Two Days Virtual International Conference
on

EMERGING ENVIRONMENTAL ISSUES AND CHALLENGES

February, 11th & 12th, 2022

Conference Proceeding

Organised By

Shillong Law College NSS Unit, Meghalaya, India

in collaboration with

Phuket Rajabhat University, Phuket - Thailand

Supported by :

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Shillong Law College, Dhankheti, Shillong

East Khasi Hills District, Meghalaya, INDIA

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DATED: 11/02/2022

MESSAGE

It gives me immense pleasure to know that the Shillong Law College NSS unit in collaboration with the Phuket University, Thailand is organising two days virtual International Conference on the theme "**Emerging Environmental Issues and Challenges"** on the 11th and 12th February, 2022. This International Conference will have participants from various researchers, academicians and other social scientist having vast knowledge on environmental issues. I believe this International Conference will encourage and help to gain new insightful knowledge in the field of environment.

I hope all the participants will enjoy this conference.

I extend my greetings and good wishes to the Organising Committee and the participants a great success.

Shri W. Khyllep (Retd IAS officer)

President Governing Body

Shillong Law College

DATED: 11/02/2022

MESSAGE

I am delighted to know that the Shillong Law College NSS unit in collaboration with the Phuket University, Thailand is organising a Virtual International Conference on the theme ***Emerging Environmental Issues and Challenges*** on the 11th and 12th February, 2022. I am happy to learn that all the research papers will be published in the conference e-proceedings having an ISBN number.

I congratulate the Organising Committee for organising the virtual international conference on this very important theme. I am sure it will be widely discussed and exchange their knowledge and information during this International Conference.

I wish the Virtual International Conference a grand success.

Shri D.B Gurung

Secretary Governing Body

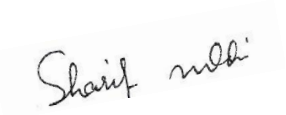
Shillong Law College

DATED: 11/02/2022

MESSAGE

I am happy to know that the NSS Unit of the Shillong Law College in collaboration with Phukhet Rajabhat University, is organizing an international Conference (virtual) on the 11th and 12th of February 2022 on the topic "Emerging Environmental Issues and Challenges" and trying to bring an abstract and Conference proceeding. I believe that the detailed papers to be presented will go to the depth and highlight many issues relating to the problems and contemporary issues on the global problems on environment which the mankind is facing
today.

I am sure that the conference will also highlight the legal issues involved to the issue of environment. I wish the conference all success.



Dr Sharif Uddin

Principal

Shillong Law College, Dhankheti

DATED: 11/02/2022

MESSAGE

I am glad to know that the Shillong Law College NSS Unit is organizing two days Virtual International Conference in Collaboration with Phukhet Rajabhat University Thailand, on the 11th and 12th February, 2022 on the topic "**Emerging Environmental Issues and Challenges"** and in this process is bringing out a Book of Abstract and Conference Proceeding. I reckon that the articles submitted in the conference will make the discussion more interesting. It is indeed a great pleasure to welcome all the participants to this conference.

I wish the Conference all Success

Dr. Mrinalini Kharshiing
Vice-Principal/Co-ordinator IQAC
Shillong Law College

DATED: 11/02/2022

MESSAGE

On behalf of the organizing committee of the virtual international conference on: 'Emerging Environmental Issues and Challenges', we would like to extend our warm welcome to all the presenters and participants and express our sincere gratitude to Chief Guest Prof (Dr.) Bajpai, Vice-Chancellor, Rajiv Gandhi National Law University, all the Resource Persons and chairperson of the conference.

This international conference is organised by the NSS (National Service Scheme Shillong Law College Unit in collaboration with the Phuket Rajabhat University Thailand. The objective of this conference is to bring Global awareness relating to environment and how to achieve the sustainable development goals in order to combat environmental issues by bringing together the researcher academician practitioner and educators to present their paper and share their valuable knowledge with recent innovative trends and latest technologies. The proceeding of this conference contains 30 papers which has been selected by the review committee. The selected paper will be presented during the conference.

We would like to express our sincere appreciation to the Phuket University Thailand, for their collaboration, Positive Energy Art Foundation and Cape Comorin Trust for their support, the NSS teams Shillong law College and the Organizing Committee for their endless effort in helping us to make this conference a success. We would also extend our appreciation to all the authors who contributed their excellent work for this international conference.

Last by not the least, we would like to thank the participants for attending the conference we hope you will learn and gain insightful knowledge from this conference

Daiahunlin Mawlong
Convener
Shillong Law College

Dr. Umeshwari dkhar
Organising Secretary
Shilllong Law College

ABOUT THE CONFERENCE

Environmental deteriorations were raised almost 50 years ago through the Stockholm Conference and various other international conferences. However, despite having various agreements, protocols, and conventions in order to safeguard the environment and to protect the future generations, nevertheless environmental concern is still the prevailing issue that the entire world is struggling. Thus, awareness relating to environmental issues is the need of the hour. This conference would try to emphasize the need of protecting the environment and also bring out various outputs and guidelines to bring about a conducive environment so as to achieve the sustainable development goals in order to combat environmental problems and its challenges. Hence, by bringing together the researchers, the academicians, the practitioners and the educators to present their papers, share their knowledge and discuss the most resent innovations, trends, and concerns as well as practical challenges encountered and solutions adopted in the field of environment. This is the right time to address new and emerging challenges that the environment is facing and to find solution to it.

MAIN THEME: EMERGING ENVIROMENTAL ISSUES AND CHALLENGES

SUB-THEMES:

1. CLIMATE CHANGE
2. SOLID WASTE MANAGEMENT
3. WILD LIFE
4. URBANIZATION
5. ENVIRONMENTAL POLICIES
6. INDUSTRALIZATION
7. OZONE DEPLETION
8. ENVIRONMENTAL PLANNING AND MANAGEMENT
9. ROLE OF LOCAL GOVERNMENT IN PROTECTING THE ENVIRONMENT
10. E-WASTE MANAGEMENT

FUNDAMENTAL DUTIES UNDER THE CONSTITUTION OF INDIA AND ITS ROLE IN PROTECTING WILDLIFE: A CRITICAL ANALYSIS

Mrs. Rajput Shraddha Bhausingh[1]

ABSTRACT

The main objective of this paper is to address the issues which are alarmingly arising against wildlife in India. It is a matter of great concern that as we are progressing, we are neglecting our duties in uplifting our care towards mother earth. The Indian Constitution promotes and develops a concern towards the environment through different provisions like, under fundamental rights, fundamental duties etc. and Judiciary has always played a very active role in interpreting the environmental issues liberally to achieve its best results. One must recognize that duties always has served as the foundation for all basic applications of laws around the world.

The paper will emphasize the significance and role of redefining the environmental consciousness through fundamental duties in India and how they would be instrumental in protecting wildlife and creating a duty-oriented society so that citizens could perform their duties towards the environment. The paper will cover subtitles such as the relevance of the concept of duty, its significance, evolving concepts of duty, people's roles in protecting wildlife, issues relating to wildlife and so on. The study is doctrinal in nature and is based on primary and secondary data. Finally, based on the findings of the study, the researcher concluded that rich wildlife can only be saved if everyone understands their value and consciously follow the conservation of wildlife as their fundamental duty under India Constitution.

