Climate Change & Urban Environments - International Laws & Treaties

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ABSTRACTS

Environmental degradation and climate change is not limited to any national boundary, rather it is a serious global phenomenon, which adversely effects human health and eco-systems. The United Nations' Framework Convention on Climate Change (UNFCC) in 1992 which sets the objective to stabilize Green House Gas concentrations to prevent dangerous anthropogenic (human induced) interference with the climate system and Kyoto Protocol in 1997 limits emission reduction targets giving international recognition to the problem of climate change.

However the Indian Environment (Protection) Act 1986 does not define this term. Section 2 states that "Environment includes water, air and land and the inter-relationship which exists among and between water, air and land, and human beings, other living creatures, plants, microorganisms and property."

For the purpose of this Paper, it's not possible to cover every aspect of environment; therefore, the focus will be on climate change. It will trace the international conventions and treaties on climate change.

The idea is to analyze environmental aspects laws & treaties with respect to climate change affecting our Urban Environments.

Keywords: Environment, Climate Change, Eco-system, Urban Environment

1. INTRODUCTION

As the earth's climate is changing & affecting our weather, oceans, ecosystems, natural cycles and our human society. The change is not only natural but also because of human interventions. Which include emissions of carbon dioxide & the heat trapping gases commonly referred as greenhouse gases known to disturb the equilibrium/balance that exist within the atmosphere. The built up of GHG gases in our atmosphere leads to the warming of temperatures which leads to change in natural climate. This is accounted due to the change in reflectivity of earth atmosphere.

The happening of ice age during 1645 to 1715 was caused due to the low solar activity with cooling of north America & Europe majorly. This was a naturally induced change in the climate. Whereas the Human induced changes including change in land use and land cover have changed Earth's reflectivity. Processes such as deforestation, reforestation, desertification, and urbanization often contribute to changes in climate in the places they occur.[1]

Activities like clearing forests, burning of fossil fuels, production of industrial products, storing waste in landfills, etc. specially industrialization has been a major contributor towards the CO2 emissions.

1.1 **Impact on Land** - Ground-level air temperatures are expected to continue to warm more rapidly over land than oceans with Future climate projections been stronger over high altitudes and land areas. Due to the larger thermal inertia of the ocean and to the increase in latent heat loss that mitigates the temperature changes there.

1.2 **Impact on Water** – The surface water balance depends on precipitation and evaporation as immediate impacts. Precipitation minus evaporation *(P − E)*. If*(P − E)* is negative, there is a loss of water at the surface. If it's positive, there is a surplus of water at the surface.[2] Leading to both the extreme situations of Drought & flooding as a consequence to the disturbance in Water Balance. This affects the water cycle which includes Infiltration, Percolation below soil surface & Runoff at surface. As a consequence to Climate change & rise in temperature the hydrological cycle is expected to get disturbed with heavier precipitation rates. This also potentially means less soil and aquifer moisture recharge for the same amount of precipitation than in the past. And Warmer temperatures resulting in higher evaporation rates, also reducing soil moisture. [4]

2. CLIMATE FORCING

Changes in the Radiative balance of the Earth—including the enhanced greenhouse effect associated with rising atmospheric CO_2 concentrations—are referred to as climate *forcing* (NRC, 2005d). Climate forcings are estimated by performing detailed calculations of how the presence of a forcing agent, such as excess CO_2 from human activities, affects the transfer of radiation through the Earth's atmosphere.[2] Climate forcings are typically expressed in Watts per square meter (W/m^2,

[1] Causes of Climate Change (also found at http://www.epa.gov/climatechange/science/causes.html)

[2] Climate Change News Roundup (also available at http://www.dailykos.com/story/2010/11/28/923501/-Climate-Change-News-Roundup-28-November-2010#)

or energy per unit area), with positive forcings representing warming, and are typically reported as the change in forcing since the start of the Industrial Revolution (usually taken to be the year 1750).[3]

3. CLIMATE CHANGE & BUILT ENVIRONMENT

The urban centers are getting more dense day by day and 70% of world population I expected to live in urban areas by 2050 (Un,2007) thereby the stress on rural areas is likely to get reduced whereas the urban areas will be over stressed & their supporting infrastructure & natural resources including water, soil, etc will get over exploited. Thus, disturbing their natural cycles and replenishment possibilities which will lead them to depletion & reduction in availability & quality like for example the case of Water as a natural resource. Due to rapid urbanization the over pumping of aquifers is executed as they struggle to satisfy their growing water needs.

Urban ecological footprint includes land use changes and the supporting resource extraction for example a change in land use, deforestation will lead to increased temperatures and the vulnerability to erosion in case of heavy rain storms. While the stress of land development will affect the ecosystem with ground level air pollution in cities effecting air quality.

