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CAUSES AND CONSEQUENCES OF CLIMATE CHANGE: THE GLOBAL CONCERN

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The issue of climate change affecting human life adversely not only in the present but also will be in future. With this speed we people burning fossil fuel and other sources of green house gases will cross the dangerous line and we will have to face increase natural disaster like flood, drought, fluctuation in rainfall, rising sea level etc. All the disaster will create up and downs in daily human life and also increase of cost infrastructure for livelihood and industry development both. The effort of the present paper is to assess the impact of climate change and to alarm the global community to unite to face the environmental challenges.

Key Words: Climate Change, Global Warming, CHG

Introduction

The environment word has derived from French verb 'environner' which means to 'encircle or surround'. Environment can be define as the physical, chemical, and biological world that surround us as well as the complex of social and Cultural conditions affecting individual or community.[i] Environmental challenges indicate uncertain nature activity and increase frequencies of disaster and uncontrolled situation to manage. The present time the serious concern before world, environmental degradation and problem coming in the form of global warming and climate change. These concerns have been putted on serious bench in 1992 and 1997 on the place of Rio de Janeiro and Kyoto of Japan respectively. It felt that effective steps to minimise the environmental problem needs of time, in the same procedure in Kyoto submits 185 countries ratify and decided to reduce 5.2 percent greenhouse gases emission at 1990s level by the year 2012.

Global warming and climate change, the worse impact of environmental challenges consequences of the increase of green house gases emissions. The causes of the GHG emissions are the burning fossil fuel in unmanaged way and deforestation. Increase Average temperature indicator of the climate change on the broad level but its seen in the appearance of extreme temperature, flood, droughts, storm, rising sea level, impacts on food production and infectious diseases on the short form.

Understanding the Climate Change

The intergovernmental panel on climate change (IPCC) defines climate change as a "change in the state of the climate that can be identified (e.g. using statistical test by change in the mean and or variability of its prosperities and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity".

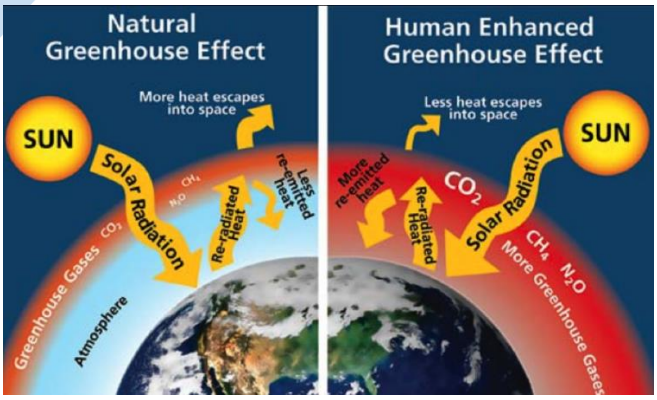
The definition of climate change provided by UNFCCC is slightly different "Climate change is a change that is attributed directly or indirectly to human activity that refers the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time period".[ii]

Climate change is the matter of changes in weather pattern from the long time old pattern. This is the natural process and changes on its automatic routine but after the more inference of human like deforestation, burning fossil fuel and more industrialisation, emitted more carbon and other five green house gases increased the concentration of GHG in the environment and resulted in the form of global warming and increase annual temperature of globe contentiously.[iii] In the other words climate change refers to the variation in the earth's globe climate or in the regional climate over the time.[iv] Climate change is the atmospheric changes or offshoot of earth's natural process. These changes include human activities not only based on the natural process.

Green house effect and Global warming

Climate change is the dynamic procedure occurring from the long year ago on their routine which makes compatible environment to live to humans. For this sunlight passes through the atmosphere and the earth surface absorb it and reflect back in the environment. Atmosphere of the earth holds small quantity of three gases namely- carbon di oxide, methane, and nitrous oxide and other three gases collectively called Green house gases. Combination of gases behave as blanket and trap outgoing radiation and reflect it back to earth and make earth surface warmer and absence this circulation earth would ice covered. This procedure of nature called **green house effect.**

Figure 1. Green house effect after Increase GHG concentration



Increase concentration of these green house gases by the human activities enhanced the green house gas effects since the time of industrialisation and before to it also. According to the study green house gases emission has increased 70 percent from 1972 to 2004. This incident tends to increase the surface temperature that called **global warming** and lead to unprecedented climate change on a global scale.[v] [vi]

Causes of Climate Change

Green house gases which required to natural climate change but excess of GHG emission disturb the natural process. The green house gases are carbon dioxide (CO2), Methane (CH4), Nitrous oxide (N2O), hydro fluro carbons (HFCs), per fluro carbons (PFCs), sulphur hexafluoride (SF6), the main source of GHG emission burning of fossil fuel. Carbon di oxide global warming potential (GWP) is 1, 21 GWP for Methane and 310 GWP for the nitrous oxide gas. A particular cause of the carbon emission is burning of fossil fuel and these fuels are coal, oil and natural gas. Its share of GHG emission depends on the uses by sector. Other cause of carbon di oxide emission are land use pattern, deforestation and land clearing, agriculture and other activities.