Keywords: Duty, Environment, Wildlife

Introduction

The environment and environmental assets are crucial not only for fulfilling the fundamental requirements of humans but also for the survival of all living species. Mother Earth which we call our home is remarkable because it is the only planet in the universe where life is proven to exist. The equilibrium among the many elements of the environment and natural resources is a vital requirement to preserve the environmental integrity and the existing capability of Mother Earth. In ancient India, the inter-relation between the different life-forms, living

[1] Assistant Professor (Law), Hidayatullah National Law University, Nava Raipur, Chhattisgarh.

creatures and ecosystems was recognized quite thoroughly and it was viewed as a holy duty to protect and maintain nature. Earth was adored and people expressed love and affection towards Mother Nature for centuries together.

Every component of the ecosystem is crucial, and one of the most significant is the wildlife that inhabits it. Wildlife and their habitats play an important role in our cultural and spiritual traditions. Our behaviour towards animals, which covers a wide range of species, has fallen well short of what should have been expected. It is widely acknowledged that the safeguarding of wildlife is somewhat necessary not only for the existence of animals, as well as for the existence of humankind. Environmentalists are getting deeply concerned as the number of species on the planet continues to decline. Long after independence, the country's plants and animals came to public attention.

The phrase 'Wildlife' is a subset of the term 'Biodiversity' which can be represented as a more generic term. The phrase "biodiversity" consists of a variety of living forms that exist, ranging from genes to whole species towards more global scale ecosystems. In other words, it refers to the heterogeneity of living species, as well as their interactions with one another. Genetic differences, and thus variances in the ecosystems in which they live, are analyzed. Earth's living bounty is a source of great joy in the ending of millennia of evolutionary development[1]. Economic progress has become such a dominating component of modern society that people have lost sight of their duties towards Mother Nature. Resources are treated as basic commodities, and economic development is pursued in with little consideration for the environment's negative consequences. Acid rain, global warming, climate change, biodiversity loss, thinning of the ozone layer, protection of wildlife and other issues threaten to wipe out all life on this planet if they aren't addressed by the human race. A 'Human Right' to the environment has arisen at the international level and is recognized in many nations, including India, to preserve the environment from degradation.

Meaning and Significance of Wildlife in India

The term "wildlife" (written as a set of words) was coined by the eminent *American Zoologist William Temple Hornaday* in his book[2] "*Our Vanishing Wild Life* (Its Extermination and

[1] Vikas Kumar Soni, *Analysis and Evaluation of Wildlife Conservation Laws and Policies in India*, 7 INT. J. RES. ANAL. REV. (IJR 867–870 (2021), https://www.researchgate.net/publication/349099067_Analysis_and_Evaluation_of_Wildlife_Conservation_Laws_and_Policies_in_India (last visited Jan 24, 2022).

[2] Wildlife Crime Investigation, (2013), http://wccb.gov.in/WriteReadData/userfiles/file/Wildlife Crime Investigation Manual.pdf (last visited Jan 24, 2022).

Preservation)" published in 1913[1]. It wasn't until the 1930s that the term "wildlife," transcribed as a single word, became widely used in everyday speech. The term "wildlife" refers to the native wild animals and plants of a territory. Section 2(37) of *the Wild Life (Protection) Act, 1972*[2] states that "wildlife" includes any animal, aquatic or terrestrial plant that is a component of any environment and is protected under the Act. Wildlife in India is a priceless treasure from nature, boasting a vast variety of plants and animals that is second to none. India is a land that is home to some of the world's most diverse ecosystems, making it a biodiversity hotspot. A diverse range of flora and fauna may be found in this country, as well as a diverse wide variety of habitats.[3] According to Valmik Thapar[4], there were 13,000 species[5] of blooming plants and 65,000 species of animals in India in 1997, including fish, birds, and mammals[6], and[7] this number is expected to rise[8].

In light of the Constitution's provision, wildlife's significance should be considered. Protecting the environment and preserving animals and forests are mentioned in India's Constitution's Directive Principles of State[9] Policy[10] (Article 48 A)[11]. To maintain and develop nature, including forests, lakes, rivers, and animals, every citizen has a fundamental duty under Article 51 A (g) of the Constitution[12]. Consequences of cruelty to animals are included in the seventh schedule of India's constitution under Article 246 (List -III). Forests wild animals and birds are also included in the seventh schedule.

Wild animals and plants can be described as being taken, owned, traded, moved, handled, or consumed illegally under any international, regional or national[13] laws. Animal cruelty and animal persecution are sometimes included in this interpretation. Many countries and regions

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[1] *Id.*
[2] *Id.*
[3] Soni, *supra* note 2.
[4] Wild life Protection: Legislative and Judicial Response, , https://www.legalserviceindia.com/articles/wild.htm (last visited Jan 24, 2022).
[5] *Id.*
[6] Constitutional provisions for protection of Environment, , https://www.legalserviceindia.com/legal/article-3906-constitutional-provisions-for-protection-of-environment.html (last visited Jan 24, 2022).
[7] *Id.*
[8] Wild life Protection: Legislative and Judicial Response, *supra* note 7.
[9] Tamil Nadu govt orders closure of Sterlite Copper plant in Thoothukudi | Latest News India - Hindustan Times, , https://widgets.hindustantimes.com/india-news/panneerselvam-says-sterlite-copper-plant-in-thoothukudi-will-be-closed/story-XVfUPpHuNcmVlocOANByGM.html (last visited Jan 24, 2022).
[10] PROTECTION OF WILDLIFE AND LEGISLATIVE CONSCIOUSNESS IN INDIA: A CRITICAL ANALYSIS - FastForward Justice, , https://fastforwardjustice.com/protection-of-wildlife-and-legislative-consciousness-in-india-a-critical-analysis/ (last visited Jan 24, 2022).
[11] Tamil Nadu govt orders closure of Sterlite Copper plant in Thoothukudi | Latest News India - Hindustan Times, *supra* note 12.
[12] Environmental Law And Policy., (2017).
[13] Wildlife Crime Investigation, *supra* note 3.

have been affected by wildlife crimes, even if they don't directly target wild animals or plants. The constitutional duty makes it quite clear that wildlife is a significant part of our national heritage. As a result, wildlife crimes have harmed the country as well as the animals themselves. Illegal wildlife trading is a severe economic offence since it involves large sums of money. The most common wildlife crimes are unlawful hunting and the illegal sale of wildlife. Preparation, possession, transportation, and processing are all supplementary offences that do not fall under a specific crime. Wildlife criminals are separated into two groups: those who kill or capture wild animals or collect wild[1] plants[2], and those who buy the products of their efforts either for individual consumption or for commercial purposes, such as trophies, skins, and furs. Wildlife traffickers are the most powerful and well-organized section of the illegal wildlife trade. Organised groups of wildlife criminals operate throughout the world, maximising their profits by committing as many crimes as possible. When people think about poaching, they generally picture acts of brutality. Weaponry has long been used to hunt for ivory, rhino horns, and other valuable items, which can lead to human deaths. Poaching of other species, such as snakes, orchids, turtles, and so on, when it comes to identifying large valued species, more emphasis is placed on technological ability. Poachers in India are usually compelled to act because of the country's severe economic position. There are many similarities between wildlife crime and other types of crime like as murder, theft, and drug trafficking, yet they are distinct:

Crimes against wildlife are site-specific. To perpetuate a wildlife crime, the perpetrator must always go to the location where the desired animal is present. Wildlife infractions were not criminalized until the Wild Life (Protection) Act of 1972[3] was passed. In the past, hunting was a noble pastime and a source of pride for the aristocracy. The great hunters of their era were once hailed as heroes. Crimes against animals don't impact or annoy the general public, according to iii. Conventional crimes like murder and theft elicit a sense of terror in the hearts of individuals because the public is outraged by such crimes and wants to see them stopped, which helps to discourage such illegal acts from occurring. Criminal acts committed against animals do not result in this outcome.

