:** This plateau is divided into two regions- Central Highlands and Deccan Plateau and characterized with broad, shallow valleys and rounded hills.

(4) **The Indian Desert:** The Indian Desert is located in Western part, in Rajasthan and divided by Aaravali hills. This part usually experienced scanty rainfall (less than 150mm). The climate is classified as arid with Luni is the only river but some rainy streams appear during the monsoon months.

(5) **The Coastal Plains:** These plains are divided into Western and Eastern coastal plains. Western plain runs from Gujarat to end in Kerala. The Gulf of Khambat and Kutch lie in this coastal plain. International border with Pakistan runs with this coast line up to Maharashtra. Eastern Coastal plains lie between Bay of Bengal and Eastern Ghats, stretching from West Bengal to Tamil Nadu. Bangladesh and Sri Lanka are two important neighbors of India in this region.

(6) **The Islands:** India has a total 247 islands- 43 in Arabian Sea and 204 in Bay of Bengal- some Coral islands are also lie in the Gulf of Mannar. Largest islands are Andaman and Nicobar; lie in the Bay of Bengal. Another important island is Lakshadweep lie in Arabian Sea.

Thus, Geographical divisions have different climatic, topographical and vegetation characters. Therefore, anticipated impacts would be different for different

region. In national security context, the Himalayan and coastal regions are very important as these regions share international borders with neighboring countries.

The Indian subcontinent is vastly depends on monsoon rain and climate change could alter the rain fall pattern in terms of distribution, duration and quantity of the region. Such significant deviation from standard rain fall pattern could substantially affect the food production, water availability, energy production and may induce economic, health and demographic issues. Such issues could further catalyze the existing or generate new inter or intra state conflicts.

Gupta and Dutta rightly pointed out as:-

> "Geophysical changes will lead to soil erosion and increase in vector-borne diseases. The variation in temperature and monsoon, the soil erosion due to floods and rise in sea level will create food and water scarcity. The adverse impact on human security would play on national security as well. There could be more hunger, more law and order problems, overcrowding of cities as a result of food and water scarcity. Since many of the countries in South Asia have weak governance structure, inadequate public health systems and low adaptation capacity, there would be greater strain on governments' resources. Climate change could create chronic economic problems including unemployment. Unemployed youth could take militancy, terrorism and organized crime. It could create fresh conflicts due to environmental reasons and also aggravate the existing conflicts. Environmental distress due to climate change will create pressure on populations to migrate to safer locations in search of livelihood."[59]

Asia is the region, now labeled as world's growth engine, where China and India are two major economic and military gigantic countries in rivalry positions. China and India are biggest global market and preferred destination of foreign

investment. Both the countries are densely populated and vulnerable to the climate change effects. The rivalry between China and India is basically rooted in the border disputes that frequently appear as military clashes at the North-East border of India. China's is attempting to restrict or control the Brahmaputra flow by making dams and artificial lake to use the river flow as a water weapon against India. Such Chinese attempts adding the environmental mistrust between the countries and certainly a cause of concerns for the National security of India.

Indian subcontinent (Southern region of Asia) comprised of India, Bangladesh, Pakistan, Nepal, Bhutan, Maldives and Sri Lanka- having area of around 1.7 million square m. with the combined population around 1.710 billion (2015). The Southern part of Asia is perceived as the poor's capital with the brutal face of socio-economic inequalities and exploitation. Political instability, corruption, communal violence, clashes, especially in Pakistan, Bangladesh and Sri Lanka make the region fertile to grow the fungi of terrorism. Due to the lower human developmental conditions and weak governance system, countries like Pakistan is now almost turned as international headquarter of terrorism and Bangladesh could be the next one.

It is very clear that barring India, adaptation capabilities and capacities of these countries are not adequate to cope with adverse consequences of climate change. Consequently, national security scenario in these countries at the great risk due to climate change and that could turn into disastrous to the national security of India. Being the largest country of the region in terms of economy, area, population, science and technology, development, business and trade; India's national security highly vulnerable to the implications, could unfold in neighboring countries due to climate change.

There are many conflicting issues already existing between India and Pakistan. India and Pakistan share water from Himalayan Rivers and in context of climate change, the potential effect can affect the Himalayan glaciers and thus water scarcity could be the potential cause of fresh conflicts between two countries. China's

attempt to change the river flows to India could also add tension between the two countries. Illegal migration from Bangladesh is already folding as security issue in India, especially in Assam, where communal violence and demographic issues already presented a concern for national security of India. Sri Lanka, being an island country, can lose its land to rising sea level and that can raise ethnic clashes within the country induce illegal migration to India. It is difficult to pin point the security implications of climate change and it is further difficult to make concrete analysis of potential threats that can arise from neighboring countries specifically, due to the climate change. In following section hypothetical description and analysis is attempted to assess potential security implications for India from neighboring countries.

## **6.4** Climate Change and India's National Security concerns (Regional context)

As stated above, climate change can vastly affect the agro-culture region of the South Asia. Indian sub-continental countries are highly vulnerable to the adverse consequences of climate change due to their socio-economic and political instability. The inter-link between climate change and regional security is hypothetically very clear and this link has already begun to reveal in different part of the world. India's neighboring countries, especially, Bangladesh, Pakistan and Sri Lanka, are already having substantial national and human security issues. There is greater probability that climate change impacts can further intensify the severity and magnitude of such issues. In following sections, attempt has been undertaken to assess the impacts of climate change on India's neighboring countries and its security implications for India.

The IPCC in its AR4 has estimated that unchecked climate change can be resulted in an increase of $0.3^0$C-$0.6^0$C globally and in South Asia, increase in average temperature is expected to be over the global average.[60] Impacts of climate change

may be unfolded in form of geophysical changes like, melting of Himalayan glaciers, sea level rise and extreme weather conditions.

- **Melting of Himalayan glaciers:** Himalaya mountain range is regarded as water tower of Asia. Himalayan glaciers are source of most of the largest rivers of Indian sub-continent and China. According to the study of Nepalese Department of Hydrology, cited by P. Bidwai, Himalayan Mountain range has been warming by 4 times ($0.06^0$C) greater than global average. Similarly, in last 40 years, Tibetan plateau has been warming by average $0.16^0$C (per decade).[61] Thus, it is very likely that rapid melting of Himalayan glaciers would first increase water flow in rivers and ultimately disappearance of glaciers would leave the biggest rivers as just seasonal.
- **Sea Level Rise:** Increase in global average temperature will lead to melting of ice caps (polar) and glaciers resulting exponential water flow to seas. Rise in sea levels would than submerge the coastal areas. In Indian sub-continent, there are many highly populated and dense cities located at coastal areas will be at the risk of submerging under sea water. The sea level rise is great threat to the existence of island countries like Maldives and Sri Lanka and even for countries like Bangladesh, Pakistan and India.
- **Extreme Weather Conditions:** Climate change may induce or aggravate weather conditions into disastrous extremes like floods, drought cyclones. Extreme weather conditions like floods further bring scary landslides and that can change the topographical characters of areas.

In Indian sub-continent, three largest countries India, Pakistan and Bangladesh are more or less equally vulnerable to the consequences of climate change. However, due to poor socio-economic and weak governance system, Pakistan and Bangladesh are likely to be affected severely.

Their inadequate adaptation capabilities and prevailing conflicting bilateral relations with India could pose threats to the national security of India. In following sections, specifically three Indian neighboring countries, Bangladesh, Pakistan and China are discussed. The discussions are done in context of possible climate change effects on these countries and how these climate change effects could bring security concerns for India.

## 6.4.1Bangladesh

In Indian sub-continent, Bangladesh is highly vulnerable to the adverse effects of climate change. According to the worldmeters.com population of Bangladesh was 164669751 in 2017 and ranked 8$^{th}$ highest populated country in the world. It has 50.259 sq. miles of total land with density 1278 per km$^2$. Around 25% of land of country is less than 7 feet above sea level. Half of population is under severly poverty. According to the Dr. Md. Nurul Islam, 'Director of Employment and Training Institute' by 2080, 40 % of productive land could be submerged in the Southern part of Bangladesh. It is predicated that one meter rise in sea-level could take up around 15% of land under sea water and make 30 million people homeless.[62]

Bangladesh is highly prone to floods and cyclones that could be aggravated by climate change. Further, the 'Sundarban' delta with an area of around 10000 sq. km is fragile ecosystem to the catastrophic tidal waves. River basin erosion is also a serious issue that could be further intensifies by the heavy floods due to climate change. Padma, Brahmaputra and Meghna are biggest rivers of Bangladesh eroding their banks every year and displacing nearly 100000 people annually in Bangladesh.[63]

Among various disputes, water sharing between India and Bangladesh is a contentious issue. Nearly, 54 different sizes of Trans-border Rivers shared by both countries. In 1996, India and Bangladesh were agreed upon water sharing of Ganges.

The Farakka barrage, commissioned in 1975, was built to divert Ganges's water through Hooghly-Bhagirathi channel to curb sedimentation at Kolkata port. Bangladesh frequently alleged India for reducing agreed 50-50% of water to Bangladesh in dry spell of year.

The Sundarban delta is a densely forested area on the Bay of Bengal formed by Ganges, Padma, Brahmaputra and Meghan rivers. It is an important ecological system supporting millions of people for their livelihood and providing raw material to the Bangladeshi industries. It is well anticipated that reduction in water flow in rivers could severely affect the ecological balance of Sundarban delta that can be resulted in fall of rice production, closures of industries and loss of employment opportunity for millions of Bangladeshi people.[64]

Water sharing of Teesta River is also contentious issue between India and Bangladesh. India claims 55 % share that is opposed by Bangladesh by demanding 50-50 division of Teesta water. The Teesta River is 5$^{th}$ largest trans-border river of Bangladesh and an important source of fresh water for irrigation and fishing in five districts of Bangladesh. India's hydro projects, mostly in Sikkim, also aggravate political tension between two countries as Bangladesh frequently alleged these hydro projects for water reduction in Teesta River.[65]

Most of the large rivers flowing in Bangladesh are trans-boundary Rivers originating from Himalayan glaciers. Therefore, it is anticipated that due to the melting of Himalayan glaciers, scarcity of water could lead tension between India and Bangladesh. Inadequate water availability could severely affect farming, fishing and economic activities (depends on Sundarban) and that can be resulted in displacement, unemployment and socio-ethnic conflicts in the country. Consequently, large migration to India cannot be denied, however illegal migration from Bangladesh has already happening, but it may accelerate due to the consequences of climate change if not properly addressed.