Methane second most important Green house gases emit from the domesticated animals such as sheep, buffalos, cows, goats etc, rice or paddy decomposed organic matter, landfill and waste dumps , oil drilling, coal mining. Nitrous oxide emission has attributed from fertilizer. Nitrous oxide emits during the agriculture and industrial activities well as during combustion of fossil fuels and solid waste.[vii]

Figure 2– Causes and consequences of global warming

Human Activity

⇩

Green house gases emission

⇩

Global Warming

⇩

Climate change

⇩

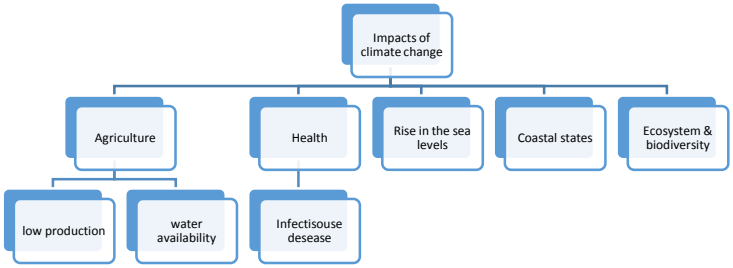
Impacts on human

Fluorinated gases hydroflurocarbons, perflurocarbons, sulphur hexafluoride are synthetic powerful green house gases emits to different types of industrial process. These gases are typically emits in small quantity but because of potent in environment these gases come s in global warming potential gases and kwon as "high GWP gases".[viii]

Impacts of Climate Change

The major impacts have been seen after climate changes in form of low Agriculture production, health diseases, crises of water availability, rise in the sea levels, melting coastal areas, and effects on biodiversity and ecosystem.

Figure3. Impacts of climate change

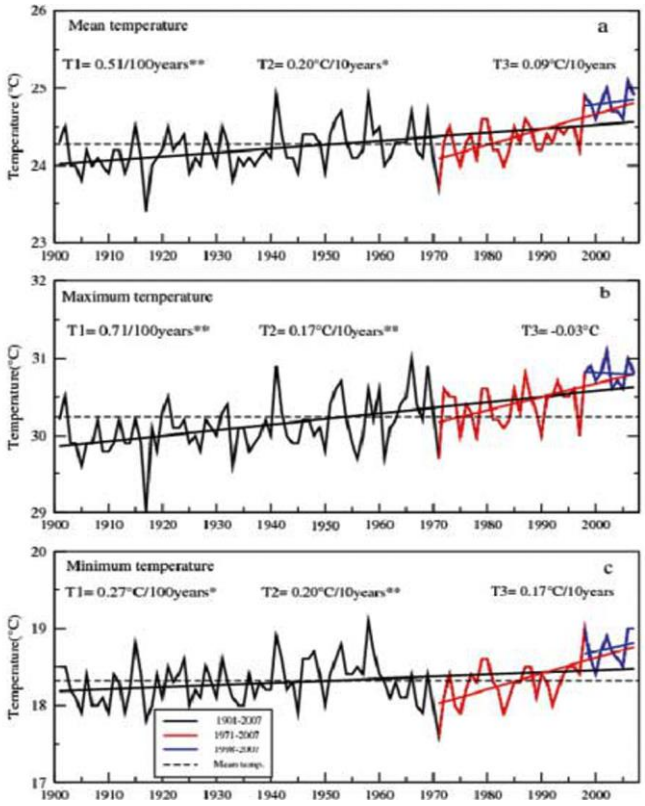


Climate Change and Indian Scenario

India has counted 0.51 degree Celsius increase in temperature for the 100 years from 1901-2007 and shows significantly warming trend.[ix] India facing the adverse effect of environment

and most venerable sectors, livelihood, Himalaya glacier melting[x] India, developing countries has not enough finance, resources and technology to tackle with natural disaster, and to adopt new strategies[xi]. India the country is already disasters prone area and 27of 35 states most disaster prone and in this most water related disaster".