[1] *Id.*
[2] Wild life Protection: Legislative and Judicial Response, *supra* note 7.
[3] SHYAM DIVAN & ARMIN ROSENCRANZ, ENVIRONMENTAL LAW AND POLICY IN INDIA (Second ed.), https://archive.org/stream/in.ernet.dli.2015.474253/2015.474253.Environmental-Law_djvu.txt (last visited Jan 24, 2022).

Fundamental Duty to Protect the Environment under Indian Constitution

The 'Right to the Environment' is viewed as the most important issue. It is also significant to address the 'Duty to Protect the Environment.' Articles 48 A and 51 A (g) of the Indian Constitution address the obligation of the state and the obligation of individuals to safeguard the environment, accordingly, as Directive Principles of State Policy[1] and Fundamental Duties[2]. It is essential to evaluate the extent to which the state and citizens in the current context see the need to safeguard the environment as a spiritual duty. It is also important to look at the challenges of implementing environmental protection laws and come up with workable alternatives. This article examines the Indian Constitution's fundamental duty to safeguard the wildlife, the problems in executing it, and recommendations for implementing the divine duty to protect the wildlife and environment in today's world.

The Indian Parliament passed a historic amendment *42nd Constitution Amendment Act, 1976*. The significance of the constitutional amendment is that India has adopted a comprehensive strategy to deal with Environment. On the one hand, it recognizes the obligation of the state and its institution to protect and improve Environment and on the other hand, considers the obligation of the state and its institutions as insufficient to achieve the goal of protection and improvement of the Environment. Therefore, it tries to place fundamental duties on the shoulders of Indian residents to maintain and develop the natural environment. In other words, it is through the efforts of the Government and the participation of Citizens, the environment needs to be protected and secured. Article 48 A directs the state*, "The state shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country."*

Whereas Article 51 A (g) directs that it shall be a fundamental duty of the citizen of India, "*To protect and improve the Natural Environment including forests, lakes, rivers and wildlife and to have compassion for living creatures*." The Constitution of India thus also lays down the environmental goals. However, the reading of the Clause of Article 48 A as well as Article 51 A is rightly silent on the issues of concrete steps that are required to be taken for the implementation of goal contain in Article 48 A and discharge of fundamental duty under Article 51 A (g). In other words, the adoption and elaboration of practical measures are left to be worked out by the Government of the day having regard to the situation prevailing at a given point of time.

[1] Religious Freedom And Environmental Protection - Academike, , https://www.lawctopus.com/academike/religious-freedom-environmental-protection/ (last visited Jan 24, 2022).
[2] *Id.*

The Judiciary has dynamically interpreted these provisions to protect the environment and natural resources in India. The Madras High Court in ***M.K. Janardhanam* v. *District Collector, Tiruvallur***[1] observed that "the phrase used (in Articles 48 A and 51 A is 'protect and improve', which implies that the phrase appears to contemplate affirmative governmental action to improve the quality of the environment and not just to preserve the environment in its degraded form." The Supreme Court in ***M.C. Mehta v. Union of India***[2] these directive principles of state policy (Articles 39(b), 47, and 48 A) individually and jointly establish a duty on the state to generate circumstances for the improvement of the overall health value in the nation, as well as to safeguard and develop the natural environment," the court concluded. The language of Article 48-A has been used by the courts to assist them in several recent environmental issues. The Supreme Court has held, if an environmental issue is presented before the Court, it is required to take Article 48-A and Article 51-A (g) of the Constitution into consideration. When required to give execution to the Directive Principles of State Policy and the Fundamental Duties of all citizens[3], a court must not be behind and assert that goals which are a matter of public policy and, and so, are a matter for the policymaking authorities. In the simplest case, the court can only inquire as to whether acceptable factors have been factored in and if irrelevant issues have been eliminated. In inappropriate situations, the court may go farther, but how far the court will go will be determined by the facts of the case. Any relevant directives may be given by the court. It is not the court's intention to strike a dynamic equilibrium between the many factors at play. The court may believe that it is entitled in accepting the conclusion of the proper authorities where the matter requires a delicate balance of appropriate circumstances.

Fundamental Duties Under the Constitution of India and Its Role in Protecting Wildlife

Articles 48, 48-A, and 51-A (g) of the Constitution mandate for the establishment of a constitutional framework for the protection and improvement of the environment. Article 48-A has used the terms "environment, forests and wildlife". The presence of these three components in one position merely indicates that they are all interconnected. It is vital to conserve and develop the environment to ensure the survival of forests and wildlife, which then, in turn, serves to preserve and enhance the overall ecosystem. Forests and wildlife are inextricably linked and symbiotic with one another. They protect each other, the provisions of Article 48 (organization of agriculture and animal husbandry) and Article 48-A and their spirit have been the status of

[1] S. Shanthakumar's, *Introduction to Environmental Law* 86 (Butterworths Wadhawa, Nagpur 2010).
[2] 2002 (4) SCC 356, Also see, *Virender Gaur* v. *State of Haryana* 1995 (2) SCC 571, 580; *Sitaram Chhaparia* v. *State of Bihar* AIR 2002 Patna 134.
[3] *T.N. Godavarman Thirumalpad v. Union of India & Others* (2002) 10 SCC 606

fundamental duty in Article 51-A (g). Thus, states and individuals are all under a fundamental commitment to maintain and develop the ecosystem, which includes the preservation of wildlife, according to the Constitution. But the spirit of Article 48 (to protect cows and calves and other milch and draught cattle) has found expression in Article 51-A (g) in the words "to have compassion for living creatures".

Conclusion and Suggestions

Since the inception of human history, the environment and natural resources have played a vital role in sustaining life and catering to the needs of humankind. They are an asset and property of future generations and must be protected and utilized sustainably for improving the quality of life of all individuals. We believe in a harmonious interaction between humans and the rest of the ecosystem, which is reflected in our Constitution. It jeopardizes our sensitive relationship with other living things and contradicts our most basic human ideals of compassion, sympathy, and regard. It is difficult to reconcile conflicting values, such as human well-being with the preservation of biodiversity and ecosystems and wildlife when it comes to managing and using wild animals. The policy will be determined by the order in which these various values are prioritized. We should plant more trees and respect all living species around us. Despite this, we believe that rigorous evaluation of the concepts at issue should drive thorough discourse regarding the same, for example, whether continual human engagement in conservation areas and other wild regions is acceptable, and what constitutes "good" and "bad" human impacts concerning wildlife.[1]We should create awareness overall in people for following fundamental duties for bright future of nature and nation.