Illegal immigration from Bangladesh is another contentious and a major security issue for India. Illegal immigration from Bangladesh has been taking place since the partition of India. During and after the partition, millions of Bengali Hindus were immigrated to India due to the fear of communal violence. In search of safe shelter, another wave of immigration took place during or just before of Bangladesh freedom war. Various studies have concluded that earlier immigration largely attributed to the communal tension and conflict between Hindus and Muslims. But the later immigrations have been happening due to the extreme poverty, poor living conditions, unemployment, poor infrastructure, political instability and environment of insecurity and prevailing violence in Bangladesh.

Exact and precise numbers of illegal Bangladeshi immigrants are still unknown, but roughly the number stands nearly 15-20 million. These illegal Bangladeshi immigrants are living in different parts of India, albeit mostly in North East states. It is found on several occasions that most of them have now, obtained various officially recognized governmental documents, like Aadhar card, ration card and enrollment in electoral list. Now, it is not easy to detect illegal Bangladeshi immigrants from those who have been living in India from generations. This situation is particularly raising red flag to the national security of India.

This illegal immigration from Bangladesh is posing critical security threats for India in many ways, as:-

- Illegal immigrations from Bangladesh have been causing demographic imbalance in several states of India. Particularly, small states of North East are vulnerable to the demographic imbalance. In Assam, the security implications of illegal immigration are clearly visible. Unrest appeared in 1980, when 'All Assam Students Union' had begun agitation against illegal immigrants from Bangladesh. Later, the agitation turned in Bodoland movement which aroused communal violence between indigenous Bodos (A Hindu Tribe) and Muslims (perceived as illegal

Immigrants from Bangladesh). Similar riots were took place in 2008 and 2012. It is difficult to differentiate between native Bengali-speaking Muslims and illegally immigrated Bangladeshi people, who also speak same language, making the situation more peculiar or sticky in context of India's security concerns. In 2012, communal clashes in Assam feared the North Eastern people in Southern India. The Central Government of India found ample of evidences that Pakistani organizations were deeply involved through social media in creating panic and provoking communal riots in other parts of India.

- Pakistan's Inter Service Intelligence Agency (ISI) is active in Bangladesh and utilizing it as a launching pad to propel militants, arms and fake Indian currency.
- The North East region of India has been facing insurgency of various tribal ethnic groups like 'Liberation Front of Assam' (ULFA). Such ethnic groups are receiving finance, arms from ISI through Bangladesh border. It is also found by Indian security agencies that such insurgent groups trained in Bangladesh by ISI.
- Drug mafias and smugglers also using the India Bangladesh pours border as a transit point
- It is also on the record that some of these illegal Bangladeshi immigrants are involve in criminal activities and prostitution in several parts of India causing local law and order problems.

The demarcation of border between Bangladesh and India is based on the rivers shared by both countries. Theses Rivers keep changing their course by eroding their bank resulting in emergence of new islands. The Moore Island, discovered in 1975 by India, had been a contentious issue between the two sides.

It can be argued from above discussion that Bangladesh is particularly highly vulnerable to the adverse effects of climate change. It is estimated that climate change

will cause the scarcity of water, land and employment in Bangladesh and that could result in water dispute and more serious illegal immigration. Poorly demarcated border between India and Bangladesh could add fresh tension between both the countries. Direct armed conflict between both countries is highly unlikely, however, small military clashes cannot be denied. Among all security risks, illegal immigration from Bangladesh is particularly, a cause of concern for national security of India. The climate change would certainly affect Bangladesh's socio-economic structure and thus more illegal immigration to India is likely.

## 6.4.2 Pakistan

Since the independence of India and Pakistan, bilateral relation between the two countries has been full of constrain, conflict and mistrust. The foundation of Pakistan's nationalism has been nourished by an anti Indian perception. All most all of the military dictatorships in Pakistan obtained their legitimacy by propounding India as a greatest threat to the security of the country. Even, democratic governments in Pakistan have also not been different in their perspective towards India. In fact, Pakistan's emergence on international map was based on the religious nationalism mainly shaped by M.A. Jinnah. He saw the Hindus and the Muslims not only as two different religions but also as two different nationalisms.[66]

Thus, Pakistan's nationalism is founded by religious discrimination and embedded with animosity against secular India. Animosity between two countries largely materialized as ongoing Kashmir issue. The two countries fought four wars, including one undeclared (Kargil) but, bilateral relation even getting more conflicting and bitter.

Apart from other reasons behind Kashmir issue, Nitin Pai quoted General Pervez Musharrf's thesis titled "Kashmir-Indus Interlinked" in which the General argued that the Kashmir issue was interlinked and depended on the Indus river water. The General further said that both the issue would not exist independently.[67]

The General rightly pointed out the fact that Pakistan is completely depended on the water of Indus River for irrigation, drinking and all other purposes. Pakistan has largest irrigation system that provides water to 80% of the total farmland (21.5 million hectares). It simply denotes that Pakistan's agriculture production and thus, its agrarian economy, is exclusively rely on the water of Indus and its tributaries. In 2007, the per capita water availability in Pakistan was just little over of 1000 $m^{3,}$ which placed Pakistan in the category of 'high stress' states with reference to water availability.[68]

The Indus River originates from Taibatue Plateau near Lake Mansarovar which is basically belongs to the highest range of Himalayan mountains. The Indus River runs through Jammu and Kashmir and then in Pakistan in Southern direction along with the length of Pakistan. Finally, ends in Arabian Sea near Karachi, an important port and industrial city Pakistan. There are 6 main tributaries of the Indus River.[69] From Eastern side i.e. Indian side, five important tributaries are: Sutlej, Beas, Ravi, Chenab and Jhelum. From Western side i.e. Afghanistan side, only one main tributary called Kabul joins the Indus. According to FAO paper "total inflow from China to India in the Indus river basin is estimated at 181.62 $km^3$."

The distribution of Indus river water is governed by the "Indus Waters treaty' (IWT) signed by Indian Prime Minister Jawaharlal Nehru and Pakistan's President Field Marshal Mohammad Ayub on 19$^{th}$ of September 1960 at Karachi. In brief, the Indus Waters treaty awarded 3 Western rivers namely Indus, Jhelum and Chenab to Pakistan; While India received exclusive rights over Ravi, Beas and Sutlej. Thus, under the supervision of the World Bank the catchment area of the Indus River divided between Pakistan- India in ratio of 56% and 31% respectively.[70]

Despite the four wars between India and Pakistan, the IWT still holding respect from both the sides. However, there are several contentious issues emerge frequently. Mostly, issues emerge due to the Indian right to use 20% of water from Western rivers for non-consumptive purposes. In 1987, India had begun the 'Tulbul

Barrage' project on the Jhelum. But, on the objection raised by Pakistan, India suspended the project unilaterally. Other contentious water issues include Bagalhari, Kishanganga and Ratle projects.

It is pertinent to mention here that the Indus Waters treaty does not carry any provision in anticipation of the climate change and its potential effect on Indus River Basin. All most all rivers in the Indus basin are dependent on the water inflow from Himalayan glaciers and Monsoon rain. It is anticipated that due to climate change Himalayan glaciers may melt rapidly and ultimately disappear in due course of time. Thus, depletion of Himalayan glaciers could leave the Indus basin on the mercy of monsoon and it is likely that monsoon, itself, may severely disturb due to climate change. In totality, climate change could manifest in a disastrous form of water scarcity in the Indus river basin.

Due to an upper riparian position, India could have substantial potential to control significant portion of water flowing through Indus river basin, although India does not have that much infrastructure in place to manipulate or cut off water flow to Pakistan. But, it is fact that India possesses the potential to do that. Many Pakistani think tank and defense expert believe that India is gradually developing such projects that can be used as water weapon against Pakistan. In July 2017, the 'Centre for Global and Strategic Studies' (CGSS), Pakistan, had organized a seminar on "Water Security and Emerging Threat in Pakistan" that seminar painted "India as a biggest threat to Pakistan's water security." The chairman of CGSS Lt-Gen (Retd.) said in opening remark that "water was once our biggest asset-but now it is our biggest threat."[71]

The water ghost was not born in the seminar; it was there since the independence of India and Pakistan. Indeed Pakistan's water fear is not baseless. In September 2016, in the backdrop of Uri Attack-where 18 Indian soldiers were killed by Pakistani army- Indian Prime Minister Narendra Modi stated "blood and water can't flow together at the same time". He made the statement during in meeting with

officials of Water Ministry on Indus Water Treaty. He also indicated review of unilaterally suspended Tulbul Project in Jammu and Kashmir.[72]

It would not be wrong to say that Pakistan's existence, as a state, greatly depends on the water India letting flow to Pakistan. This had been revealed in 1948, when India shut down water flow to the cannels taking water in Pakistan, however, India restored the supply by next day. Pakistan has been aware of this fact right from the partition. There is a famous quote of David Lilienthal in this regard, cited vigorously, he said:-

> "No army, with bombs and shell fire could devastate a land as thoroughly as Pakistan could be devastated by the simple expedient of India's permanently shutting off the sources of water that keep the field and the people of Pakistan alive. India has never threatened such drastic step……but the power is there nonetheless."[73]

It is indeed a fact that India owns or possesses such power, albeit, does not have required infrastructure in place to deal with excess water, if exercised, could drastically wipe out Pakistan's existence. Therefore, right from the independent existence of Pakistan, its security policy has been confined to destruct India's sovereign right over Jammu and Kashmir.

The root cause of Kashmir issue between the two countries thus, can be understood in context of water security that likely to be aggravated by climate change. Since all rivers originate from Himalayan Mountains, sovereign right over Jammu and Kashmir is strategically inevitable in context of water security. It is well taken fact in strategic establishment of Islamabad that they cannot afford or win direct armed war with India. Instead, Pakistan adopted the strategy of proxy-war to pressurize India for a territorial settlement in such a way that it could destroy India's sovereign right over Jammu and Kashmir. Pakistan's proxy-war strategy include many activates as: - Feeding terrorism in J&K, facilitating insurgent groups,

propagating manipulated communal material through social media, propelling counterfeit currency, terrorist killing of Kashmiri Hindu and terrorist activity in other parts of India etc. Pakistan's morbid obsession with J&K could exacerbate terror attacks in the situation of severe water scarcity due to climate change.