Built areas in urban centers changes reflectivity especially through dark surfaces which includes roads & other hard paved dark areas. Along with glass used as a major building material which ends up absorbing a huge amount of heat from solar radiation. This all together contributes towards heat island effect which is a consequence of increased temperatures of urban localities. This also effects the rate of precipitation & its intensity to some extent. In addition to its impact over global carbon balance.

Built Urban environments are getting effected by the concentrations over their infrastructure with increase in population it has significant impacts on climate change. Example: The growth of the southwestern U.S. “sunbelt” as well as that of megacities throughout other arid regions of the world increases the populations at risk from extreme heat as well as their demand for energy and water.

In 2003 an anticyclone triggered temperatures of western Europe to an excess of 95degree F-99 degrees F for a period of 9 days with urban heat island effect amplifying the temperatures with associated poor quality of air causing 14,800 excess deaths. Especially in France where housing

[3] Advancing the science of Climate Change, Chapter6-changes in the climate system, page no.189

infrastructure from Paris to Marseille commonly does not include air conditioning or insulation between roofs & room. [4]

For urban centers located along coastal lands there is a constant threat of rising sea levels. Example: Tsunami which affected the coastal areas. In India alone 11,000 people died in tsunami & 380,000 Indians have been displaced by the disaster. [5]

4. INTERNATIONAL SCENARIO

In order to limit the magnitude of climate change many international convention and policy framing has been done under UNFCCC & Kyoto protocol.

4.1 United Nations Framework Convention on Climate Change - Was created in 1992 as the main forum for international agreement on tackling climate change. 195 countries have now joined the international treaty determined to protect the climate system for present and future generations.

While addressing the need of developing countries to access resources to grow taking into account the possibilities for achieving greater energy efficiency and better control of GHG emissions. The idea is to attempt Stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic human induced interference with the climate system. Which should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner'

Affirming that responses to climate change should be coordinated with social and economic development in an integrated manner with a view to avoiding adverse impacts on the latter, taking into full account the **legitimate priority needs of developing countries** for the achievement of sustained economic growth and the eradication of poverty. The treaty itself sets no binding limits on greenhouse gas emissions for individual countries and contains no enforcement mechanisms. In that sense, the treaty is considered **legally non-binding.**

[4] Earth Observatory, NASA (*http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=11972*).

[5] Tsunami's Impact on India (also found at http://academic.evergreen.edu/g/grossmaz/cramerbd/)

4.2 **Kyoto Protocol**- Is the first legally binding treaty aimed at cutting emissions of the main greenhouse gases, to contribute to global warming & set specific targets for reductions in greenhouse gas concentrations in the global atmosphere. With a main theme for countries to cooperate.

- A cautionary note in the protocol is to be careful of the wider impacts GHG reduction schemes may have. Some may be too costly to maintain for the benefit they provide, others may cause an unreasonable degree of disruption to the populace, industry etc.
- A key feature of the protocol is the agreement on the use of some form of **emissions trading**. If introduced the trading system should allow the holder of a credit the emission of a specified amount of GHG.

4.3 **The Intergovernmental Panel on Climate Change (IPCC)** is the leading international body for the **Assessment of Climate Change**. It was established by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO) in 1988 to provide the world with a clear scientific view on the current state of knowledge in climate change and its potential environmental and socio-economic impacts. It is an intergovernmental body under the auspices of the United Nations (UN) and is open to all member countries of the United Nations (UN) and WMO. Currently 195 countries are members of the IPCC. It reviews and assesses the most recent scientific, technical and socio-economic information produced worldwide relevant to the understanding of climate change. Because of its scientific and intergovernmental nature, the IPCC embodies a unique opportunity to provide rigorous and balanced scientific information to decision makers. By endorsing the IPCC reports, governments acknowledge the authority of their scientific content. The work of the organization is therefore policy-relevant and yet policy-neutral, never policy-prescriptive.[6]

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

- New commitments for Annex I Parties to the Kyoto Protocol who agreed to take on commitments in a second commitment period from 1 January 2013 to 31 December 2020;
- A revised list of Green House Gases (GHG) to be reported on by Parties in the second commitment period; and

[6] http://www.ipcc.ch/organization/organization.shtml

- Amendments to several articles of the Kyoto Protocol which specifically referenced issues pertaining to the first commitment period and which needed to be updated for the second commitment period.[7]

4.5 The Bali Road Map

The Bali Road Map was adopted at the 13th Conference of the Parties and the 3rd Meeting of the Parties in December 2007 in Bali. The Road Map is a set of a forward-looking decisions that represent the work that needs to be done under various negotiating "tracks" that is essential to reaching a secure climate future.

