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Climate Change and Biodiversity: An Analytical Study with Reference to Indian Laws

Utkarsh Jain[1], Piyush Kumar Trivedi[2]

[1]Researcher, LLM, Khwaja Moinuddin Chishti Language University
[2]Superviser, Assistant professor, Khwaja Moinuddin Chishti Language University

ABSTRACT

As per the nature of law, changes are bound to be happening in the system if any component of the system gets altered by any means. Change of climate and subsequently loss of biodiversity threatens the existence of human being. The loss of biodiversity, which has been happening worldwide, poses a serious threat to the anthropological system. An investigation of the current trend and future scenario shows that this loss is likely to continue in the foreseeable times. India has a huge variety of biodiversity and in the last few decades, its biodiversity has come under threat from climate change which accelerated by the anthropogenic activities of various sources of pollution. Biodiversity conservation and sustainable development are the possible ways to curtail the impact of climate change. Although, adequate efforts have been made worldwide to tackle the environmental challenges, the adverse effects of climate change are still accelerating and the rate of loss of biodiversity is continuing globally.

Keywords: Biodiversity, Climate change, Acts, Sustainable development.

Introduction

Environment is a combination of all the nature's gifts without even the trace of human contribution to it. Its various components are essential for the human survival in various forms without which no one can think of his existence. It has the unique feature of providing spaceand support for life, all the materials for development and also offering a great receptacle for the substances labelled as wastes. The natural resources are measured in terms of quality as well as quantity. Their reasonable and fair availability depends upon the conscious utilization taking care of their capacity and capabilities not by reckless and unmindful exploitation restricted to self-interest. In the pre-industrial period, the problem of natural environment was of the first generation associated primarily with pollution of water and air confined to in and around the human settlements. It was not wide spread crawling, posing a serious threat of alarming nature far away from its source. The local and ordinary legislations, directly or indirectly, did have the control and command measures to control, contain and curb the menace.

In course of time, man's desire, propensity and capability to race forthe development resulted in a threshold situation beyond that if suitable and careful management was not undertaken, the environment would not be worth-living. Such a critical state of affairs led to cause environmental problems of the second generation, known as global warming, greenhouse gas effect / climate change, ozone layer depletion, acid rains, sea level rising and loss of biological diversity on the planet. The process

ofdevelopment without integrating the environmental concern has generated the risk of very delicate and slow but of very sensitive nature in the form of by-product that the whole world feels as a climate change.

The present paper attempts to trace down the nature of inter- relationship between the climate change and biodiversity and examinesthe legal framework to tie the relationship more firmly. The existence of human population is supported by various factors such as biodiversity, ecosystems, goods and services system provide. The factors which support the human population to flourish luxuriantly are facing rapid exceptional loss. Ecosystem is one of them, which is facing steep injury over the past few decades and posed new challenges for human survival, which need urgent attention. As reported by the Ministry of Environment, Forest and Climate Change (MoEFCC, 2014), India, a megadiverse country is con- tributing 7 to 8% of all recorded species, including 45000 plants species and 91000 animal species in the world, while India have only 2.4% of the world's land area. It is situated at the tri junction of the Afrotropical, Indo-Malayan and Palearctic realms, all of which support rich biodiversity (MoEFCC, 2014). Being one of the 17 identified megadiverse countries; India has 10 biogeographic zones and is home to 8.58% of the mammalian species known so far, with the corresponding figures for avian species being 13.66%, for fishes 11.72%, for amphibians 4.66%, for reptiles 7.91%, and for plants 11.80%. Himalaya, Indo-Burma, the Western Ghats-Sri Lanka and Sundaland are four out of 34 globally identified biodiversity hotspots are representing India (MoEFCC, 2014). Biogeographic classification for conservation development has been developed and has also mapped as biodiversity rich areas across the country.