Another dimension of water scarcity that could manifest in form of ethnic implodes in Pakistan. Ethnic friction between Sindhi and Punjabi is already there in Pakistan. Sindhi ethnicity mostly centered in Sindh province near the coastline and depended on Indus water. Punjabis mostly reside in Punjab province which is upper riparian in Indus river system. Any reduction in water flowing to Sindh would trigger the feeling of being exploited by Punjab that could take severe form of ethnic violence between Sindhi and Punjabi. Further, rising sea level in coastal area could induce migration of Sindhis into other parts of Pakistan, especially to Punjab. Such ethnic conflict in Pakistan could initiate illegal immigration to coastal areas of India and that could turn in security implications for India.[74]

Another possibility that could emerge from this ethnic conflict is indicated by Nitin Pai. Pakistani army is mostly dominated by Punjabis; in case of ethnic conflict "counters urgency operations by the Pakistan army could turn into ethnic killing leading to a flow of refugees into adjourning Indian state".[75] This ethnic conflict, further escalate Baloch insurgency for freedom. Thus, it is clear that Pakistan is sitting on the brink of ethnic implode and climate change could further intensify this pre existing ethnic conflicts which, as Nitin Pai indicated, eventually lead break in Pakistan's army and failure of Pakistan as a state. Collapse of Pakistan as a state could have a profound geopolitical and security impact that is likely to affect India's national security scenario.

### 6.4.3 China

China is undoubtedly a super power of the world. It is now a gigantic economy of the world after the US. By surpassing the US in 2007, China is top most

GHGs emitter of the world. However, its per capita GHGs emission is slightly lower side when compared to the developed world. In Fact it is still half of the US. In climate change regime, India and China have long been regarded as close allies to counter the strategic pressure from developed countries. Together, both the countries have given a strategic and tactical representation to the global South. It is also a fact that China is far bigger economy than India and its aggregate and per capita emission is quite high in comparison of Indian emission. India and China has been a great believer of the CBDR-RC principle in climate regime and strongly advocated for equity issue in context of mitigation obligations.

In 2013, China was contributing 29 % to the global emission and similarly in term of per capita it was emitting nearly 7.2 ton of Carbon dioxide. On the other hand, India was emitting far less than the Chinese and the world's average emission. In present scenario, China's GHGs emission comes closer to the developed countries. It is the reason now; India and China are not seen as a closer allies as they were once.

In Asia, India and China are two big economic and military giants. They had fought a war in 1962 and since then, the bilateral relations between both the countries have been strenuous due to the prevailing border disputes. Two Indian states, Arunachal Pradesh and Sikkim are particular centerpiece of the border dispute between the countries. China has its own version of border map which claims these two Indian states as its territory: in fact these two states are integral part of India and under sovereign control of India. Apart from border dispute, India and China also share the great Himalayan Mountain ranges which divide India and China geographically.

The Himalayan Mountain ranges are source of various tarns-boundary rivers flow through India, China, Bangladesh, Myanmar and Pakistan. Among all major rivers, the river Brahmaputra is particularly important as it provides water to all this three countries. The river Brahmaputra originates from the Mansarovar Lake in Tibet and flows through China, India and Bangladesh and ends in Bay of Bengal. The

Brahmaputra River is approximately 2880 km long and important source of irrigation in all three countries. In china it is known as 'Yarlung Zangbo' and in Tibet it is called as 'Tsangpo'.

In context of climate change, similar to all rivers, it is also vulnerable to the rising global temperature. As the river Brahmaputra also originates from a glacier called 'Angsi' in Tibet, its flow can also be affected by change in climate. Thus, change in water quantity of river could be a source of contentions among all three countries or conflicts. Since the source of Brahmaputra falls under the sovereign control of China, it is in controlling position and can make alteration in the flow of the river. In fact China has made many dams on tributaries of Brahmaputra to control the flow of water into the river. However, it is difficult to assess how efficiently China can control the water flow.

There are several media reports which confirmed that China is gravely attempting to control the water flow of the river Brahmaputra by making big ticket size hydroelectric projects. However, China remains in denial mode regarding such construction which can severely affect the river flow. According to the news article published on website of The Hindu, China is constructing three dams in addition to 'Zangmu' dam which began in 2010 in Tibet. Three additional dams are in Daru, Jiach and Jiexu are under construction.[76]

Many times, on the basis of satellite images, various media reports claimed that China is constructing an underground tunnel to divert water of Brahmaputra to its desert areas. However, China has denied any such construction of underground tunnel. On raising the concern with China, India was informed that these projects are run on river type; therefore, the question of river flow alteration is baseless.

In 2002 and 2008, India and China signed MoU to share the hydrological information with each other, especially in Monsoon season, but China has been lackluster in providing such information to India, while it provides same information

to Bangladesh on regular basis. Some security experts believe that China is not a reliable country and there is fair possibility that it is weaponizing the water against India. This can happen in case if India attempt to do so with Pakistan. The use of Brahmaputra's water as a weapon was firstly experienced in year 2000, when sudden flash of flood occurred in Arunachal Pradesh and took 30 lives. Some Indian government officials and security experts claimed that the flash flood was artificially created by China.

In conclusion, it can be said that certainly Brahmaputra is an important river for India and Bangladesh. India is also constructing several hydro projects on Brahmaputra to harness its potential in energy production. There is fair possibility of alternation in water flow of river due to climate change. The glacial source of Brahmaputra can shrink or disappear due to the rise in temperature and that could push India and China in a bitter wrangling to secure more and more water. Further, Chinese attempt of controlling the flow of Brahmaputra could be a tactical maneuver to keep India under pressure. It can also be said that by such maneuver, China is saving Pakistan as India is in controlling position with respect to trans-boundary Rivers flowing from India to Pakistan.

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# Chapter 7

## Conclusions

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## Conclusions

Climate change is a big threat to the existence of mankind on the Earth. The materialistic approach of development abundantly exploited the Mother Nature for the sake of materialistic development. Since the Industrial Revolution in 1970, the world has been relied upon fossil fuels for development needs. The Industrial Revolution that had begun in Western world was fueled by the fossil fuels. Energy is primary requirement for any development activity. The Western model of development is indeed, a carbon development because for energy needs it is greatly depends on fossile fuels. They burned abundant amount of carbon fuels for energy requirement.

During the Industrial Revolution, innovations of new technologies created huge factory based manufacturing facilities for the production of goods. The political and social environment of that time was full of the voices of Liberalism based individualism. Thus ideology of liberalism and innovation of technologies, together, had created a capitalist model of development. Although, communist model of development was substantially different from the capitalist model in terms of social and political structure but they were common in industrial mode of production. Soon, the whole world adopted fossil fuel based mode of productions as a universal path of development. The main reason behind the use of fossil fuel can be said as their easy availability at cheaper cost.

Carbon is a fundamental atomic base of every fossil fuel, therefore when these fuels are burned they liberate carbon into the atmosphere in form of gases like Carbon Dioxide($CO_2$) and Carbon Mono Oxide(CO) along with carbon particles. Some other gases like Methane ($CH_4$), Nitrous Oxide ($N_2O$) and Chloflurocarbons (CFCs) and Hydroflurocarbon (HFCs) are also liberated into the atmosphere due to the human activities. These all gases are particularly sensitive to the long wave solar radiation

(Heat) that emitted back by the earth. The Sun is source of the planet Earth. The energy from the Sun is received mostly in form of visible light that absorbed by the earth(oceans and land). This absorbed heat energy then emitted back to the atmosphere in form of long wave radiation and eventually this heat radiation released into the space by upper part of Stratosphere.

In this whole process of exchange of radiation, some of heat is retained by the atmosphere due to the naturally occurring Greenhouse gases. The residual portion of heat radiation traps between the earth and the atmosphere and raise the mean earth temperature by $14^0$C-$15^0$C. This phenomenon is known as natural greenhouse effect and it is very essential to keep the earth warm enough to support life on the earth. In absence of such natural greenhouse effect, the earth would have been a frozen planet.

The solar energy budget of the earth is a delicate balance between the incoming and outgoing solar radiation. This solar energy budget is disturbed when excessive emission of greenhouse gases enhanced the naturally occurring greenhouse effect. More greenhouse gases in the atmosphere traps more radiation which leads more rises in global mean temperature of the earth, known as global warming. The excessive concentration of GHGs in the atmosphere is primarily attributed to the anthropogenic activities. It is evidenced from the fact that the $CO_2$ concentration has risen from 280 ppmv to 401ppmv in between 1700-2015 period.

The AR5 has confirmed that since 1880 the average global temperature has risen by $0.85^0$C. The effect of global warming has already unfolding in geo-physical structure of the earth. The ice sheets of Greenland and Antarctica are shrinking by 3.5 % to 4.1% per decade which corresponds to rise in sea level by 0.19 meter. The RCP predictions of the IPCC clearly predicated that in RCP8.5 scenario the global earth temperature can increase by $3.2^0$C-$5.4^0$C by the year 2100 and that will be disastrous for the life on the earth.

Due to the rise in global temperature cascading effects of climate change will affect every aspect of human life. The agriculture, fisheries and aquaculture sectors will take a big toll in terms of productivity and associated livelihood. Human health will also be affected because warm environment produces favorable conditions for deadly viruses and bacteria that cause vector and water borne diseases. Further, heat waves, air pollution, water pollution, chemical pollution will affect human health with greater severity. Climate change induced unemployment, poverty, migration, loss of social relation all these effect can put individual in severe condition of stress and anxiety that can manifest in mental and psychological issues and diseases.

Historically, the issue of climate change was emerged in scientific arena. In 1827, Jean Baptite Fourier discovered the heat trapping ability of the atmosphere. In 1896, Savante Arrenieas presented the theory of global warming. He demonstrated that doubling of atmospheric $CO_2$ could raise global mean temperature by $5^0$C to $10^0$C. The WMO and ICSU further initiated several researches to confirm the global warming and associated climate change.

The political era of climate change had begun in 1972, when the UN organized conference on environment and development in Stockholm. The conference witnessed huge perspective difference between developing and developed countries. Indian Prime Minister Mrs. Indira Gandhi, in her seminal speech, portrayed the priority of development over the environment and called for development to eradicate poverty in developing countries. Subsequent conferences including 'First World Climate Conference' (1979), 'Villach Conference' (1985), and Toronto Conference (1988) were mostly scientific by nature. These conferences were firmly established the science of climate change.