[1] Ethics of Wildlife Management and Conservation: What Should We Try to Protect? | Learn Science at Scitable, , https://www.nature.com/scitable/knowledge/library/ethics-of-wildlife-management-and-conservation-what-80060473/ (last visited Jan 24, 2022).

QUEST FOR SPIRITUAL ECOLOGY AS WAYS OF ENVIRONMENTAL CONSERVATIONALISM IN MAMANG DAI'S THE VOICE OF THE MOUNTAIN

Rik Sarkar[1]

ABSTRACT

Contemporary research in the field of Environmental Studies has given rise to a host of discourses about nature and environment in a way that facilitates a kind of multidisciplinary approach embracing principles from divergent fields of study in tackling environmental issues of our present times. Spiritual ecology, as a subset of environmental studies, is an emerging field of academic study that deals with the intersection between ecology and religion that calls for a moral and spiritual response to current ecological crisis. Its exhortation to experience a deep, lived connection with the planet, vibrant and living at the same time, stems from a cynical awareness about the development in the field of science and technology that has largely contributed in precipitating planetary crisis. It is in this sense that the poetry of Mamang Dai is infused with a keen awareness of the existence of all living organism, the guiding spirit that animates earth. Her Poem *The Voice of the Mountain* interfuses elements of mysticism surrounding the sacred mountain with local folklore and myth to pose important questions about Environmental Conservationism. The present paper attempts to deal with the quest for spiritual ecology as ways of environmental conversationalist in the selected works of Mamang Dai.

Keywords: Ecology, Religion, Spirituality, Environment, Conservationism,

Introduction

Spiritual ecology, as a fast-emerging field of academic study, deals with the intersections between religion, conservation in that it recognizes the fact that there is a spiritual facet to all issues related to conservation, environmentalism. While analyzing spiritual ecology, one of its leading practitioner, Llwwellyn Vaughan-Lee, also a lineage holder of the Naqshbandiyya-Mujaddidiya Sufi order, argues that our present ecological crisis is rooted in urgent spiritual questions. It is a challenge to bring humanity back humanity back into harmony with the life-systems that support us. One of the response to present planetary crisis is "greening the economy" which looks to technological innovation to ensure sustainable development without degrading

[1] Assistant Professor in English, Seva Bharati Mahavidyalaya, Kapgari, Jhargram, West Bengal.

nature further. But it sidesteps a deeper questions that suggests our present ecological crisis requires a spiritual and moral response. Incidentally, this sentiment was similarly echoed by Pope Francis in his second encyclical entitled *Laudato si*' which has the subtitle "on care for our common home", which underlies the need to look at the spiritual and moral issues wrought about by the unprecedented destruction of eco-systems we are inflicting upon the earth. Native American faith keeper Chief Oren Lyons stressed upon the role of Thanksgiving and the spiritual laws as response to present ecological crisis. To put it in the word of the Buddhist activist Joana Mercy as she says "as your heart breaks open there will be room for the world to heal" referring to the unmitigated destruction caused by human action.

It is against the backdrop of such an understanding of spiritual ecology, we need to look at the poetry of Mamang Dai as she employs certain elemental symbols found in nature. Her poetry is "The Poetry of the Earth" to quote the title of John Keats's poem. A poet, novelist and journalist, Mamang Dai who belongs to the Adi tribe, left a lucrative job of the Indian Administrative Service to pursue a career in poetry, has always unequivocally stressed the role the geography, landscape, myths and stories have played in shaping her poetic sensibility. Carefully building a narrative away from the scourge of insurgency and militancy, she writes of the elements of nature like clouds, rivers, mountains- together they form a 'homeland' in spiritual sense. In fact, this tendency to mystify nature is a common element in many of the writers hailing from the North-east including Temusla Ao, Mona Zete.

In *The Voice of the Mountain*, Dai says that the mountain can identify with the desert and the rain. The recreation of the past is made possible by the mountain. The mountains know the clouds intimately and have a clear inkling of the impending rain. Thus, geographical concepts of mountain as a bearer of rain and rain-shedding natural structures are interlinked with the philosophy of hill tribes. In *The Nature Faith and Worship among Adis*, Dai has remarked that the great forest, the mountains and environment has shaped the consciousness of the Adi people intrinsic to their spiritual world-view. What Mamang Dai seems to suggest through her poetry that the kinship of human beings extends to other species and elements and to quote a few lines from Dai's poem *Birthplace*:

"We are the children of the Rain

of the cloud woman

brother to the stone and the bat

in our cradle of bamboo…" (2013, 1-7)

This, by objectifying non-human forces and species, and also by deifying nature, Dai seems to point towards an ecological vision where the hierarchy between human and non-human forces are abolished and the relationship between them is one of equality. In envisioning such an egalitarian ecological society, Dai is also critical of the concept of development, materialism and utter disregard for non-human forces. 'Deep Ecology' as scholars put it is an outright repudiation of the anthropocentric and hierarchical human outlook with the solution of eco-criticsm with moral and spiritual underpinnings. Therefore, Mamang Dai's approach to nature as a poet belonging to the Adi community, identifying herself with their world-view, system of belief, is one of spiritual reciprocity, to promote and uphold a harmonious relationship among all species.

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A JURISPRUDENTIAL STUDY ON CLIMATE CHANGE, INDIAN LAWS AND ROLE OF JUDICIARY

Priyam Priyadarshini Goswami[2]

ABSTRACT

Climate change is normally known as any long-term significant change in the climate over a period of time, caused by nature or human activities. Climate change is already happening and represents one of the greatest environmental, social and economic threats facing the planet. India is one of the most vulnerable countries to climate change and third largest emitter of greenhouse gases in the world after China and the United States.

The European Union has long been at the forefront of international efforts to combat climate change and was instrumental in the development of the two United Nations climate treaties.

In India even before the independence several environmental legislations existed for protection of environment, but the real impetus for bringing about a well-developed framework came only after the UN Conference on the Human Environment held on in June, 1972 at Stockholm. Under the influence of this Conference, the National Council for Environmental Policy and Planning was set up in the year 1972. After the Stockholm Conference, in 1976, constitutional sanction was given to environmental concerns through the 42nd Amendment.

In this article an attempt is made to discuss the various issues of climate change, role of Indian Judiciary to deal with the problem of climate change and Indian laws.

Keywords- Climate change, greenhouse gases, environmental legislations, Environmental Policy, judiciary.

Introduction:

Climate change is normally known as any long-term significant change in the climate over a period of time, caused by nature or human activities. Climate change is already happening and represents one of the greatest environmental, social and economic threats facing the planet. India

[2] Assistant Professor, University Law College, Gauhati University

is one of the most vulnerable countries to climate change and third largest emitter of greenhouse gases in the world after China and the United States.

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1.1 WHAT IS CLIMATE?