A significant measure has been taken for inventorization of vast and diverse biological heritage. Researchers have carried out numerous studies on aquatic ecosystems, mycological work related to classification and floristic studies on abundant groups of fungi. Huge number of lichen species, which are nature's most remarkable alliances with at least 2300 species belonging to genera 305 and families 74 having been report- ed in country. Marine floral biodiversity of India having over 200 diatom species, 90 dinoflagellates, 844 marine algae and 39 mangrove species is remarkable (MoEFCC, 2014). Significant endemism across different plant groups in India noticed. Around 4045 species of lowering plant endemic to India are dispersed amongst 141 genera belonging to 47 fami- lies. In terms of endemism of vertebrate MoEFCC reported that India's global ranking is 10^{th} in birds (69 species), 5^{th} in reptiles (156 species) and seventh in amphibians (110 species) (MoEFCC, 2014). Based on the origin of cultivated plants, India has 15 agroclimatic zones and has been considered to be the primary center of origin of rice. Total 811 cultivated plants and 902 of their wild relatives have been documented. Vast and rich repository of farm animals, represented by a broad spectrum of native breeds of 34 cattle, 12 buffaloes, 21 goat, 39 sheep and 15 chicken have been reported by MoEFCC in India. Abundant biodiversity of the traditional agriculture and practices in different parts of India supported food security of hundreds of millions of people across the country. The rich livestock sector plays a significant role in the Indian economy. The area of Indian forests has covered over 692,027 km^2, cover 21.05% of the topographical area of the India, whereas forest cover has either remained static or has reduced in most of the developing countries. India has added around three million hectares of forest and tree cover over the last decade. The MoEFCC reported that the total tree cover in India is estimated to be 9.08 million hectares, accounting for about 3% of the total topographical area of the India. Network of 54 National Parks covering 21,003 km and 373 Sanctuaries covering 2288,649 km, giving a combined coverage of 1,09,652 km. *i.e.* 3.34% of the country's geographical area in 198 km. The network has grown gradually, and up to 2014 total of 690 Protected Areas which comprises National Parks 102, Wildlife Sanctuaries 527, Conservation Reserves

572 and Community Reserves 4, covering 5.07% of the country's geographical area. Apart from this, country has 23 marine Protected Areas in peninsular India and 106 in the islands.

Climate change and biodiversity

Climate change has been emphasized as serious threats to biodiversity which are likely to be adversative for biodiversity. Variation in precipitation and temperature are two important aspects of climate variability that are likely to have a direct and significant effect on India's biodiversity. Thuiller (2007) has stated that each 1^0C rise in temperature will lead to shifting the zone of occurrence of several specialist species by 160 meter vertically and 160 km horizontally. Although the specific impact of climate change on India's natural resources area wise is yet to be studied. Sukumar (1995) reported that endemic mammals like the Nilgiri thar face an in- creased risk of extinction.

Study of Intergovernmental Panel on Climatic Change (IPCC), a United Nations Scientific Consortium, reported that impact of climate change on biodiversity are expected to increase in magnitude and prevalence as CO_2 levels and temperatures continue to rise and in extreme conditions, *i.e.*, heat and storms, increase in frequency and intensity (IPCC, 2007).In mitigating and adapting the impacts of climate change, biodiversity plays a key role. Entire ecosystems such as forests and peat lands sequester carbon in their vegetation and soil thus supporting climate-regulating functions world- wide (Amend and EiIng, 2010; Carlson *et al.*, 2010).

It has been observed that emissions of greenhouse gases are threatening the biodiversity globally. In 2007, a prediction was made by the IPCC, that by the end of the 21st century, global surface temperature may rise by 1.8 to 4^0C and concluded that an increase of 1.5 to 2.5^0C would threaten 20 to 30% of plant and animal species of the world with extinction. Bates *et al.*, (2008) reported that climate change may adversely impact more than 5,000 plant species due to the loss of their suitable habitats.

Gitay *et al.* (2002) stated that the global mean surface temperature has increased by 0.6°C over the last 100 years. The IPCC and Anon (2007) predicted an increase in global average temperature between 0.1- 0.3^0C per decade. IPCC (2007) also reported that the rise in CO_2 concentration from 280 parts per mil- lion (ppm) in 1750 to 379 ppm in 2005 to approximately 395 ppm at present, signifying the main role in increasing the global atmosphericCO_2 levels. The IPCC reports state that human activities have tremendously influenced the global water cycle by impacting the global carbon cycle (NASA, 2010). India has extreme degree of sensitivity towards the climate change, due to excessive population pressure and a consequential strain on natural resources.