In 1988, under the auspices of the UN, the UNEP and WMO established the IPCC. The IPCC was an intergovernmental body to assess all aspects of climate change. The IPCC published its report in 1990 that formed the basis for the UNFCCC negotiations. Second World Conference on Climate Change was convened in 1990,

during the conference developing countries insisted for a separate political intergovernmental body to conduct negotiations for the UNFCCC. On 21 December 1990, the UN established the INC which held five sessions for negotiations. In final session issues in debate were related to the historical responsibility of developed countries, inclusion of time table based reduction targets and financial and technological assistance. Finally, all issues were hided under the carpet of consensual language of draft decisions of the UNFCCC.

The UNFCCC was adopted in the UN conference on Environment and Development (UNCED), popularly known as 'Earth Summit'. The UNFCCC entered into force on 21 March 1994. To implement the convention, Parties to the Convention (CoP) met in Berlin. The 'Berlin Mandate' was agreed to establish a Protocol to implement objectives of the UNFCCC. In 1997, Kyoto Protocol was agreed in CoP3 that assigned emission reduction targets for developed parties (Annex I) on an average below 5% of 1990 level. By Marrakech CoP7 in 2001, CoP finalized the operational rules for the KP. The KP entered into force on 16 February 2005. The first period of the KP was 2008-2012 that further extended by Doha amendment.

The CoP 8 to CoP 12 was mostly focused on procedural rules of the KP. After entering of the KP into force the CoP also began to serve as MoP to the KP from CoP 11. CoP 13 in Bali was important one as by this CoP; it was felt that a comprehensive treaty or agreement should be there for long term goals of climate regime. CoP 13 produced Bali Action plan and established AWG-LCA to conduct negotiations for long term goals identified in Bali Action Plan. The Copenhagen summit, the final accord was brokered between the US and the BASIC heads of state. The Copenhagen Accord was not adopted by the CoP but just took note of that. The Accord undermined the CBDR-RC and negotiations were set on voluntary mitigation actions.

The CoP 17 produced the 'Enhanced Action on Durban Platform' and created the AWG-ADP to draft an agreement had to be adopted by CoP21. In CoP 18 at Doha, amendment to KP was adopted for the second period from 2013 to 2020. The

AWG-LCA and AWG-KP terminated at Doha conference. The CoP 19 at Warsaw urged all parties to submit their INDC to form the basis of Paris Agreement. The next CoP20 was held in Lima where CBDR-RC was resorted to some extent. The CoP 21 held in Paris and adopted the Paris Agreement which is basically INDCs driven. It is estimated that all aggregated INDCs pledges still fall short to the target which is necessary to keep the rise in global mean temperature below $2^0$C.

# Hypothetical Statements and corresponding Conclusions

## Hypothetical Statement: **Developed countries are historically responsible for climate change**

**Corresponding Conclusion:-**

It is well documented and established fact that most of the greenhouse gases historically emitted by the developed countries. The observed spike in GHG emission had been seen clearly aftermath of Industrial Revolution. Since the Industrial Revolution took place in Western countries they abundantly used fossil fuels to meet energy demand of industrial sectors. The issue of historical responsibility has been a fundamental issue of contentions between developed and developing countries. During the INC negotiations, India and China attempted to establish historical responsibility of developed countries but, due to the strong opposition of developed countries no agreement explicitly held developed countries responsible for climate change.

However, explicitly developed countries are held responsible for larger portion of GHGs emission. It is well acknowledged in the UNFCCC text that major portion of GHG emission was originated in developed countries. Further the UNFCCC acknowledged that anthropogenic activities are responsible for climate change. The UNFCCC expected developed countries to take lead in dealing with climate change. It can be said that implicitly developed countries are held responsible

for climate change. The differentiation of parties with respect to mitigation commitments in the UNFCCC and Kyoto Protocol shows the historical responsibility of developed countries. In the KP, only Annex I parties were under legal obligations to reduce the GHG emission 5% below of 1990 level. The CBDR-RC which was strictly applied to the KP, itself, mirrors the historical responsibility of developed countries.

However, in Paris Agreement, it is clear that historical responsibility of developed countries in causing climate change has been silently given up. In Paris Agreement, each party has to take mitigation actions irrespective of its historical responsibility in creation of climate change. Developed and developing countries are on same footing in Paris Agreement, both have to take mitigation pledges through their respective INDCs, albeit targets are discretionary.

Conclusively, it is clear that historically, developed countries are mainly responsible for climate change. However, in Paris agreement, it is completely undermined. The CBDR-RC also reframed in light of national circumstances which indicate the possibility of differentiation among developing countries. The residual part of historical responsibility of developed countries can only be seen in their obligation of providing financial and technological support to developing countries. Here also, Paris Agreement expected larger developing countries to be on donor side of financial assistance.

**Hypothetical Statement: Any equitable global climate deal should include CBDR-RC and Per Capita based Carbon budget Approach.**

**Corresponding Conclusion:-**

In climate change regime, equity predominantly implies equal right to global atmosphere as global atmosphere is regarded as common heritage and resource of mankind. The equity issue has been a centerpiece of the contention and highly

debated between developed and developing countries. Implementation of equity has been emerged as a big challenge in climate change regime. India and China along with other developing countries have been struggled to ensure that equity should be kept in any agreement. For developing countries, the CBDR-RC is the fundamental principle to ensure equity in climate change regime.

The principle of CBDR-RC differentiates countries according to their respective capability in dealing with climate change. How the capability of a country should be decided? It has been a major issue in climate regime. In this context, India adopted the per capita approach to establish the capability of a country. The UNFCCC also acknowledged the fact in para 3 of its preamble that per capita emission in developing countries was lower and that had to be grow to meet their developmental needs to eradicate poverty. The per capita approach is particularly favorable for India as its per capita emission and GDP comes at lower side. It has been made clear in figure 4.2 that India's per capita emission is very low. In 2013, it was just 1.8 $CO_2$ ton, while the USA was emitting 21.3 ton of $CO_2$ (Fig.4.5). Similarly economic capability, when considered in per capita context, India and other developing countries come to lower side of comparison chart to developed countries (Figure 4.8).

On the flip side, if the same data is compared on aggregate basis results inverts. On aggregate basis China was the largest $CO_2$ emitter in 2007and 2011 followed by the USA and India. It is the fundamental argument of developed countries; especially, the US argued several times that without any meaningful participation of large developing countries, objectives of the UNFCCC cannot be achieved. India and other developing countries adopted to take voluntary emission reduction targets (NAMAs) supported by financial and technological assistance by developed countries.

The per capita argument has never been included explicitly in any agreement. In the KP, since developing countries were out of any mitigation ambit, the issue of

per capita and carbon budget was not significantly raised. But in Paris Agreement, as the differentiation structure has been vanished, the issue of carbon budget becomes relevant. The Paris Agreement has been under a great critic that despite knowing the fact that offered aggregated INDCs pledges will not be sufficient to hold the rise in global temperature below $2^0$C, it has not included the carbon budget approach to decide fair emission quota of a country.

Conclusively, this thesis opined that mitigation responsibility should be decided on the per capita basis. Fair allotment of emission right can only be possible with per capita approach. The remaining carbon budget should be allotted on the basis of per capita emission right. The Paris Agreement lacks on carbon budget approach; it is only based on the "shame and blame" approach. Instead, it should have been allotted the fair emission quota to each country that automatically had decided how much a country could emit. It is clear that equitable deal should have differentiation in light of CBDR-RC and per capita based carbon budget approach.

## Hypothetical Statement: GHGs Mitigation actions are related to development

**Corresponding Conclusion:-**

This hypothesis statement is deliberated in chapter 5 of the thesis. It is well established fact that change in climate can only be averted by reducing GHGs gases. In today's date, there is no viable and practical solution or technology is available that can directly remove atmospheric GHGs. Therefore, the world has only one solution and that exists in shifting the developmental goals on low carbon emitting economy. Developmental activities are capital intensive and economy should strong enough to provide adequate capital. For a resilient and strong economy, its competitiveness with other economies is necessary and that largely depends on the production and manufacturing cost. Fossil fuels are most affordable and abundantly available source of energy and hold largest share in energy matrix of almost all countries.

It becomes clear that development is linked with GHG emission and that link lies in economy. Therefore, mitigation actions to curb GHGs emission require significant deviation from carbon based energy sources to low carbon sources or unconventional sources of energy. Thus, this shifting is huge capital and technology intensive process and could seriously affect the competitiveness of economy. It is the basic reason behind the refraining of countries to accept mitigation actions in climate regime.

The link of development and mitigation action was firstly encountered in Stockholm conference in 1972, where developing countries advocated for their sovereign right of choosing their development options. Since then, this issue is highly contended between developing and developed countries. Almost in all countries, coal is a primary source of energy and largest portion of GHG stock is emitted by this single source. Replacing coal with solar or wind or nuclear energy is costlier business that every country unwilling to do. Because it requires huge mobilization and diversion of capital that otherwise would have been used in other development goals.

In contrast of this negative relationship between development and mitigation actions, there is a positive relation also exists. India and China are predominately utilizing this positive relation. In Indian context, the country is energy hungry country and nearly 70 % of its energy demand is met by import of fuels. India can significantly reduce its energy import bill by turning its economy as a green economy. In 2017, India's import bill was around US$ 150 billion which is expected to surge US$ 300 billion by 2030. This huge import bill largely (80%) constituted by the crude oil. Increase in 1 dollar per barrel directly put extra burden of nearly 10000 crore on annual basis. Further higher import bill negatively affect Inflation, Current Account Deficit and value of currency. All these negative effects adversely affect development prospects of the country. These adverse effects can easily be reduced by shifting the economy on alternative sources of energy.

Similarly, shifting economy on unconventional energy sources can open up new avenues for development and employment. India is aiming to cater this huge investment opportunity in solar, nuclear and wind power. India established the 'International Solar Alliance' in Paris 2015 can be seen in this context. Thus, this thesis finds that mitigation actions and development are highly related to each other. Their relation exists in both, negative and positive context. It is viable for countries, like India to adopt a gradual approach of shifting more and more portion of economy on green sources of energy.