The climate refers to the sum total of weather conditions and variations over a large area for a long period of time. A description of a climate includes information on, e.g. the average temperature in different seasons, rainfall, and sunshine etc. [3]

There are approximately five main climate types on Earth-

- Tropical
- Dry
- Temperate
- Continental
- Polar

1.2. METHODOLOGY

The present study is doctrinal in nature. It is based on the primary sources like statutes, case laws, international treaties, and secondary sources like text books, journals, articles and internets. This research paper is mainly based on thorough analysis of various laws adopted by India for the protection climate change.X

[3] Available at-Avahttps://www.climateurope.eu/what-is-climate-and-climate-change/,visited on-15-01-2022

1.3. OBJECTIVES OF THE STUDY

The research has been carried out by the author bearing in mind the following objectives-

a) To search India's International obligations for protection of Climate change.
b) To examine the existing legal framework on climate change in India.
c) To analyze the Constitutional commitment to protect the climate.
d) To analyze **effects of climatic change .**
e) To examine the role of Indian Judiciary.
f) To scrutinize The Air (Prevention and Control of Pollution) Act 1981.

1.4 ABOUT CLIMATE CHANGE

To understand climate change, we first need to understand the difference between weather and climate.

Weather refers to the actual atmospheric conditions that are being experienced now. It also includes changes that are forecast over the next few days, for example, in temperature and rainfall.

On the other hand Climate refers to the kind of weather that's typically expected in a region. This includes describing the range of conditions that are possible.[4]

Climate change is a long-term shift in the average weather conditions of a region, such as its typical temperature, rainfall, and windiness.[5]

1.5 REASON OF CLIMATE CHANGE

Although there are hundreds of reason for the climatic change we are only going to discuss the natural and manmade reasons-

1.5.1 Natural Reasons

These include- volcanic eruption, solar radiation, tectonic plate movement, orbital variations.

[4] Available at -https://www.canada.ca/en/environment-climate-change/services/climate-change/canadian-centre-climate-services/basics/concepts.html ,visited on-15-01-2022

[5] Ibid

Due to these activities, the geographical condition of an area becomes quite harmful for life to survive. Also, these activities raise the temperature of the earth to a great extent causing an imbalance in nature.

1.5.2 Human Reasons

Man, due to his need and greed has done many activities that not only harm the environment but himself too. Many plant and animal species go extinct due to human activity.

Human activities that harm the climate include- deforestation, using fossil fuel, industrial waste, a different type of pollution and many more.

All these things damage the climate and ecosystem very badly. And many species of animals and birds got extinct or on a verge of extinction due to hunting.

1.6 EFFECTS OF CLIMATIC CHANGE

The climatic changes have a negative impact on the environment. The ocean level is rising, glaciers are melting, CO2 in the air is increasing, forest and wildlife are declining, and water life is also getting disturbed due to climatic changes.

Apart from that, it is calculated that if this change keeps on going then many species of plants and animals will get extinct. And there will be a heavy loss to the environment.

1.7 EXISTING LEGAL FRAMEWORK ON CLIMATE CHANGE IN INDIA

There is no specific legislations in India in place to combat the effects of climate change.

Hence, in the absence of a specific law, the most crucial legislation that comes close to tackling the problem of climate change is The Air (Prevention and Control of Pollution) Act 1981.

The Air (Prevention and Control of Pollution) Act 1981[6] is enacted by the Parliament under Article 253 of the Constitution of India.[7]

The fundamental objective of The Air (Prevention and Control of Pollution) Act 1981, is to provide clean air to the citizens and main objectives are-

a) It provides that the air pollution in any way be prevented and controlled.

b) It also provides that air must be restored and maintained for future use.

It is also a comprehensive legislation with more than fifty sections. It makes provisions, interalia, for Central and State Boards, power to declare pollution control areas, restrictions on certain industrial units, authority of the Boards to limit emission of air pollutants, power of entry, inspection, taking samples and analysis, penalties, offences by companies and Government and cognizance of offences etc.

The Air (Prevention and Control of Pollution) Act 1981 is important in the sense that, it provides for the prevention, control and abatement of air pollution as the presence of air pollutants in the atmosphere is injurious to human beings or other living creatures and plants.[8]

Thus, by talking of a direct link between air pollution and its effect on the whole environment, the Air (Prevention and Control of Pollution) Act 1981 addresses a key area related to climate change. The Air Act, however, does not mention the term 'Climate Change'.[9]

The State boards in consultation with the Central boards can also lay down standards for emission of air pollutants from plants and automobiles.[10]

Further, under the Air Act, a Metropolitan Magistrate or Judicial Magistrate of First Class is empowered to restrain an air polluter from discharging emissions, after an application has been made by the Board and allows the Board to close down an industry, or withdraw its supply of power or water, if the directions of the Board are not followed.[11]

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[6] The Air (Prevention and Control of Pollution) Act 1981

[7] The Constitution of India, art 253. -"Legislation for giving effect to international agreements Notwithstanding anything in the foregoing 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."

[8] The Air (Prevention and Control of Pollution) Act 1981, sec. 2 (a).

[9] The Air (Prevention and Control of Pollution) Act 1981.

[10] The Air (Prevention and Control of Pollution) Act 1981, sec. 17 (1) (g).

[11] The Air (Prevention and Control of Pollution) Act 1981, sec. 22 A.

The parliament also passed the Water (Prevention and Control of Pollution) Act, 1974 prior to the Air Act.

The Water Act provides for the prevention and control of water pollution. [12] Note that, both Water and Air Act have similar provisions with respect to achieving their said objectives.[13]

After the Water and Air Act, the parliament enacted the Environment (Protection) Act, 1986 to fill in the gaps left in India's core body of environmental law. The purpose of the Environment (Protection) Act, 1986 is to provide for the protection and improvement of the environment.[14]

The Act covers all forms of pollution; air, water, soil and noise. It provides the safe standards for the presence of various pollutants in the environment. It prohibits the use of hazardous material unless prior permission is taken from the Central Government.

The Government can also lay down emission standards, which are to be found in the Schedules appended to the Environment (Protection) Rules, 1986.[15] Furthermore, the rules framed under the EPA also lay down emission norms for specific industries as well as general emission standards.[16]

The Central Government also enacted the Ozone Depleting Substances (Regulation and Control) Rules, 2000, in exercise of its powers conferred by Sections 6, 8 and 25 of the EPA.[17]

The rules prohibit any person from production and consumption of ozone depleting substances and from importing or exporting to any country without a license issued by the authority.[18]

Nonetheless, in the absence of a comprehensive legislation, as and when climate related claims have reached the courts, the judiciary has been proactive in protecting the environment. However, the number of climate-related claims reaching the courts is very less.[19]

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[12] The Water (Prevention and Control of Pollution) Act, 1974.
[13]https://eprints.lancs.ac.uk/id/eprint/125076/1/Climate_Change_And_Its_Impact_On_India_A_Comment.Pdf
[14]The Environment (Protection) Act, 1986
[15] The Environment (Protection) Rules, 1986, rule 3.
[16] ibid.
[17] The Ozone Depleting Substances (Regulation and Control) Rules, 2000.
[18] The Ozone Depleting Substances (Regulation and Control) Rules, 2000, rules 3, 4 and 5.
[19] Jolene Lin, Litigating Climate Change in Asia, (2014) 4 Climate Law 140, 146.