Figure 4– All India annual mean maximum and minimum temperature variations during 1901-2007



Source- Centre for Climate and Energy solutions

Increasing temperature will increase the frequency of this disaster having country map or figure of India climate disaster risk may. The anticipated increase in precipitation, melting glacier and rising sea level will severely increase the incidence of floods ,hurricanes and storms and will increase or mammoth threat of food security with increase problem of drought and floods , melting glacier the reducing the availability of water and 2ºC increase temperature will replace seven million people because of submersion of major cities like Chennai and Mumbai and overall production will reduce 40 percent and GDP decline by 9 percent[xii].This section focusing on the climate change impacts in India.

Agriculture Production

Most climate sensitive sector of economy agriculture facing the climate change impacts in form of lose of agriculture production which totally based on inputs and weather. It is not affected only in one way but also different by region to region. It affected crop yield as well as crop types. Main inputs of production are water for irrigation and solar radiation important for plants growth, adversely affected by climate. Share of agriculture in GDP and employment has been declined. [xiii]This disaster has affected socio as well as economic condition of India. According to the projection 2.5º C to 4.9ºC increase temperature will reduce 32percent-40percent rice yields and 41percent to 52percent wheat yields, GDP will fall 1.8percent- 3.4 percent by the same region.[xiv]

Food Security

Climate change has made complicated the problem and process of food security i.e. food availability in the course of the inerter annual inter seasonal rainfall. India second populous country and about 12 state comes under the alarming condition in reference of hunger by the global hunger index. 43.9 percent in Bihar, 42.8 percent Madhya Pradesh and 31.9percent in Andhra Pradesh underweighted children under the five year.[xv] . 54percent India's wells ground water decrease more than one metre per year and 58percent decline ground water level.[xvi] Still Country has third world's poor and 32.7percent population lives below poverty lines.[xvii]

Health Impacts

Frequencies of floods and droughts will spread the disease like Diarrheal deaths malaria, dengue. According to World Health Organisation, 2014 increase temperature increases the climate attributive deaths and disease. In India malaria related causes of reported to around 2 million in 1990s.[xviii] There is increasing concern for heath effect due to global climate change in medical science. This change will affect adversely to health in the way of mortality and morbidity rates. WHO estimate warming and precipitation changes due to climate change claim 150,000 lives every year diseases such as Malaria, yellow fever, dengue and cholera all climate sensitive disease spread by insects like Mosquitoes, which grown up in wetter and warmer world. Deaths caused by heart disease, respiratory, illing heat waves, Diarrhoeal diseases and mal nutrion by crop less availability add and make problem serious. Increasing temperature in good for cold area and their health issues but negativity over count positive of temperature increase because change in ultra violate radiation over the year spread eye diseases and skin problem etc. ICRS identified four more risk arise from climate change related to health (1) - climate change and vector borne disease (2)-Aerosols and respiratory diseases (3) U V – A and U V –B and corneal damage, (4)environment and health disease.[xix]

Economic Impacts

Due to climate change economics impacts will be appear in the various form such as cost of damage due to disaster or loses, adaptation cost to restoration, residuals damage cost arising to any uncovered risk. Preventive adaptation cost increasing in five year plan to adopt to mitigate basis requirement of good business infrastructure also will damage due to climate change and its handling and preventive steps increasing and will create cost in future

also. Market and policies related to infrastructure, risk management policies come under it.

Energy the key of economic activity to give movements requires creation due to GHG mitigation of policies. Shifting toward conventional to renewable energy, import, export etc change infrastructure require to attention. According to estimation it adaptive, preventive and reconvention of new infrastructure will be 2 to 3 times higher to existing infrastructure. The function and cost of infrastructural department will increase.[xx] Business and trade of country also affected to it.

Important international submits to minimise climate change

1. **United nation framework on convention climate change UNFCCC -**
   UNFCCC was adopted in Rio earth summit in 1992 at Rio de Janeiro. UNFCC come into the force on 21 March 1994. Parties to convention (COP) are 195 countries who signed the convention.
   The objective of the convention was to stabilize the green house gas concentration at a favourable level. In other words "at a level that would prevent dangerous anthropogenic interference with climate system" and such a level should be achieved within a time frame sufficient to allow ecosystem to adapt naturally to climate change, to ensure that food production is not threatened and to enable economics development to proceed in a sustainable manner. The UNFCCC Article 3.1 mentions the parties, responsibility to future along with present "common but differentiated responsibility." The UNFCCC promotes annual review to convention related implementation and meeting held's annually of COP. The UNFCCC gave target of returning to 1990s GHG emission level by 2012 for industrialised countries.[xxi]