## Hypothetical Statement: **Climate Change regime is conflicts of interests.**

**Corresponding Conclusion:-**

In climate change regime, despite the unanimous acceptance of mitigation actions, every country either individually or through its negotiating block advancing their own interests. Within the larger ambit of developing and developed countries several other individual interests always have been in conflicting positions. The US has been constantly remained engaged with the regime but in final agreement always pulled itself back. It is clearly evidenced by its withdrawal from KP and now from Paris Agreement. The US has been mainly interested in non binding or loosely drafted agreement without any differentiation with respect to mitigation obligation. It always pressed hard for the inclusion of India and China in legally binding regime. The US always presented hurdles in formation of differentiated based climate regime. It used the SIDS and LDC with bribe to pressurized India and China for legally binding commitments. During CoP 4, the US bargained with Argentine for its OECD membership. The US has been continuously attempted to fragment the unity of G-77 to deprive India and China from Third World support. It can be said that US succeeded to some extent. US did a bilateral climate deal with China in 2014 and this deal reframed the CBDR-RC in light of national circumstances. This had put enormous pressure on India to take legally binding commitments.

The OPEC along with US had attempted to block the negotiations for the UNFCCC. Later, since OPEC was a less influential organization, it had shifted its position to more flexible stance. Instead of blocking the process they attempted to make it slow and demanded compensation for revenue loss due to mitigation measures. Russia had used the Kyoto ratification to undermine the EU's protest of its entry into the WTO. Russia was aware of the fact that without its ratification the Kyoto would not survive. Russia utilized this opportunity to receive consent of potential buyers of its surplus AAUs. Russia denied to ratified the KP II due to restriction on carried forward of surplus AAUs from the KP.

The SIDS and LDCs are always regarded as rooted in G-77. They commonly use the AOSIS platform to voice their interests in climate regime. These countries have been great believer of CBDR-RC, but on many occasion they attempted to apply this principle within the group of developing countries to differentiate themselves from large developing economies like BASIC. These countries are highly vulnerable and island countries, hence they insisted for $1.5^0$C goal in climate regime that was opposed by India and China. According to wiki leaks cables these countries have been bribed by the US to pressurized India and China for legally binding commitments. On many occasions, these countries criticized India and China for not taking binding commitments. They also demanded compensations for loss and damage due to climate change. These countries' interests largely focused on maximum financial and technological assistances for adaptation and capacity building. The EU, throughout the regime has been remained focused for its international image of global leader. It has been worked as bridging tool between many differences of countries. However, its leadership undermined during the Copenhagen summit when accord was agreed only between the US and BASIC leader.

Brazil is a prominent member of the BASIC but its interests are different to some extent than the other members. Brazil is a forest country and it always fought hard for the inclusion of GHG reduction due to deforestation. China and India are

always kept in same basket due to their larger economy and population. Initially, they were followed an identical stance and position on CBDR-RC and equity issues. Both the countries fought for avoiding legally binding emission obligation. Later, they adopted voluntary mitigation obligation on condition of financial and technological support from developed countries.

Despite various similarities, India always pretended for not be seen as next China. After the bilateral deal between China and the US, India left in isolation. India cannot offer peaking of its GHG emission at this juncture as China did. Similarly China's per capita emission is almost matching with developed countries and it has almost reached to the peak. Therefore, India's interests are different now. It has to still stick with its developmental agenda.

**Hypothetical Statement: India's associated national interests with climate regime are rightly saved by India's foreign climate policy.**

**Corresponding Conclusion:-**

India has been a prominent and important player in climate regime. In Stockholm Conference, India raised the question of priority over the environmental issues. During the period from 1972 to 1990, climate science was not much understood in developing world; India successfully bargained its interests and saved them to a great extent. Initially, India's climate foreign policy was mostly formulated on the basis of core values of broader foreign policy and orthodoxy established by Mrs. Indira Gandhi. The emphasis on development over environment has been prominent feature of India's climate policy that still holds validity in present scenario.

Equity based right of development has been prominent interest of India associated with climate regime. India preserved this sovereign right throughout the regime, even in Paris Agreement; India has not given it up. India has committed to reduce its emission intensity to GDP by 33 %, albeit, India offered this pledge on

voluntary basis and tuned it with the reciprocal financial and technological support from developed counties. It implies that if India does not get reciprocal support, it can revert back from its pledges offered in INDC.

India was 9th largest economy on aggregate basis but it was ranked at 145 on per capita income basis in 2013. Similarly, India stands at lower side of HDI. Therefore, development is inevitable for India and it has rightly kept it option open to increase its GHG emission. Unlike China, India's economy is service based economy that is the reason India can easily achieve its mitigation targets offered in the INDC.

Equity has been particularly important interests of India to preserve the differentiated structure of climate regime. India has been fought hard to ensure the retention of CBDR-RC as a fundamental principle in Paris Agreement. But it was only partially succeeded in its efforts. Solidarity with Third world has also been interest of India in climate regime. India tactfully negotiated with the support of G-77, BASIC, and LMDC. Throughout the regime, India adopted a coalition strategy to amplify its voice for safeguarding its interests in climate change regime.

India successfully secured its business and trade interests in climate regime. After initial hesitation, India turned positive towards the CDM projects. India has been utilizing climate financing to support its mitigation and adaptation activities and at the same time India harnessing every possible opportunity associated with the manufacturing of equipments for alternative source of energy. India is creating market and manufacturing facilities to promote electric vehicles. Importantly, India got NSG wavier for its ambitious nuclear energy targets by indicating flexible stance in its foreign climate policy.

Another dimension of India's interest in climate regime is associated with its international image of world leader and super power. India is seeking permanent membership in Security Council of the UN and wants to enter into NSG. For these broader interests, India is gravely implementing its mitigation commitments offered

in INDC. Thus, India is projecting itself as a responsible member of international community. After the US exit from the Paris Agreement, India announced its firmness towards Paris Agreement and presented itself to fill the void; and as a solution to the leadership impasse in climate regime.

**Hypothetical Statement: India's role position and stance in climate change regime has been dynamic and accordingly subject to change in pursuit of its national interests.**

**Corresponding Conclusion:-**

India's role and positional stance in climate regime has been interest centric and dynamic according to international and domestic circumstances. In the beginning of climate regime, developmental agenda was on forefront of India's climate policy with the objective of poverty eradication. India's early positional stance in climate regime was categorized as a stonewaller. However, India can be said as obstructionist in early climate regime. India's obstructionist position was circumscribed up to evade any binding mitigation obligation that could potentially interfere with its developmental objectives. India advocated for time table based emission targets, but only for developed countries.

India adopted the CSE concept of per capita and successfully utilized it to discard immense pressure from developed countries. During the INC negotiations, India strongly advocated for inclusion of CBDR in the UNFCCC to ensure differentiation in obligation with respect to climate change actions. India formed a Green Group to avoid any new commitments for developing countries in post UNFCCC scenario. During the negotiations for the KP, India saw flexible mechanism as a free pass to Annex I countries to evade their mitigation action and accordingly attempted to derail the talk of flexible mechanism. However, by 2001, India realized the benefits of CDM mechanism and took U turn.

By the Bali conference, India's stonewaller position began to show flexibility. In the period from 2005 to 2009, India was engaged with US to finalize INDO-US nuclear deal, therefore, flexibility in Indian stance can be understood in nuclear deal context. In 2007, at G8+5 summits in Germany, Indian Prime Minister Dr. M.M. Singh indicated flexible stance and singled for acceptance of voluntary mitigation commitments. India wanted to secure nuke deal and seeking for NSG wavier without locking itself under NPT that could not have been possible without the US support.

India's traditional position was drastically changed under Environment Minister Jairam Ramesh. He adopted internationalist approach and attempted to forge India like world's super power. He stated that India was not depended on international financial aid to implement its domestic mitigation actions. He further suggested to Prime Minister Dr. M.M. Singh through a media leaked letter to depart from Third world stigma and align more with G-20 countries. However, Ramesh was highly criticized in Parliament and in response Mr. Ramesh had to assure the Indian Parliament that India would not accept any legally binding commitment and peaking year for its emission. However, amid of announcement of emission cuts by several countries, India announced a cut of 20-25% to its GDP intensity by 2020.

At Copenhagen, India along with other BASIC countries brokered the Copenhagen Accord with the US which set the ground for bottom up approach and self determined emission cuts, the US wishing for. At Copenhagen, it seemed that India dropped its long holding stand on historical responsibility of developed countries. It was clear that India reshaped its stonewaller stance to flexible stance. The legitimacy of this change can be seen in broader context of India's foreign policy. With this progressive and internationalist stance, India attempted to prove itself as responsible member of international community to strengthen its claim for permanent seat in the UN Security council and NSG membership.

At Durban and Doha conferences, India was fairly isolated as its BASIC allies, Brazil and South Africa consented for legally binding emission cuts. India's

attempt to save the CBDR-RC was resulted in failure. In changing scenario of regime, India down its gears and presented itself as not be seen as next China. India aligned itself close with mid size developing countries and deliberately set the leadership image in off position for time being. Ahead of the Paris Agreement, India aligned with LMDC (China, Philippines, Saudi Arabia, Thailand, Malaysia, Bolivia and etc.) By the Doha conference, it was clear that Paris Agreement would be on INDCs based which contained with self determined emission pledges. But once pledged, the offered targets would be legally binding and subject to increase in progressive manner in succeeder INDCs. At Lima conference, India in close coalitions of G-77, AILAC, LDC and LMDC asserted for inclusion of CBDR-RC. It can be said that India succeeded to some extent as the CBDR-RC is there in Paris Agreement but in light of national circumstances.

Despite the China's disclosure of its peaking year, India firmly denied to indicate any peaking year for its emission. Further India announced to double its coal production by 2020. This strongly convened India's message that it would not given up its developmental right. Additionally, Indian INDC clearly emphasized that India would need 2.3 trillion US$ (@of 2014-15) for financing its mitigation and adaptation actions by 2030. India clearly indicated through its INDC that its actions would be reciprocal to international financial support. This created a window for India to revert back from its offered pledges. During Paris conference, India Prime Minister Mr. Modi asserted that equity implied nation's commitments in context of carbon space, nation occupied. This statement of Indian Prime Minister made it clear that future negotiation should include the carbon budget approach to precisely decide emission targets. Conclusively, it becomes clear that in climate change regime, India saved its national interests by changing its policy stance to meet the goal of its foreign climate policy.

**Hypothetical Statement: Climate Change consequences have security implications for India in context of neighboring countries, especially Bangladesh, Pakistan and China.**

**Corresponding Conclusion:-**

Consequences of climate change are widespread and affect almost all aspects of a state and individual person. Climate change also carries huge security implications. The traditional approach of security is state centric and predominately assumes security in military context. While, modern approach is wide and along with traditional approach, it also includes socio-economic factors in individual security context. There are numbers of confirming studies that revealed that climate change can greatly affect security scenario of states. The climate induced security implications can be more distressful and potential cause of conflicts in the regions where states are in rivalry position for scarce natural resources like water.