1.8 ROLE OF JUDICIARY

The Supreme Court of India by broadly construing the meaning of Article 21 of the Constitution has made an attempt to address challenges arising from climate change.[20]

Article21 of the Indian Constitution [21] has been held to include the right to enjoy pollution free air and water for full enjoyment of life.[22]

The Supreme Court in the Kedia Leather & Liquor Ltd., case held that, "environmental, ecological, air and water pollution amount to violation of the right to life assured by Article 21 of the Constitution. Hygienic environment is an integral facet of healthy life. Right to live with human dignity becomes illusory in the absence of humane and healthy environment."[23] "

In order to protect 'life', in order to protect 'environment' and in order to protect 'air, water and soil' from pollution, the Supreme Court, through its various judgments has given effect to the rights available to the citizens and persons alike, under Article 21.

In the matter of enforcement of fundamental rights under Article 21, under public law domain, the Court, in exercise of its powers under Article 32, has awarded damages against those who have been responsible for disturbing the ecological balance either by running the industries or any other activity, which has the effect of causing pollution in the environment. The Court while awarding damages also enforces the 'Polluter Pays Principle', which is widely accepted as a means of paying for the cost of pollution and control."[24]

1.8 CONCLUSION

This research paper has discussed the growing concerns faced by India with regard to climate change. There is an urgent need to enact specific enactments, which address climate change in India.

Since, the existing legal framework in India lacks seriously when it comes to climate change. There needs to be a strong national environmental policy which should include clear cut rules with regard to environmental pollution and waste management, while giving licenses to

[20] Jolene Lin, Litigating Climate Change in Asia, (2014) 4 Climate Law 140, 146.
[21] ibid
[22] State of M.P. v. Kedia Leather & Liquor Ltd., (2003) 7 SCC 389.
[23] ibid.
[24] Surendra Malik and Sudeep Malik, Supreme Court on Environment Law (1st edn, Eastern Book Company 2015) 6. See also, M.C. Mehta v. Kamal Nath, (2000) 6 SCC 213.

industrial houses. Since vehicles contribute to air pollution in a significant manner, a practical solution needs to be developed to curb this issue.

The State must take initiative to encourage community participation in monitoring pollutions. India has ratified several international conventions relating to Climate Change. But none of the provisions in those international agreements can be implemented by the Indian State per se.

Hence India needs to frame new laws to incorporate those provisions in order to implement them to its letter and spirit.

Apart from this, there must be strict penal provisions to those who do not abide by the laws meant to safeguard the environment and tackle climate change. Where the State fails, the Apex Court in its judicial capacity can make laws, which will be binding on all. Only when the State, Judiciary and Civil society join hands, climate change can be tackled to a large extent and the impact it has on the people, especially the marginalized can be lessened to a minimum.

AQUATIC POLLUTION: A LEGISLATIVE AND JUDICIAL ANALYSIS ON PLASTIC WASTE MANAGEMENT

Pulak Symon[25]

ABSTRACT

The lackadaisical attitude of dumping garbage in a larger picture reflects karma which by its way's bites back. A wave in an ocean can be a picturesque but some garbage with the wave can be a grotesque. Water has always played a crucial role in nourishing humanity. More than 3 billion people either directly or indirectly are dependent for their means of income through it. However, the consequences of proliferation in the climatic condition, the massive encroachment of human activities and dumping of uncountable tonnes of plastic and other waste materials in the ocean and rivers has led to a disbalance in the marine life. The need of the hour through this paper is to understand as to how is the legislative and the judiciary acting to curb the menace. The social media is filled with disturbing videos of marine life getting affected by plastic waste. The research will be to examine the plastic waste in the water bodies and to understand the formulation of laws to protect the marine life and the implementation of such said laws in reality. Attempt will also be done to identify the lacuna in any law and provide suggestions that are needed to fix it.

Keywords: Aquatic Pollution, Plastic Waste Management, Climate Change

INTRODUCTION

The role of rivers and oceans has always acted as a source of 'living' for humans. The dependence of human on water has been since time immemorial. It is with time that the technological development took a huge pace and the ignorance to dispose the waste has been in a perennial flow.

The life of water body is dual in nature. The 'surface' life which is visible to a human eye and the life 'beneath' the water which can be termed as marine world. This marine world is exquisite with various species ranging from small to large and aquatic plants which is so vast that half of it is still unexplored.

[25] Research Scholar, National Law University and Judicial Academy, Assam

It can be learnt today that the development of human life has been a hazard for the aquatic life. They have to bear the consequences of our ignorance to waste products for our development. It does not limit itself to waste products but extends itself to exhaustive mining at the sea and river beds, oil spills and huge amount of plastic. The constant decline of pH level in water bodies is an alarming indicator which mirrors the amount of pollution loaded in a water body. The river Yamuna which flows through the capital of India is so polluted even after treatment that it is advised to not use it for irrigation or drinking purposes.[26]

The constant challenge for the marine ecological balance to survive does not limit to itself but expands its limit to affect the health of human life as well. The Constitution of India through Article 21 talks about 'right to life' which is infringed because of degrading human health that has become an issue of concern due to various rise of water borne diseases.

Attempt to save the marine ecology for the first time can be dated back to 1982 when the 'United Nation Convention on Laws of Seas' was brought to force by the various member States. The Convention highlighted the agreement which defined the obligations and its duties imposed on the coastal nations to respect and utilize the marine ecosystem. In 1995 India has become a signatory to the convention and being a part of the UNCLOS treaty resolved various sea boundary disputes. Attempts by the Indian legislature has been in protecting the environment of the country by drafting various legislations to protect the marine life such as the 'The Maritime Zones of India Act of 1976', 'The Coast Guard Act of 1978'.

To deal with the oil spills subsequently coast guards has been appointed and being designated as the Chief Administration of the Oil Spill Response in Maritime Zones of the Nation. Also, the 'Shipment Act of 1958' brought with it strict measures for curbing marine pollution. Parallelly, 'The National Oil Spill Disaster Contingency Plan' was passed by the Indian Government in 1993 which assigned patentability to the respective departments for oil spill administration in the maritime zone of India.[27] A welcome move was the 'Automated Ocean Pollution Observation system' in 2018. It was designed to report mechanical and pre-programmed data on various marine pollution in Indian ocean.

Even though the legislations are being enacted but the growth of it is still limited to the outcomes deserved to protect the marine ecosystem. A 2015 report by the "United Nations Environment

[26] ENVIS Centre on Hygiene, Sanitation, Sewage Treatment Systems and Technology, http://www.sulabhenvis.nic.in/Database/WaterQualityStatus_6984.aspx, (last visited on Feb 5,2022).
[27] 'National Oil Spill Disaster Contingency Plan (NOS-DCP)', 1994.

Program" mentioned that more than 0.6 tonnes of plastic waste are being discharged in the ocean from India which makes India stand on 12th position among the 20 countries highly responsible for marine pollution.[28]

This paper will thus try to analyze and study the causes of marine pollution with measures taken to manage plastic waste and surge in plastic waste in covid times. Also, attempts to understand the legislations and policies in marine ecosystem and judicial standpoint on plastic waste will be learnt through it.