In Socio economic development the people, Climate plays a critical role in the lives and livelihoods. Climate has shown warming of 0.89^0C (0.69 to1.08^0C) during the period 1901–2012 which is mainly attributed to anthropogenic activities (IPCC, 2013). IMD (2012) stated that increasing temperature trends of the order of 0.60 ^{0}C during last 112 years. Goswami *et al.* (2006) stated that increase in heavy rainfall events and decrease in low and medium rain fall events over India have been observed.

India's policy statement and the Constitution

The National Environment Policy, 2006 (NEP) seeks to achieve a balance and harmony between conservation and development. The policy is intended to mainstream environmental concerns in all developmentalactivities. The dominant theme of the policy is that while conservation ofenvironmental resources is necessary to secure livelihood and well being of all, the most secure basis for conservation is to ensure people dependent on particular resources obtain better livelihood from the fact of

conservation, than from degradation of the resources,[1] and biodiversityis one of such resources. The NEP prescribes that human beings are atthe centre of concerns for sustainable development and entitled to a healthy and productive life in harmony with nature.

The principal aim of the National Forest Policy, 1988 is to ensureenvironmental stability and maintenance of ecological balance including atmospheric equilibrium which is vital for sustenance of all life forms, human, animal and plant. The derivation of direct economic benefit must be subordinated to this principal aim.[2] Conserving the natural heritage of the country by preserving the remaining natural forests with the vast variety of flora and fauna, that represents the remarkable biological diversity and genetic resources of the country is a priority. The national goal is, therefore, set to have 33 per cent of the total land area of thecountry under forest or tree cover by 2012[3] to ensure stability of thefragile ecosystem. Forest land or land with tree cover should not be treated merely as a resource readily available to be utilised for various projects and programmes, but as a national asset which requires to beproperly safeguarded for providing sustained benefits to the entire community. Diversion of forest land for any non-forest purpose shouldbe subject to the most careful examinations. Construction of dams andreservoirs, mining, industrial development and expansion of agriculture should be consistent with the needs for conservation of trees and forests. Projects which involve such diversion should at least provide in their investment budget, funds for afforestation.[4]

India is a place of recognizing the nature and natural resources as sacred and, therefore, vast majority of the people do believe in protection and conservation of natural environment. Indian ethos is enshrined in the Constitution of India[5] in the form of constitutional obligation of the state and fundamental duties of the citizens referring to protection of natural environment. Protection of environment, and particularly safeguarding of forests, is a constitutional goal of the country that would help in containing the climate change and conservation of biodiversity.On the other hand, a coexisting duty has also been cast on the citizens of the country to follow sustainable conduct oriented to the protection and improvement of environment and the forests and have compassion for living creatures. These constitutional provisions do reflect the state's concern and the citizens' aspiration towards the protection of environment and mandate both the actors to do positive and restrict the activities and interventions inducing and causing negative impacts on climate and the biotic diversities. Such alarming call has been given to the nation about sixteen years before the matter was taken up by the international community for the whole world. The apex court in India has been referring to these provisions in almost all the cases since 1985, relating to environment protection and conservation of the forests and, thus, has highlighted their importance in state's planning relating to development and the individual's outlook towards the environment.

Legislative and administrative measures

Following the constitutional trend and in pursuance of various declarations, conventions, and instruments adopted by the international community, India has been proactive in the formulation of

[1] National Environment Policy 3 (2006).
[2] National Forest Policy 3 (1988).
[3] Supra note 22 at 30
[4] Supra note 39 at 6.
[5] First Constitution in the world providing for environmental protection. Constitutional amendment was brought in the year 1976, inserting arts. 48A and 51A(g). Art. 48A states

policy intobinding rules of conduct as well constitution of various authorities to execute and achieve the goal of reduction of GHGs emission and protection of endangered species in the country. A survey of the legislations enacted by Parliament with respect to environment points out its concern and outlook to climate change and protection of the biodiversity. The following outline of such legislations shall substantiate the point.