2. **Kyoto Protocol**
   Kyoto protocol submits organised in 1997 Kyoto of Japan. It convention come into force in February 16, 2005. The objective of this submits banded the emission reduction target to mitigate the green house gases emission internationally. Set target to mitigate was to reduce green house gases emission 5.2% at the level of 1990s in 2012 in the first commitment period. To meet this target Kyoto protocol launched three market based mechanism first is Emission trading second Joint implantation and third clean development mechanism.[xxii]

Doha Amendment

In Doha, Qatar, on 8 December 2012, the "Doha Amendment to the Kyoto Protocol" was adopted. Included abetments-

- 18% emission below at the 1990s level in Second commitment period 1 January 2013 to 31 December 2020.
- Revised list of GHG by parties in the second commitment period.[xxiii]

The Bali Roadmap

Bali roadmap was adopted in the third meeting of parties and 13th conference of parties on conventions (COPs) held in December 2007 in Bali. The objective of the roadmap was to set a forward looking decision to represent the action taken to secure climate future under negotiation track. Meeting includes Bali action plan and plan divided into five main categories- shared vision, mitigation, adaptation, technology and financing. [xxiv]

Copenhagen Accord

The accord held in Denmark 2009 and this was the 15th conference session of UNFCCC parties and 5th conference session of conference of parties (COP). This agreement includes several important elements such as- Strong coverage of government views, Long term goal to bound maximum global temperature not more than 2 degrees Celsius to the pre industrial level and demand by vulnerable developing countries to limiting temperature increase below to 1.5 degrees.[xxv]

Cancun Agreement

This agreement has ever been seen as the largest collective efforts at international level along with national level to minimise green house gases emission under the UNFCCC. This concurrence held in 2010 at Cancun, Mexico and plans to emission reduction and to facilitate to developing countries for protection to climate change and sustainable development. This agreement has included several motives such as- Mitigation, transparency, technology, Adaptation, Forests, capacity building, finance and set up of Green Climate Fund for developing countries to support them in mitigation climate change and adaptation to its impacts. The funding format $100 billion per year by 2020.

Durban Agreement

The Durban agreement of UNFCCC held in 2011 at Durban give breakthrough on climate change related international community to come

closer all governments on the climate change problem to deliver ultimate objective to stabilize Green House Gas concentrations in the atmosphere at a level that will prevent our dangerous interference with the climate system as well as right to sustainable development.

Doha Climate Gateway

At the 2012 UN Climate Change Conference in Doha, Qatar (COP18/ CMP8),

- Strengthened their determination and set out a timetable to adopt a universal climate agreement by 2015, which will come into effect in 2020.
- Streamlined the negotiations, completing the work under the Bali Action Plan to concentrate on the new work towards a 2015 agreement under a single negotiating stream in the Ad hoc Working Group on the Durban Platform for Enhanced Action (ADP).
- Emphasized the need to increase their ambition to cut Green House Gases (GHGs) and to help vulnerable countries to adapt.
- Launched a new commitment period under the Kyoto Protocol, thereby ensuring
- that this treaty's important legal and accounting models remain in place and underlining the principle that developed countries lead mandated action to cut Green House Gas emissions.
- Made further progress towards establishing the financial and technology support and new institutions to enable clean energy investments and sustainable growth in developing countries.

So that the world has a chance to stay below an agreed maximum 2 degrees Celsius temperature rise, beyond which even more serious Climate Change impacts will occur, the Governments agreed to find ways to scale up efforts before 2020 beyond the existing pledges to curb emissions.

Also in Doha, the UN Secretary General Ban Ki-moon announced that he would convene world leaders in 2014 to mobilize political will to help ensure the 2015 deadline is met.[xxvi]

Warsaw Agreement

The19th session of the conference of the Parties (COP) to the UNFCCC held in November 2013 and focus to define the clearer path for the final two years agreement called "Durban Platform negotiation". Parties set a loose timeline for proposing their intended nationally determined contribution to the 2015 agreement by the quarter of that year for those "ready to do so". Other major issues developing countries demand for increased climate finance and for new mechanism to help especially vulnerable nations cope with unavoidable "loss and damage".[xxvii]

Paris Agreement

The Paris agreement known as 21st session of the UNFCCC conference of parties or COP 21 held in December 2015. Main decisions taken in the conference-