UNDERSTANDING THE CAUSES OF MARINE POLLUTION WITH SPECIAL FOCUS ON PLASTIC WASTE DISPOSAL

Research shows that more than 233 marine species have ingested plastic waste and the polluted plastic waste has even reached the bottom of the deepest part of the oceans. [29] Also, the constant projects to build roads over rivers, oceans cannot be considered progress if the ignorance about the marine pollution is not taken due consideration. This is in precise a basic understanding of what is marine pollution. In precise, it is the direct or through indirect means the flow of toxic materials into the marine ecosystem which pollutes the environment and the marine species which gets affected by such human interference.

India has a 7500km long coastline shared with 13 States, 1200 mini-islands and big islands in and around its Exclusive Economic Zone which makes India unique and rich but a recent report from "Energy and Resource Institute" has drawn quite an attention to the level of increasing pollution in the coastline which is a threat to the human and the marine life. It is the agricultural run off and pollutants from industries, solid wastes, oil spills which has detoriated the marine environment resulting in an extensive desolation of dissolved oxygen and microbial concentration levels. [30] It is a necessity that at least 5 milligram per litres of dissolved oxygen is a pre-requisite to a balanced healthy eco-sensitive maritime zone. [31]

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[28] UNDP, Human Development Report 2015, https://hdr.undp.org/sites/default/files/2015_human_development_report.pdf, (last visited on 10 Feb 2022).
[29] Jen Allan, 'Thanks To A Little-Known Treaty, Poorer Countries Can Now Say No To Exported Waste', The Wire, https://thewire.in/environment/recycling-could-poorer-countries-refusal-to-plastic-waste-imports-make-the-system-fairer, (Last visited on 10 Feb 2022).
[30] DH News Service, 'Alarming rise in Coastal Pollution', Deccan Herald, (Jul 12 2017, 08:42) (https://www.deccanherald.com/content/622192/alarming-rise-coastal-pollution.html).
[31] B.S.R.V.Prasad, 'Dynamics of Dissolved Oxygen in Relation to Saturation and Health of an Aquatic Body: A Case for Chilka Lagoon, India', Journal of Ecosystems, (Feb 20 2014), (https://www.hindawi.com/journals/jeco/2014/526245/).

A study conducted by the 'Central Pollution Control Board' claims 302 contaminated rivers are polluted in a 2015 report[32] which increased to 351 rivers in 2018 by the Pollution Board.[33] The pollution level of rivers is tested by checking the Biochemical oxygen demand (BOD). Three States are contributing massively in polluting its rivers which includes Maharashtra, Assam and Gujarat. [34] The most notable effort that can be seen by the Central Government is the 20,000-crore project to clean Ganga which was a success or a failure is still disputed.

The role of plastic in marine pollution has choked many marine species in the oceans. More than 14 million tons of plastic waste are being disposed in the ocean due to which the beauty of marine life has added plastic in it. It is also well known that plastic is the most least biodegradable substance which takes many years to degrade itself. This makes plastic itself stand out to be one of the highest pollutants of our environment. The lack of plastic waste management and constant dumping of plastic waste on rivers has made indirectly oceans a dumping site of plastic waste which is a cause of concern.

The Indian rivers has been a constant carrier of plastic waste apart from other pollutants. Earlier, a river was known to connect life but now it acts more into destroying life. The United Nations Report states that the Indus River carries with it a whopping 1,64,332 tons of plastic debris to the ocean whereas the Meghna- Brahmaputra-Ganga chain carries 72,845 tons of plastic debris to the ocean.[35] The numbers are astoundingly huge which bring a question to plate as to what is the Government doing to solve this irreparable damage being done to the environment?

The plastic waste when deposited into ocean, under the influence of the UV rays, strong winds and water currents breakdown into smaller particles which is known as micro-plasts and further into nano-plasts this leads to easy consumption of these plastic wastes by the marine species which is toxic to their health.

[32] CPCB, 'Annual Report 2017-18', (https://cpcb.nic.in/openpdffile.php?id=UmVwb3J0RmlsZXMvOTIyXzE1NjQwMzg5OTFfbWVkaWFwaG90bzE0Mjg2LnBkZg==.)

[33] Jacob Koshy, 'More river stretches are critically polluted: Central Pollution Control Board', The Hindu, (Sep 17 2018),(https://www.thehindu.com/news/national/more-river-stretches-critically-polluted-cpcb/article24962440.ece).

[34] Ibid.

[35] Emily Melvin, 'Plastic pollution solutions: emerging technologies to prevent and collect marine plastic pollution', Environmental International, (Aug 14 2020).

Most developing countries actually lack the infrastructure to reduce and prevent plastic waste such as sanitary landfills, proper waste management process thus making the country less efficient.

The constant marine pollution with the relevant causes is an alarm to all the States to take initiatives to stop plastic waste as sooner or later the environment always gives back what it receives.

JUDICIAL POLICIES ON PROTECTING THE MARINE POLLUTION AND REMEDIAL LEGISLATIVE APPROACH ON PLASTIC WASTES

Relevant Legislations	**Salient features concerning Marine Environment**
INDIAN FISHERIES ACT, 1897	**THIS ACT PROTECT THE FISHES AGAINST VARIOUS EXPLOSIVES LIKE DYNAMITES**
INDIAN PORTS ACT, 1908	**LAWS RELATING TO PORTS AND SHIPMENTS**
COAST GUARD ACT, 1950	**PENALTIES AND HEAVY FINES ON POLLUTING PORT WATER**
MERCHANT SHIPPING ACT, 1958	**PROVIDES CONTROL FOR POLLUTION BY SHIPS**
WILDLIFE PROTECTION ACT,1972	**PROVIDES THE PROVISIONS RELATED TO PROTECTION OF AQUATIC CREATURES.** **LATER AMENDMENTS OF 1991 AND 2000 ALSO INCLUDE THE PROTECTION OF FISHERIES, CORALS AND SHELLFISHES AND OTHER ENDANGERED WATER CREATURES.**

WATER (PREVENTION AND POLLUTION OF CONTROL) ACT, 1974	**CONTROL THE POLLUTION WHICH ARE LAND BASED**
MARITIME ZONES ACT, 1976	**ACT REGULARIZING MARINE ECOSYSTEM**
MARINE FISHING REGULATION ACT, 1978	**IT IS FOR THE COASTAL STATES TO PROTECT FISHERIES AROUND TERRITORIAL WATERS**
FOREST CONSERVATION ACT, 1980	**IT PROTECTS THE MARINE BIODIVERSITY**
COASTAL POLLUTION CONTROL SERIES, 1982	**IT IS INTRODUCED BY CPCB TO KEEP TRACK OF DATA RELATING MARINE POLLUTION**

There are more such legislations which are enacted for various purposes to serve the protection and promotion of coastal rights and limiting pollution but just by enacting legislation is it enough? Plastic is a constant threat to the marine life but what is been done to tackle the issue is a point of concern.

Plastic is considered a hazard because of a chemical toxin named as 'Diethylhexyl Phthalate' (DEHP). This toxin when entered into any body whether it be marine or human gives rise to

various health hazards such as 'cancer' and 'congenital disabilities'.[36] Plastic acts as a sponge and absorbs various toxins from the surrounding ambience and thus it slowly enters the food chain and creates problem by disturbing the ecosystem.