The Himalayan mountain ranges are called water towers of Asia. All most all major rivers of India, Bangladesh, Pakistan and China are originated from Himalayan glaciers. It is well estimated fact that due to rising global temperature Himalayan glaciers are shrinking and may be disappeared, eventually. This can result in water scarcity in Indian subcontinent and that could be a potential cause of conflicts among these countries.

Bangladesh and India share many tans-boundary rivers which originate from the Himalayan glaciers. Due to climate change water flow in these rivers could greatly diminish and can cause tension between India and Bangladesh. The socio-political-economic conditions in Bangladesh are not stable. Most of the population live in poverty and highly depended on agriculture, fisheries and wages from industries (sourced raw material from Sundarban) for their livelihood. It is very likely that due to climate change consequences all these employment sectors can take hard hit and that could unleash mass illegal migration to India. This illegal migration is

already creating security issues in North East of India and further exacerbate in ethnic conflicts. This illegal Bangladeshi migration to India can be utilized for transportation of counterfeit currency, drugs and illegal arms. Militants can also entered into India silently as illegal migrants. In addition to this, changing river banks can also cause border issues and conflicts between both the countries.

Security implications of climate change can be more aggressive and conflicting between India and Pakistan. Pakistan is completely depended on water of trans-boundary Rivers that originate from Himalayan glaciers and entered into Pakistan after flowing through Indian Territory. The sources of rivers are located in Kashmir which is Indian state. Thus India made several dams on these rivers which have been major cause of contentions between two countries. Pakistan's livelihood and agriculture is largely depended on Indus water. Although, distribution of Indus and its tributaries is governed by the IWT, but Pakistan has been always fear that India can use these rivers as water weapon against Pakistan by closing or altering flow of rivers. It is the reason Pakistan attempting to attain control over Kashmir through direct or proxy war. It is well anticipated that water scarcity in Indus and its tributaries due to climate change can add fresh conflict in bilateral relation of both countries. Even it could turn into nuclear war in case of severe water scarcity.

The Brahmaputra is an important tans-boundary river which has source in Tibet. This river has been focal point of contentions between China and India. Both the countries creating hydro projects on the river to harness its potentiality but as China is in upper riparian position, India is feared that China can interfere in natural flow of the river. In several media reports it has been claimed that China is constructing underground tunnel to divert water of Brahmaputra, albeit China denied such claims. However, it is quite certain that in situation of water scarcity, China can interfere with natural river flow of Brahmaputra that could be a potential reason for conflict between two countries.

## A piece of Recommendation

It is clear from the rating system of CAT that with most developed countries, some developing countries have not pledged sufficiently to ensure the rise in average temperature below $2^0$C. As far as India's position is concerns after Paris Agreement, India should neither accept any peaking year for its GHG emission and nor any emission limitation in absolute term at this juncture. India should advance its position by demanding a fair share in global carbon space on the per capita basis. India should proactively pursue its development goal with the aim to occupy maximum carbon space. India is no longer trust its long holding ally China, as China has already occupied the fair share of carbon space. Therefore, it is likely that it would not stand close to India in its demand for equity and CBDR-RC. India has to or should form new synergy with other developing nations.

It is crystal clear that the Annexure based differentiation does not exists any more so the Equity demand should be raised on the basis of Carbon Budget approach. On this basis, India can demand that it should have also equal right to raise its per capita emission to the level, where it can converge with the USA and China (12 tones). India has pledged ambitious reduction target in its INDC, albeit, in term of economic intensity which is indeed achievable with adequate financial and technological support from developed countries. Therefore, India should press hard for financial resources and technology transfer from developed countries to ensure that its indented commitments would be achieved.

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**Department of Political Science,**
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**Banswara**

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This is to certify that your paper **(Evaluation of India's early position in Climate Change Regime)** has been published in **Vol. 3(4), December 2017** of a Peer Reviewed/Referred and UGC Approved International Journal- "**Annals of Education**" (e-ISSN: 2455-6726, ISRA Impact Factor: 0.211).

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RESEARCH PAPER

# Evaluation of India's early position in Climate Change Regime

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## ABSTRACT

*India is always regarded as a representative voice of the global South. During the cold war, under the auspices of Non-alignment Movement, India emerged as a beacon for newly born Asian, African and Latin countries. India played a crucial role in the international negotiations for 'New Economic World Order' and the Vienna Convention. India successfully articulated and safeguarded the interests of developing countries in the 'Montreal Protocol'. With the emergence of the climate change regime, the Global South was under immense pressure from the global North to take mitigation commitment to avert climate change. During the INC negotiations, India's foreign climate diplomacy and its position at negotiations played a decisive role in fostering of the convention. To what extent India represented the global South and achieved its interest in the INC negotiation? It can be unveiled by analyzing the early position of India in INC negotiations. An attempt has been made by this paper to explore the early Indian position to reach the answers of said questions.*

***Key words**: Cold War, Montreal Protocol, Climate Change Regime, INC negotiations*

## INTRODUCTION

India has been a key player since the beginning of Climate change regime. India's active engagement in climate regime can be attributed to its unique national circumstances. India as a developing country, coping with substantial poverty issue, it has negligible historical contribution to the accumulated carbon stock and its per capita GHG emission is still, relatively lower in comparison of developed nations. On the flip side, India has transitioned into a fast growing economy, now it is 3rd largest GHG emitter, it is estimated that India's GHG emission is likely to surge in future due to its growth oriented policies.

India is intriguingly positioned in the climate change regime. On the per capita basis, India has substantial lower emission, lower electric consumption and lower income. But on the aggregate basis, India stands to higher side of said indicators, especially aggregate GHG emission. With the 1.2 billion populations, India stands in the list of the countries who suffer vastly due to then climate change. Paradoxically, India's rising GHG emission can potentially undermine the global efforts of GHG reduction. Thus, India's position and its role in climate change regime can be characterized as an attempt of balancing between 'deal breaker' and 'deal maker'. However, India has been affirmatively positioned itself as a dealmaker within the ambient of climate diplomacy.

## ANALYTICAL DISCUSSION OF INDIA'S EARLY POSITION IN CLIMATE CHANGE REGIME

The issue climate change is merely not an environmental issue; it is politically charged issue and emerged as a battlefield of national interests over the time. India is not an exception; its position in the climate change regime mirrored its national interests and over the time and accordingly changed to adjust with dynamism of the regime. India's position and role in the climate change regime went through a mix character of consistency and dynamism. India's initial position was predominantly based on the philosophical values and the legacy of India's foreign policy. But, later, it was more precisely influenced by the national interests.

The root of climate change regime goes back a long in the History; Stockholm to Rio (Earth Summit) Prior to the Rio Summit, in 1972 at UN conference on the Human Environment, Indian Prime Minister Mr. Gandhi laid down the intellectual tradition of the Indian climate policy. The seminal speech by Mrs. Gandhi formed the basic architecture of Indian stance which prevailed

nearly two decades of climate regime. Three important narratives from Mrs. Gandhi's speech which later determined Indian position are; first, Environment protection is a geopolitical threat to Indian interests; second, socio-economic development and poverty eradication; third, the developed nations historically responsible for the environment degradation, hence they should take the lead in the efforts of environment protection.

From the Stockholm to Rio, the period was marked as divisive perspective of the global South and the North towards the issue of climate change. The G-7 meeting at Paris in July 1989 had raised the political temperature of the issue. Developed nations outright denied to acknowledge any historical responsibility of environmental degradation and sharing of the costs of global measures. During the NAM meeting in September 1989, Indian Prime Minister, Rajiv Gandhi, implicitly placed the condition of technological and financial support in order to ensure environment friendly development in the developing nations.

Mr. Gandhi suggested a 'Planet Protection Fund' to make the eco-friendly technologies available for developing countries at a reasonable cost. This Indian proposal was unanimously supported by other developing countries at the Common Wealth meeting in October 1989 (Rajan, 1997). In absence of any reliable GHG emission data, Indian position was largely determined by the traditional approach of India's foreign policy. The Southern coalition was the prominent feature of the Indian foreign policy and it had been clearly appeared at the conference of Select Developing Countries in 1990 at New Delhi. The India's approach towards climate change was echoed from the paper prepared by Government of India for the conference. In brief, Indian Government argued (MoEF, 1990)-

1. Developed countries caused the threat of climate change and they are primarily under obligations to reverse the situation by capping their GHG emissions.
2. Even though, GHG emissions in developing countries increasing, historically their contribution is masculine in comparison of the developed countries. Developing countries need environmental friendly technologies to ensure their development with due regard to environment.
3. Responses to the climate change must vary according to the factors like stage of development, geography, perception. More importantly, the developing countries accept specific responses only when such responses would not interfere with their development and their choices of resource selection to fuel such development.

India was positioned itself as the voice of the global South and adopted 'coalition' strategy to counter the Northern pressure. It was evidenced by the discussions during the 4th plenary session of the IPCC held in Sweden from 27 to 30 august, 1990. In the plenary session, India strongly pressed for the replacement of a phrase "common responsibility" with the phrase "main responsibility" of the developed countries to combat climate change. Amidst of the strong resistance from USA and UK, compromised text appeared as; "Common but differentiated responsibility" in dealing with problem of climate change and its adverse effects (Rajan, 1997).

India and other developing nations were not satisfied with the functioning and structure of the IPCC as they were not represented adequately. The IPCC was allegedly biased towards the developed countries. India, along with Brazil, pressed hard to shift the convention negotiations to the separate forum under the direct authority of the UN General Assembly (Sengupta, 2012). Thus, the UN General Assembly accepted the Indian demand in its Resolution 45/212 on 21 December, 1990 and established a single Intergovernmental Negotiation Committee (INC) under its authority to ensure and provide full participation to all nations.

First INC session adopted the general procedure and rules for proceedings of the INC. Prior to the II session of the INC in June 1991, two important development were took place. One, amidst of critical weakness of Indian economy, negotiators were instructed for caution to avoid any isolation during negotiations. Second, the CSE report which criticized and reputed the WRI report's finding that equally accounted developing countries for climate change. The CSE report exposed the critical methodological deficiencies of the WRI report and raised the questions over its biased outcomes. The CSE report argued that emission comparison of countries would be illogical without considering the population size and needs of that population. Thus, CSE suggested the 'per capita,

notion which morally acknowledged the equal share of each human being to the global common of environment (Narain, 1991).