- Reaffirm the goal of limiting global temperature increasese well below 2degrees Celsius, while urging effort the limit the increase 1.5 degrees.
- Establish binding commitments by all parties to make "nationally determined contributions" (NDCs) and to pursue domestic measures aimed at achieving them.
- Commit all counties to report regularly on their emissions and "progress made in implementing and achieving" their NDCs and to undergo international review
- Commit all countries to submit new NDCs every five years, with clear expectation that they will "represent a progression'' beyond previous ones
- Reaffirm the binding obligations of developed countries under the UNFCCC to support the efforts of developing countries, while for the time encouraging voluntary contributions by developing countries to
- Extend the current goal of mobilising $100 billion a year in support by 2020 through 2025, with a new, higher goal to be set for the period after 2025
- Extend a mechanism to address" loss and damage" resulting from climate change, which explicitly will not involve or provide a basis for any liability or compensation
- Require Parties engaging in international emission trading to avoid "double counting"
- Called for new mechanism, similar to the clean development mechanism under the Kyoto protocol, enabling emission reductions in country to be country toward other countries NDCs.[xxviii]

India's action to lessen climate change

1. **National Environmental policy**

The national environmental policy 2006 made to fill the existing gap in the present knowledge and to give extend coverage to earlier policies. The main objectives of the policy was as follows-

- Conservation of critical environmental resources
- Intra governmental equity: livelihood security for the poor
- Intergovernmental equity
- Environment concerns in economic and social development

- Efficiency in environment resource use
- Environmental governance
- Enhancement of resources for environmental conservation.[xxix]

2. **Prime minister council on climate change**

A high level advisory group on climate change was constitute in June 2007 and reconstituted in November 2014 with the following objectives-

- Coordinated national action plans for assessment, adaptation and mitigation of climate change.
- Advise government on pro active measures that can be taken by India to deal with challenge of climate change.
- Facilitate inter ministerial coordination and guide policy in relevant areas.[xxx]

3. **The National action plan on climate change**

The NAPCC has been launched in 2008 to identify a number of measures that simultaneously advance the country's development and climate change objective of adaptation and mitigation. It includes eight national missions to achieve the goal of climate change.

- **Jawaharlal Nehru National solar mission-**
  The objective of this mission is to establish to India as a leader in solar energy. The mission contains three phases- 1st phase 2010-2013 to focus on capturing the low hanging option in solar thermal; promoting off grid system to serve populations without access to commercial energy and modest capacity addition in grid based systems. In second phase 2013-2017 & third phase 2017-2022 capacity will aggressively ramped up to create conditions for scaled – up and competitive solar energy penetration in the country.
- **National mission for enhanced energy efficiency-**
  The objective of the mission to achieve growth with ecological sustainability by revising cost effective and energy efficient strategies for end – use demand side management.
- **National mission on sustainable habitat-** the objective to promote sustainability though improvement in energy efficiency in buildings, urban planning, improved management of solid and liquid waste including recycling and power generation, model shift towards public transport and conservation.
- **National water mission-**
  The Objective of the mission to conserve water minimise wastage and ensure equitable distribution both across and within status through integrated water resources development and management.

- **National mission for sustainable agriculture –**
  The objective of the mission to transform agriculture into an ecologically sustainable climate resilient production system while at the same time exploiting its fullest potential and thereby ensuring food security, equitable access to food resources, enhancing livelihood opportunities and contributing to economic stability at the national level.
- **National mission sustaining the Himalayan eco system-**
  The main objective of the mission to evolve management's measures for sustaining and safeguarding the Himalayan glaciers and mountain eco system and attempt to address key issues namely impacts of climate change on the Himalayan glaciers and biodiversity wildlife conservation and livelihood of traditional knowledge societies.
- **National Mission for green India-**
  The objective of to use a combination of adaptation and mitigation measures enhancing carbon sinks in sustainably managed forest and other eco systems, adaptation of vulnerable species or ecosystems and adaptation of forest – dependent communities.

- **National mission on strategic knowledge for climate change-**

The objective of mission to identify the challenges and responses to climate change through research and technology department and ensure funding of high quality and focused research into various aspects of climate change.