4.6 The Copenhagen Accord

This included the long-term goal of limiting the maximum global average temperature increase to no more than 2 degrees Celsius above pre-industrial levels, subject to a review in 2015. It also included a reference to consider limiting the temperature increase to below 1.5 degrees - a key demand made by vulnerable **developing countries**.[8]

4.7 The Cancun Agreements

The Cancun Agreements, reached on December 11 in Cancun, Mexico, at the 2010 United Nations Climate Change Conference, represented key steps forward in capturing plans to reduce Green House Gas emissions, and to help developing nations protect themselves from climate impacts and build their own **sustainable futures**. The main objectives include: (i) Mitigation; (ii) Transparency of actions; (iii) Technology; (iv) Adaptation; (v) Forests; (vii) Capacity building; and (viii) Finance.

4.8 The Durban Agreement

The United Nations Climate Change Conference at Durban in 2011, delivered a breakthrough on the international community's response to Climate Change. four main areas of coordinated and complementary action and implementation, designed also to build and preserve trust among countries, were agreed viz. (i) Second commitment period of the Kyoto Protocol; (ii) The launch of a new platform of negotiations under the Convention to deliver a new and universal Green House Gas reduction protocol, legal instrument or other outcome with legal force by 2015 for the period beyond 2020; (iii) Conclusion in 2012 of existing broad-based stream of negotiations; and (iv) To

[7] http://unfcc.in/kyoto_protocol/

[8] http://unfccc.int/meetings/copenhagen_dec_2009/meeting

scope out and then conduct a fresh global Review of the emerging climate challenge, based on the **best available science and data**.[9]

4.9 The Doha Climate Gateway

At the 2012 UN Climate Change Conference in Doha, Governments consolidated the gains of the last three years of international Climate Change negotiations and opened a gateway to necessary greater ambition and action on all levels. Among the many decisions taken, Governments:

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

5. SUGGESTIONS AND CONCLUSION

- Green redesign of urban areas is required with reduced air pollutants, rain water harvesting systems that naturally replenishes the natural aquifer while maintain the ground water replenishment & extraction Balance.
- Since roofs & paved areas typically comprise about 25-35% of urban areas therefore by replacing dark reflective surfaces with green rooftops & roofs with high reflective materials will help to reduce urban heat island effect while improving local air quality.
- A comprehensive law is needed on climate change as there is no such law in many countries including India. Focus should not only on improving understanding, but helps to inform solutions for problems at local, regional, national, and global levels. With an Integrative and Interdisciplinary Research on Climate Change Research.
- Integrategration of diverse kinds of knowledge and explicitly engages the social, ecological, physical, health, and engineering sciences should be there. With special emphasis on coupled human-environment systems rather than individual human or environmental systems in isolation.

[9] http://unfcc.int/key-steps/durban_outcomes

- Development and employment of decision-support resources and tools that make scientific knowledge useful and accessible to decision makers. And Focus, where appropriate, on place-based analyses to support decision making in specific locations or regions, because the dynamics of both human and environmental systems play out in different ways in different places and decisions must be context-specific.
- Supports adaptive decision making and risk management in the face of inevitable uncertainty by remaining flexible and adaptive and regularly assessing and updating research priorities.

Urban Areas due to their profound impacts on infrastructure, local resources & Energy consumption, offers a great opportunity of interventions to improve over the qualitative as well quantitative aspects of environment. The stress of development and the tension of over withdrawal of water will pose a major problem for cities or urban areas leading to the depletion of water quantity & quality both due to excess water withdrawals compared to limited replenishment & aquifer recharging. This imbalance especially in case of ground water will generate the imbalance in regional ecosystem.

The World Bank Report "Turn Down the Heat: Climate Extremes, Regional Impacts, and the Case for Resilience" published in June 2013, projects that a scenario of 4degree Celsius rise in global temperature, would result in increased climate extreme events such as heat waves, sea level rise, more storm surges, droughts and flooding in the South Asian region including India. The Indian Government has also constituted an Executive Committee on Climate Change in January, 2013, under the chairmanship of Principal Secretary to Prime Minister to assist the Prime Minister's Council on Climate Change in evolving a coordinated response to issues relating to Climate Change at the national level and to monitor the implementation of the eight National Missions and other initiatives under the NAPCC.

Therefore, the need is to have more stringent reforms and legally binding laws which not only ensure the elimination of exploitation of our natural resources but should also restrict the consupmtion of resources due to urban development and also should be able to promote sensitization and awareness among common public for equitable & balanced use of our natural resources for the overall development of mankind.

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