The CSE report was, then, armed the Indian negotiators with a mathematical weapon and the 'per capita' notion. The policy input from the CSE report was clearly displayed in the Indian position at II session of the INC. India came up with a 'non-paper' which emphasized the notion of per capita. The head of the Indian delegation, Mr. Dasgupta stated the Indian position as:-

"The problem of global warming is caused…. by excessive levels of per capita emission of GHG gases…developed countries with high per capita emission levels of greenhouse gases are responsible for incremental global warming…. the principle of equity should be the touchstone for the judging any proposal. An equitable solution can only be found on the basis of significant reduction in levels of per capita emission in developed countries, so that over a period of years these converge with rising per capita emission in developing countries" (Dasgupta, 2012). Dasgupta further denied any legal responsibility for developing countries and said that developing countries might consider for taking feasible corrective measures in accordance with their national development plans and objectives provided that full incremental costs involved were met by provision of new and additional financial resources from developed states (Dasgupta, 2012).

India's 'non-paper' call was generally welcomed by developing nations but, resisted by developed nations, especially the US. The EC and Japan presented the 'pledge and Review' proposal. India opposed it by raising the concern for sovereignty and possibility of interference with national plan of development.

During the III session of INC, India advanced its same position that had been adopted in the II session of the INC. But in a meeting of secretaries of Ministry of External Affairs (MEA) and the Ministry of Environment and Forest (MoEF), prior to the III session, a slight flexible positional stance was suggested to the Indian negotiators in the backdrop of the economic and financial crisis. (Rajan, 1997) Indian position on climate change was explicitly emerged through the cabinet meeting held on 3 of December 1991, just before the IV session of the INC. In the meeting the cabinet approved the MoEF note containing the main positional stands in India's foreign climate policy. The main elements included were, the notions of per capita, opposition to the review of national developmental policies, acceptance to contractual commitments and call for separate funding under the direct authority of the convention (Rajan, 1997).

During the IV session of the INC that was held in Geneva from 9-20, December, 1991, witnessed the continuity of head fight between the North and the South over the issue of "main responsibility", technology transfer, financial assistance and the obligations for developing countries.

With the differences on the key issues, the INC negotiations entered into the V session on 18 February, 1992 in New York. The US was emerged as a stumbling block during the V session by rejecting to provide new and additional financial resources to the developing countries and it also rejected to accept any time bound measures for the GHG emission stabilization (Rajan, 1997). In the communication to the Indian government, C. Dasgupta reported, "Nevertheless, it is possible that a last minute efforts will be made to bridge the differences between the US and the EC by adaptation of an ambiguous formulation concerning stabilization and reduction of emission of developed countries. This could be the basis of an attempt to shift the balance of responsibility from the North to the South. Our delegation would have to be prepared for this eventuality" (Dasgupta, 2012).

The US and the EC talks in Washington in May 1992 resulted in the formulation riddled with ambiguities hiding the key points of differences. The agreed draft between the US and the EC was incorporated in the Chairman's text that tabled at the resumed V session of the INC. The head of Indian negotiator Mr. C. Dasgupta pointed out the artful ambiguity of the text and described it as a legal 'striptease' (Dasgupta, 2012). The debate upon chairman's text was kept confined to an enlarged bureau including 25 key players. It had been done according to the chairman's suggestion to speed up the negotiations. India took part in the crucial bureau debate and secured its national interests to a substantial extent.

From Indian perspective, the final package had both, positive as well as negative outcomes. India was keen to include inadmissibility of specific review of its national development policies and plan.

India ultimately successfully evaded all references to a review of the efforts of developing countries in dealing with climate change (Dasgupta, 2012).

The Indian demand of new and additional financial resources was incorporated in the Article 4, para 3 of the convention as "The developed country Parties and other developed Parties included in Annex II shall provide new and additional financial resources to meet the agreed full costs incurred by developing country Parties in complying with their obligations under Article 12…." (UNFCCC, 1992). India pleaded hard for the transparent financial mechanism under the direct authority of the CoP, it was met by article 11 of the convention as "It shall function under the guidance of and be accountable to the Conference of the Parties" (UNFCCC, 1992). India's demand of equity and justice was also met by inclusion of the CBDR-RC as a guiding principle of the UNFCCC. It was placed explicitly in article 3 under the title of 'principles' and in Article 4.1of the convention. The principle has been consistently legitimating Indian position and serving as bedrock of the India's foreign climate policy.

Mr. C. Dasgupta, who laid the Indian delegates during the INC negotiations, highlighted specifically paragraph 7 of the Article 4, India was able to secure only after very hard and protracted negotiations, as a crucial victory. Article 4.7 says:-

"The extent to which developing country Parties will effectively implement their commitments under the Convention will depend on the effective implementation by developed country Parties of their commitments under the Convention related to financial resources and transfer of technology and will take fully into account that economic and social development and poverty eradication are the first and overriding priorities of the developing country Parties" (UNFCCC, 1992).

Article 4.7, reflects the Indian position and stance during the INC negotiations and in subsequent negotiations. Mr. C. Dasgupta elaborated the Indian position in context of article 4.7 of the convention as; "The Framework Convention conforms to our position concerning the voluntary and non-negotiable nature of the actions taken by the developing countries without international support. Developing countries have no obligation to implement mitigation measures involving incremental costs, unless these are met in full by the developed countries. When thus supported, developing countries assume a contractual or conditional commitment but unlike the binding commitments of the developed countries" (Dasgupta, 2012).

## CONCLUSION

After Independence, The foreign policy of India was framed on the basis of coalition strategy. This was also reflected in climate change regime. India along with China and G-77 was the voice of Global South during the INC negotiations. Mrs. Gandhi's speech at Stockholm in 1972 was the foundation stone of the India's position in climate change regime. She was clearly highlighted that poverty was the greatest polluter and hence the development to eradicate poverty was the first priority rather than environment protection. Thus, sovereign right to development was the prime objective of India during the INC negotiation. Amidst of uncertainty of climate science, India had perception that any GHG mitigation obligation would adversely affect its growth prospect and development plan. Therefore, during the INC negotiations, India positioned itself as to evade any mitigation obligation. India's position at negotiation was mainly principled on the two arguments that the developed countries are historically responsible for environment degradation; hence they have the main and primary obligations to take measures to avert climate change. Second, India's per capita emission was minute in comparison of the development countries; hence it has to grow to meet the development need of its huge population.

India fought hard to save its interests in the INC negotiation for the convention and eventually succeeded to abide any binding mitigation obligation. India played a key role in developing the architecture, norms and rules of the climate regime in ways that suited its own interests, and that of its coalition partners.

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# Assessment of Responsibility in Climate Change Regime

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**Abstract**

*Climate change is a threat for the existence of the mankind on the earth. It is well established by the IPCC reports that climate change is attributed to the anthropogenic GHG emission. To avert the climate change, it is inevitable to keep the rise of average temperature of the earth under 20 C limits by mitigating the GHG emissions. Therefore, the question of responsibility arises, who will take the mitigation actions and how the responsibility will be distributed. The present paper is an attempt to assess the 'Responsibility' in the climate change regime with regard to the CBDR-RC principle of the UNFCCC.*

**Keywords:** *Climate Change, Anthropogenic, GHG Emission, Mitigation Actions, Climate Regime*

## Introduction

Since the beginning of the industrial revolution, irrespective of development model, whether capitalist or communist, fossil fuel extensively has been used for energy needs. Invention of new technologies provided the tool to exploit the nature for the materialistic development. Countries, pioneer in technologies, brutally exploited Mother Nature for their own sake, of development without considering the future of mankind. The result was obvious, warmer earth owing to the unrelenting emission and accumulation of carbon dioxide (CO) and other greenhouse gases in the atmosphere.

Rio Earth summit, which succeeded in a convention (UNFCCC), since then UNFCCC has been a political platform of conflicts and constrains of different interests of the countries. The issues of fairness, justice and equity in burden sharing of mitigation efforts are always critical in global negotiations under auspices of the UNFCCC. These contentious issues were brought to the negotiation table by the conceptualizing the principle of "Common but Differentiated Responsibilities".

Lack of universally accepted definition of CBDR made the principle itself a contagious issue. It takes consideration of different circumstance of the parties while framing a collective responsibility to a treaty for the protection of the environment. (P.Sands, 2003) It may bind parties to an international nature of treaty with non-uniform allocation of responsibilities based on their various contributions to degradation of the environment and their respective capacities in rectifying such problem. (Rajamani, 2005)

It could be said that the concept of CBDR is an attempt to unify states, with the contradictory interests, in resolving international environmental problems in a cooperative manner. CBDR is adumbrated by the International Legal Association as 'a duty to co-operate in the achievement of global sustainable development' and thereby recognizing 'the needs and interests of developing countries and countries with economies in transition', and in particular those countries 'affected adversely by environmental, social and developmental consideration.' (Rajamani, 2005)

The principle of CBDR clearly acknowledges differences in the contributions to environmental degradation (historical and current) while recognizing varying economical and technical capabilities in tackling them. (Rajamani, 2005) Hepburn and Ahmad emphasized that origin of CBDR can be traced in the concept of the "common heritage of mankind." (Rajamani, 2005)

Indeed, irrespective of countries common responsibility, fair and justifiable difference can be made in respect of their responsibility towards addressing issues of environmental degradation. Thus, CBDR consists of two major components; one, international cooperation which is denoted by 'common responsibility' and second, liability which is denoted by 'differentiated responsibility'. (Gaan, 2007)

The concept of CBDR consists of two elements common responsibility and differentiated responsibility. These two elements are explained below.

**Common Responsibility—**Common responsibility describes the obligations to be shared by two or more states towards the protection of a particular environmental resource. Such resource can be under the control of no state, or under the sovereign control of a state, but subject to a common interest. (Gaan, 2007) The evolution of the concept of common responsibility is a result of an extensive series of international laws governing resources marked as 'common heritage of mankind' or of 'common concern' (Giddens, 2014)

**Differentiated Responsibility**—It acknowledge the different circumstances, particularly each states' contribution to the evolution of a particular problem and its capacity and ability to control, protect and reduce the thread. (Giddens, 2014) Differentiated responsibility translates into differentiated environmental standards set on the basis of many factors, including future economic development of countries, circumstances, special needs, and historic contributions to the creation and evolution of an environmental problem. (Giddens, 2014)

CBDR-RC as a "single hybrid policy principle" made a strong case to balance consequentialist and non-consequenalist positions. Similarly, on one hand, it would bring together the capacity to fight climate change (capacity to pay) and responsibilities for climate related harm on the other hand. (R., 2009)

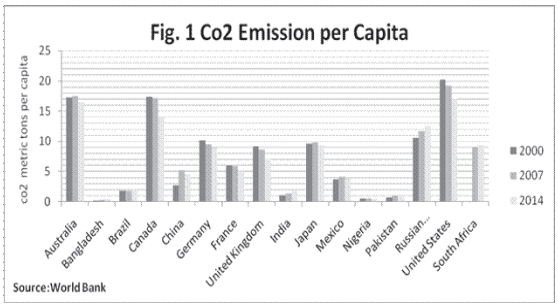
**Arguments for CBDR in the Climate Change Regime**

The justification of CBDR in climate change regime is rely upon two main principles, one the equality and polluter pays principle and second, the economic and capacity principle.