Other national and sub national initiatives-

- National clean energy fund
- State action plan on climate change
- NABARD progressing adaptation actions
- Auto fuel vision and policy 2025
- Indian network for climate change assessment
- Expert group on low carbon strategies for inclusive growth
- Bilateral cooperation on environment and technology.[xxxi]

3. **Parliamentary forum on global warming and climate change-**

The meeting constituted first time in 2008 to interact with the specialists who were working on global warming and climate change. In this forum focus on the road map for 2025, reduction in the emission intensity of India GDP by the year 2020 as communicated by government of India to the UNFCCC. The focus of the meeting two major things one is NAPCC and second Low carbon strategies for inclusive growth. Included matter in forum for discussion, impact of climate change, technology and climate change, national solar mission and related initiatives under NAPCC. National mission on sustainable habitat etc. and issues of climate change mitigation methods.[xxxii]

4. **Climate change action programme(CCAP)-**

There is various other science initiative of Indian government plans comes under the climate change action programme (CCAP). This included national carbonaceous Aerosol Programme (NCAP) launched in 2011, with the involvement of major activity institutional and multi agency study. This study done by ministry of environment and forest with collaboration of ministry of earth sciences, the Indian spaces research organisation, the ministry of science and technology and other agencies to understand the role of black carbon in climate change through monitoring and modelling techniques ad long term ecological observatories (LTEO), Coordinated studies on climate change for north east region (CSCCNE).[xxxiii]

5. **Indian network for climate change agreement(INCCA)-**

INCCA to national assessment of climate change INCCA launched by the Ministry of environment and forests on October 14, 2009. This network designated to assess the drivers and implications of climate change through scientific research, climate change assessment once every two years, developed decision support system, capacity building for management of climate change risks and opportunities. Several climate changes related programme carried INCCA such as-

- A provisional assessment of GHG emission profile of India for 2007.
- An assessment of the impacts of climate change on water recourses, agriculture, forests and human health in the Himalayan region, North eastern region, western Ghats and coastal region of India
- Undertake the assessment of black carbon and it's impacts on ecosystems
- Undertake a long term ecological, social, and economic monitoring of ecosystem to identify patterns and drivers of change that influence the sustainability of livelihoods depend on these systems across India
- Build capacity through thematic workshops and training programs
- Synthesize information thus generated in appropriate communication packages for informed decision making[xxxiv]

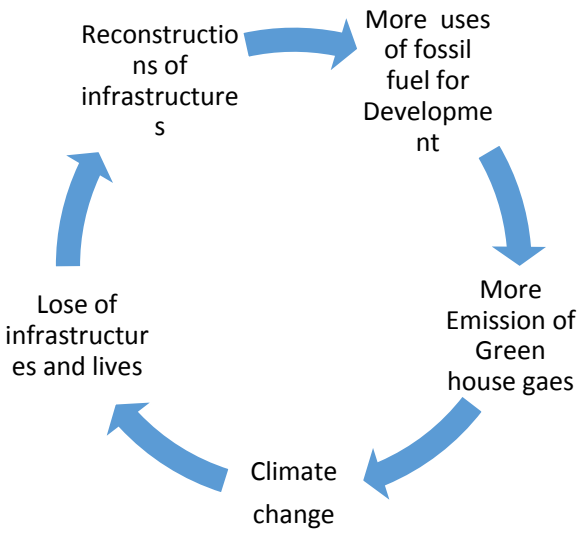
6. **RPO and renewable energy procurement obligation-**

The main driver of renewable energy to promote renewable energy sector and solar

power is RPO. NAPCC has not set any target for RPO but after the came in force National tariff policy 2006, amended in 2011 solar specific RPO increase from minimum of 0.25% in 2012 to 3% in 2020. [xxxv]

Conclusion and suggestions

The issue of climate change affecting human life adversely not only in the present but also will be in future. With this speed we people burning fossil fuel and other sources of green house gases will cross the dangerous line and we will have to face increase natural disaster like flood, drought, fluctuation in rainfall, rising sea level etc. All the disaster will create up and downs in daily human life and also increase the of cost infrastructure for livelihood and industry development both. In the race of development rotationally we generating the problem for us for development utilise natural resources in unmanaged way and burn more fossil fuel as highly we can this process increase GHG emission in atmosphere and increase temperature will lead to abnormal climate change again will increase damages of infrastructure and cost of life like less agriculture production, increase disease, poverty problem, decrease land area and after it to manage and restructure of infrastructure again exploit more natural resources and increase emissions.



To minimise this horrific circle there is need of sustainable development and use of clean technologies introduced by Kyoto protocol three mechanism emission trading, joint implementation and clean development mechanism. These are the technologies through which there is option to adopt clean technologies and minimise green house gases concentration in atmosphere which responsible for all the environmental challenges. Shifting towards renewable energy to fossil fuel will be very constructive in this system.

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