The Wild Life (Protection) Act, 1972

The act is first of its kind, providing for the protection to wild animals, birds and plants, introduced and enforced at the time when there was no discussion on the climate change and conservation of the biodiversity drawing worldwide focus until 1992. Hunting of wild animals specified in schedules is prohibited[6] unless the animals has become dangerous to human life or is so disabled or diseased as to be beyond recovery or is required for education or research purposes. Further, the act prohibits picking, uprooting, damaging, acquiring or collecting any specified plant[7] from any forest land unless permitted by the concerned authority for certain definite purposes. The central and the state governments may, by notification, declare any area as sanctuary[8] or park[9] if the area is of adequate ecological, faunal, floral, geo-morphological or of natural significance, for the purpose of protecting, propagating or developing wild life or its environment. The act lays down for in-situ conservation as well as ex-situ conservation.

The Air (Prevention and Control of Pollution) Act 1981

The Act provides for prevention, control and abatement of air pollution with a broader approach for the preservation of natural resources of the earthincluding the preservation of quality of air and establishment of air pollution control boards to carry out the objects. It says that "emission" means any solid or liquid or gaseous substance coming out of any chimney, duct or flue or any other outlet. The boards are authorized to lay down standards for emission of air pollutants into the atmosphere from industrial plants, automobiles or from any other source not being ship or an aircraft. The boards are empowered to issue directions to the persons violating the law and also lodge complaints against such persons in a court of law.

The Environment (Protection) Act 1986:

After the speciallegislations, i.e. aforesaid the Air Act, 1981 and the Water Act, 1974 dealing with the respective pollution problems, it was found that therewere still areas left out of their contours and the environment could not be protected due to activities not directly connected to water and air pollution, there were no provisions demanding some affirmative actions to improve the quality of the environment. The Act of 1986 is a comprehensive legislation empowering the central government to take measures to protect and improve the quality of environment by constituting authority / authorities[10]. Further, the Act empowers[11] the central government to make rules for carrying out the purposes of the

[6] S. 9.
[7] S. 17A
[8] S. 18
[9] S. 35
[10] S. 3 (3).
[11] S. 25.

Act. By invoking these provisions, the central government has constituted several authorities[12] with different term of references to lessen the pollution load and also suggest viable options to avoid the impact of restrictions imposed to protect and improve the environment. One of such authorities is the central empowered committee constituted in 2002 to recommend the clearance of big projects involving exploitation of natural resources like mining and forests. Under the rule making power, the central government, has made rules and regulations including concern of biological diversity,[13] giving the Act a status of umbrella legislation. The Act, therefore, is highly significant to prevent and control the climate change.

The Forest (Conservation) Act, 1980

Forests have been identified richest source, amongst the natural resources, to be exploited for commercial gain as well as for the infrastructure development by the colonial rulers. In this process, the vision for sustenance of natural environment did not find any place resulting into loss at the speed higher than the capacity to regenerate. The British in order to monopolize the control over forest, introduced the Forest Act, 1865, having right of ownership denying others and the power to protect the same. Such protectionist approach failed because the local people lost interest in taking care of the forests as they were not the beneficiaries. Post-colonial government continued the practice[14] until it was realized to have a law in the form of Forest (Conservation) Act in 1980 providing for the conservation of forests. The underlining object of the law is to impose restrictions on use of forest land for non-forest purpose and to protect and conserve the green cover essential for the trapping of carbon dioxide.

The Biological Diversity Act, 2002

India is one of the few countries[15] to have enacted such a legislation. The Union Ministry of Environment and Forests (MoEF), the nodal agency for implementing provisions of CBD, has developed a strategy for biodiversity conservation at macro-level in 1999 and enacted the Biological Diversity Act in 2002. The Act provides for conservation of biodiversity within species, between species, ecosystem and the traditional knowledge connected therewith. This Act primarily aims at giving effect to the provisions of CBD, i.e. conservation of biological diversity, sustainable use of its components and fair and equitable sharing of the benefits arising out of utilization of genetic resources, and regulates access to biological resources and associated traditional knowledge. Under the law, three-tier regulatory authorities at the level of centre, state and down to the local bodies are constituted for effective enforcement. Another very significant feature of the Act is laying down the duty[16] of the central government to develop national strategies, plans, programmes for the conservation, promotion and sustainable use of biological diversity including measures for identification and monitoring of areas rich in biological resources. It speaks of promotion of in situ and ex-situ conservation of biological resources, incentives for research, training and public education to increaseawareness with respect to biodiversity. Under Section 37, the stategovernment may, in consultation with the local bodies, notify areas of biodiversity importance as