The equity and polluter pays principle: From the beginning of Climate change regime in international political arena, developing countries consistently advocating and advancing the argument that developed countries are primarily responsible for environmental degradation. Hence, in context of their historical emission they have to bear the burden of averting climate change.

Developing Countries are continuously emphasizing the idea of "Per Capita" as this is a direct measure of human welfare, expressed and accepted in international negotiations. From developing countries point of view the Notion of 'Per Capita' is most significant criteria for deciding the equal right to environmental space. (Thadeus, December 2010)

Developing countries particularly, China and India were frontiers to raise the per capita norms in climate change regime to combat climate change. They had very clear assumption that progressive convergence towards an equitable distribution of emission rights should be based on per capita norms.

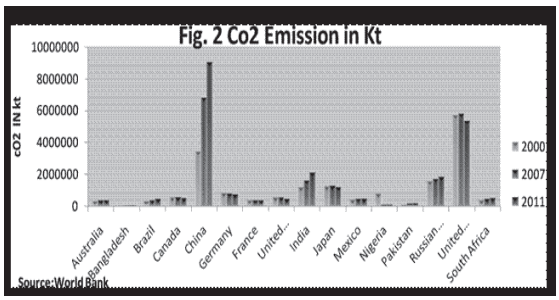



CBDR is mostly framed to compare per capita or national emission levels. These indicators

capture the relevant notion of responsibility, however fails to capture other facets. Per capita emission captures the population size but does not cover the causal-contribution aspect concerning responsibilities of sovereign states at the international level.

It is clear from the Fig. 1 that larger emission blocks belongs to developed countries, assigns greater responsibility to developed countries in combating climate change. The predominant argument of developing countries is rested upon the notion of 'per capita'. While developed countries argue to consider the aggregated emissions and the future GHG emission of developing countries.

If same data is compared on the basis of national emission (which does not capture population size), different picture emerges. In figure no 2, the emission data of countries is compared on the aggregate basis for three different years.




From Fig 2 it is clear that China is topping the list of large emitters followed by US, India and Russian federation. In fact, China has surpassed US in 2007 and became largest Co2 emitter. Observation of Co2 emission trend reveals that emission is increasing in developing countries while falling in developed countries.

On the basis of data obtained from EU Edgar (Emission database for Global Atmospheric Research) for the year 2013, it is clearly illustrated that on the basis of nation wise indicator developing countries have to opt mitigation efforts in combating climate change. US is very keen to include large developing emitter like China and India in any meaningful agreement to mitigate GHG. On the flip side, China and India are consistently advocating the per capita indicator to decide the distribution of mitigation efforts. They have made it clear that per capita is the only basis to ensure equity in any meaningful agreement.

Again, the per capita argument is logically transformed in the notion of 'Carbon Debt'. The notion of 'carbon debt' recognizes historical emission of developed countries. According to the notion of carbon Debt, those using more than their fair share over the global average (on per capita basis) are running of debt to those using less than their fair allocation. (A.Simns, 1999)

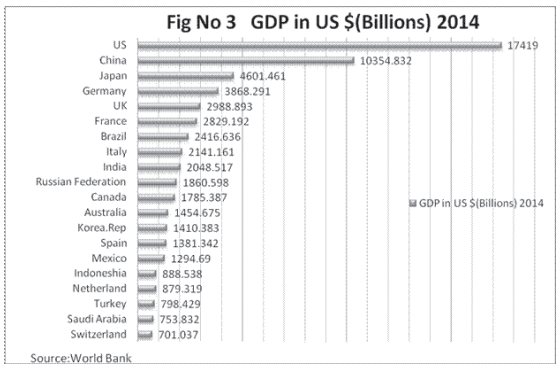
The North owes a climate debt to the South and it is rising. The North's high historical emission, coupled with its continuing failure to reduce GHG emissions substantially, have only left a limited, indeed minuscule, carbon budget on which the Southern countries must pursue their development objectives-providing to their poor people a modicum of food and water security, primary health care, literacy, elementary education, access to energy, and employment security. (Bidwai, 2012)

**The Economic and Capacity Argument**

Vulnerability to climate change impacts is divisive, it differ country to country, depending on the economical social and institutional structure of a particular country. Highly concentrated rural population and dependency on agriculture and natural resources, makes developing countries more vulnerable to climate change impacts. According to World Bank data for the year 2014, 70 % of world's poor who live in rural areas, depends on agriculture for their livelihood. Climate change poses a serious threat to these population, which is mostly concentrated in developing and under develop countries. The global average of rural populations is 47%, against this world average, rural population in least developed countries is 69%; in pacific island small states it is 63%; in South Asia it is 67% and in Sub-Saharan Africa it is 63%.While a well below of global average, rural population in OECD members is 20% and in Euro area it is 24%. (World Bank, 2014)

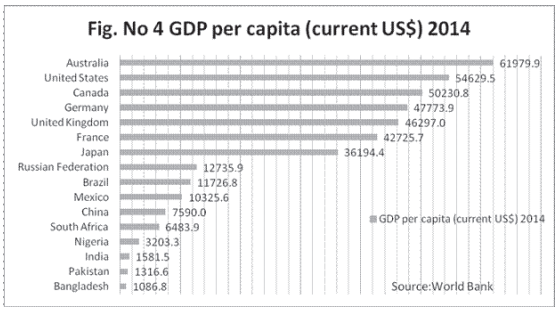
Highest rural population to the total population mostly living in developing countries and more prone to impacts of climate change due to their dependency on agriculture sector. It is a major contributor to the GDP of developing countries and this sector is more vulnerable than to other sectors of GDP. Decrease in crop yield makes the social structure unstable and could lead to social conflicts in developing countries. Again the poor infrastructure, weak governance and poor functioning of institutional structures make the impacts of climate change multifold in developing countries.

Apart from Mitigation, adaptation to the impacts of climate change is also linked with economic capacity of a country. In terms of absolute GDP (PPP) is taken to determine the economic capacity, it reveals that developing countries are not far behind of developed countries. In Fig No 3 the absolute GDP(PPP) is compared on the basis of data published by World Bank for the year 2014. (Worldbank, 2014) In Fig. 3 shows that large developing countries are well economically positioned to cope with climate change and they should accept more responsibility in the endeavor to fight climate change.




Conversely, developing countries have different perspective. They have argued that economic capacity should not be seen in absolute GDP terms, instead, they argued in favor of per capita ratio. In term of GDP per Capita, the above comparison inverts in results. As it reveals from the Fig No 4 on the basis of GDP per capita indicator large developing economies are far behind of developed nations.

On the per capita basis developing countries are arguing that they should not be compelled to take legally binding emission restriction in account of their requirement for developmental needs to eradicate poverty and meeting the basic needs of their billions of people.




In climate change regime 'Capacity' is one of the most important criteria for differentiating between countries under the principle of CBDR. Rio Declaration expressly recognized that developed countries responsibility premised on their capability of their superior technologies and financial resources and thus included in UNFCCC on the basis of their respective capabilities, which is denoted by classification of Annex-I and non Annex countries. (Rajamani, 2005)

The capacity criterion, enshrined in the CBDR, is based on the 'polluter pays principle' which reflects the responsibility of the polluter to bear the cost of averting climate change and adaptation cost of climate change. (Sands, 1995) The capacity criterion is closely linked to the past current, and future contributions criterion.

However the validity of this argument is challenged by the fact that GHG emissions of developing country parties are increasing with a faster pace and are expected to surpass emissions of the US and other developed nations, sooner or later. The combustion of fossil fuel is a main cause of anthropogenic emission of Co2 and world energy use continues to be the contagious issue in global climate change debate. Indeed, developing world emissions began to outpace developed emissions in 2005, and they are projected to continue increasing 7 times faster than in the developed countries. China is now top emitter followed by U.S., and its emissions growth is projected to be 9 times greater than that of the U.S.by 2030. (EIA, 2009)

International Energy Outlook, 2009 (IEO hereafter) has estimated growth projections for different countries and regions. According to IEO report China and India will grow at faster rate. China is expected to grow with expected rate at 6.4 per year and India is expected to grow at 5.6 annually by 2030. Higher growth requires intensive use of energy and energy portfolios of China, India and other fast developing countries are mainly depended on fossil fuel like coal Natural gas and oil. According to World Bank in year 2011, China's 79% of electricity production is based coal fired power plant and India's 68% electricity was coming from coal based power plants.

On account of robust growth projections in developing countries, their Co2 emission is likely to increase with excess demand for energy at much faster pace as compare to OECD countries. Developed countries, especially US, continuously pressurizing large developing countries to take legally binding emission cuts. On the other hand, developing countries are more concerned of their development requirement and not willing to accept any legally binding emission targets. It is made clear by EIA that Co2 emissions related to energy production are projected to grow at the rate of 2.2 % annually in Non-OECD countries from 2006 to 2030 and it is likely to grow in OECD countries at much slower rate 0.3% annually. In non-OECD group Co2 emission (energy related) of Chain, Brazil and India are likely to grow at around 2% annually. (EIA, 2009)

Again when the same projection were done on the basis of per capita indicator it reveals that despite faster growth in energy related co2 emission in Non-OECD countries, these non-OECD(3.7 metric tons)) countries will not be any close to OECD (11.2 metric tons) countries by 2030. India is projected to release only 1.4 metric tons per capita Co2 related to energy by 2030 which will be masculine compare to US or Canada.

**Conclusion**

It can easily be concluded that on the basis of per capita indicators, developing countries are far behind than developed countries. But on the aggregated basis their emission is growing at faster rate. Developed countries historically responsible for most of the GHG emission hence they should take greater responsibilities to tackle the climate change in terms of mitigations Actions.

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