[12] The Environment Pollution (Prevention and Control) Authority, Loss of Ecology (Prevention and Payment of Compensation) Authority, EnvironmentImpact Assessment Authority, *etc*.
[13] The Environment Impact Assessment Regulation, 2006, makes mandatory for the proponent of the project, under para. 6 read with appendix II, to point out categorically about threat to biodiversity and energy conservation.
[14] National Forest Policy, 1952, the first forest policy in independent India
[15] National Biodiversity Action Plan, MoEF, 2008, p. 5.
[16] S. 36

biodiversity heritage sites.

The Scheduled Tribe and other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

The Forest Rights Act has forced some changes on this front because it explicitly identifies community based conservation as a legitimate right. The Act has also specific provisions for empowering those who hold forest rights, checking activities detrimental to the forest and biodiversity.[17] The forest people and the forest have inalienable linkages and, having regard to the symbiotic relationship between the tribal people and forests, the primary task of allagencies responsible for forest management should be to associate the tribal people closely in protection, regeneration and development of forests. And also focus special attention to the alternative sources of domestic energy on a subsidized basis to reduce pressure on the existing forest areas. The holders of customary rights and concessions in forest are motivated to identify themselves with the protection, conservation and development of forests from which they derive out livelihood and benefit and in return they must keep the biodiversity intact.

Judicial approach

The Supreme Court has been very vigilant and sensitive on the matter of environment in last few decades of the twentieth century and introduced several basic principles of environmental law emphasizing the need to preserve the environment - "there should not be development at the cost of environment and vice versa".[18] The court endorsed Principle 3 of the Rio Declaration stating as the right to development must be fulfilled so as to equitably meet developmental and environmental needs of the present and future generation. The principle of sustainable development encompasses all the socio-economic and the cultural activities and the ecosystem that needs to develop in harmony. The concern of climate change and conservation of biodiversity are the offshoots of principle of sustainable development and, therefore, the Indian judiciary pre-empts the issue foreseeing the irreparable loss to the mankind. The Supreme Court, acknowledging the fact of global warming due to industrialization, burning of fossil fuels and massive deforestation, has cautioned that the "global warming is expected to profoundly affect species and ecosystem".[19] The court further planted[20] the concept of public trusteeshipas a core principle for the protection of natural resources of the land andsea in the corpus of Indian environmental law. The public trust doctrine primarily rests on the principle that natural resources have a great importance to the people and, therefore, it enjoins upon the government and its instrumentalities to protect the resources for the general public.The public trust doctrine is an affirmation of the duty of the state to protect the people's common heritage of the components of environment.

Conclusion and Suggestions

The grasping of Climate Change Law in India in light of the broad legal framework as stated above is insufficient to explain the ambit of legal provisions. This is evident to show how scattered and piecemeal is the Climate Change Law regime in India. No doubt the extent and nature of the Climate

[17] S. 5.
[18] Indian Council for Enviro-legal Action v. Union of India (1996) 5 SCC 281 at 296.
[19] Karnataka Industrial Area Development Board v. C. Kenchappa (2006) 6 SCC 371 at380.
[20] M. C. Mehta v. Kamal Nath (1997) 1 SCC 388.

Change is inherently quite extensive and omnipresent. However, the nature of the phenomenon is not the reason why the legislation pertaining to Climate Change in India is scattered. India until now has been reactive or responsive to the climate change concerns. But it is high time that all these concerns have to be dealt with not merely by comprehensive norms and plans. It has to be dealt with under the aegis of a legislative enactment to make it more effective and result oriented. An un- successful attempt was made by a private member to propose an enactment for laying down Climate Change Legislation in India in 2012. This attempt though unsuccessful, is a torch bearer towards the efficient solution for the climate change problems in India.

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