It is also a problem in various tourists spaces, due to inflow of tourists in such areas the plastic waste tend to increase and the aesthetic beauty of the landscape or a river is damaged due to overuse of plastic which is a problem in itself.

The first attempt to bring a legislative action in India to regulate plastic waste was the formulation of "Recycled Plastic Manufacture and Usage Rules,1999". The rules regulate the use of virgin plastic and storing of food items. It was later replaced by the "Plastic Waste (Management and Handling) Rules, 2011"

The rules further modified itself to enact the 2016 Rules which shifts the accountability to each and every citizen for improving proper waste disposal mechanism. The rules widened its jurisdiction by not limiting to urban areas but also rural areas as plastic has reached such areas. The initiative to collect back the plastic waste by the producer company. Effort was also initiated to construct road with plastic waste.[37]

The new "Plastic Waste Management (Amendment) Rules 2021" aims at banning thermocol, single use plastic bags, ice cream sticks and added some new definitions to it. But in reality such rules and regulations will be of no use until and unless the people pledge themselves to stop the plastic use.

The Judicial developments around the plastic waste includes various cases. In the case of *Dharampal Satyapal v. Deputy Commissioner of Central Excise*[38] it revolved around a direction given by the Court to stop using plastic packets for packaging guthkas, tobacco and pan flavoured masalas. It is a welcome move to stop the plastic usage from the roots but to the contrary till date the Government cannot stop single plastic usage even though attempts were being made to reduce it but the increasing rate of plastic usage shows the reality.

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[36] Felicia Coleman, 'Ingestion of plastic-pollutants by aquatic birds', 34 *NOAA* 385 (2018).

[37] "Plastic Waste (Management and Handling) Rules, 2016".

[38] 'Dharampal Satyapal v. Deputy Commissioner of Central Excise', (2015) 8 SCC 519.

In the case of *Him Jagriti Uttaranchal Welfare society v. UOI*[39] the NGO was against the bottling of soft drinks and liquor in plastic bottles as the chemicals leach out from the plastic bottles and is toxic in nature which pollutes the environment. The NGT directed FSSAI, CPCB, Ministry of Environment to take steps to curb the plastic waste and furnish reports therein.

Focus on marine species was given importance in the case of '*Karnail Singh v St of Haryana'* [40]in which marine species were pronounced as legal entities and that it was the duty of every citizen of India to act as a guardian and protect such animals.

AQUATIC POLLUTION AND THE COVID-19 PANDEMIC

The pandemic has been a real roller coaster for each and everyone's life. The spread of virus has been sweeping away with it many loved ones but in the process to save their lives diagnosis in the hospitals and medical centres were availed. Most of the hospitals ran out of beds due to the over-crowding of patients. Now, the issue is when such huge amount of diagnosis were conducted then lot of medical waste were also generated which included a lot of used ppe kits, masks and related medical wastes so how was the waste being disposed?

The medical wastes slowly became the new normal for the household wastes which is an issue because of the dumping of such wastes in the drains and open water bodies which indirectly contributes to the aquatic and marine pollution as all the waste gets dumped in the rivers and subsequently to the oceans. [41]

The waste is not only limited to medical wastes but can be seen in the food industries as well. The revenue of Zomato during the pandemic has doubled from Rs466 crore in the financial year of 2018 to Rs 2,604 crore in the year 2020. [42] The huge amount of turn out also included huge amount of plastic waste. A survey conducted in 2018 pointed that 22,000 tonnes of plastic waste was generated. [43] The amount of such plastic waste was double in 2020.

[39] 'Him Jagriti Uttaranchal Welfare society v. UOI', (2019) SCC Online NGT 1780.
[40] 'Karnail Singh v St of Haryana ', (2019) SCC Online P&H 704.
[41] Nagarajan, 'Maharashtra's War on Plastic' 40 EPW 20 (2020).
[42] Neha Alwadhi, 'Zomato's revenue from operations doubles to Rs 2,604 cr amid pandemic', The Economic times, (April 28, 2021 23:40), https://www.business-standard.com/article/companies/failure-of-govt-steps-vaccinations-may-cause-economic-disruption-zomato-121042800994_1.html.
[43]Polymer Technologist, 'Zomato and Plastic Waste',(Oct 19,2020), https://polymertechnologist.in/2021/10/19/zomato-and-plastic-waste/comment-page-1/#:~:text=Moreover%2C%20as%20of%202019%2C%20Zomato,of%20all%20food%20delivery%20aggregators.&text=As%20per%20the%20survey%20conducted,as%20Zomato%2C%20Swiggy%2C%20etc.

The general awareness and the sensitivity of the issue relating to plastic waste should also come from the citizens as well. William Rodrigues, CEO and the founder of Saahas on zero waste said that citizens should be aware of the plastic waste they generate. It will be the first step to contribute to the cause by reducing and reusing and the second step will be the segregating of dry and wet waste.[44]

JUDICIAL RULING ON PLASTIC WASTE MANAGEMENT

In October 14,2020 the National Green Tribunal has directed the Ministry of Forest, Environment and Climate Change (MoEF&CC) to file a report on the amount of plastic being imported from other countries.[45] The report said that 900,000 tonnes of plastic waste was being imported to India which is and added pressure on India as the plastic waste management is not up to the mark like the other countries.

The Judiciary has sought help of Article 21, 48 and 51(g) to address various environmental issues relating to clean water and environment. In the case of '*Narmada Bachao Andolan'* [46]it was held that the right to clean water is a fundamental right under Article 21 of the Constitution of India. It is a basic necessity to sustain in this world which if denied will lead to grave injustice.

The Delhi High Court has also stated on various occasions on the reduced use of plastic as much as possible. In the case of '*All India Plastic Industries Association and others v. Government of NCT of Delhi'*[47] the Court stated a blanket ban on plastic is not possible but the plastic manufacturers should go for an alternative to plastic.

The judgment reflects the reliability on plastic to survive which even though harmful cannot be totally ruled out. The scientists have found an alternative termed as 'bio-plast' which is still doing rounds in the labs but if successful can help to be an alternative of plastic.

The environmentalist MC Mehta has filed many PILs in the Court to raise the cause of environmental degradation. One such case is the 'MC Mehta v UOI'[48], in which the rising level

[44] Anisha Reddy, 'Is the waste from your online deliveries choking Bengaluru?', The News Minute (Jul 08,2019), https://www.thenewsminute.com/article/waste-your-online-deliveries-choking-bengaluru-105069.
[45] DTE staff, 'Daily Court Digest: Major environment orders, Down to Earth (September 11, 2020), https://www.downtoearth.org.in/news/environment/daily-court-digest-major-environment-orders-september-11-2020--73341.
[46] 'Narmada Bachao Andolan v. Union of India', (2000) 10 SCC 664.
[47] 'All India Plastic Industries Association and others v. Government of NCT of Delhi', (2009) SCC Online Del 1914
[48] 'MC Mehta v. UOI', 1987 SCR (1) 819.

of pollution in river Ganga was brought to light. The Court directed the urgency to protect the river from pollution and highlighted Article 48-A of The Indian Constitution which states that it is the duty of the State to protect and improve the forest and wildlife of the country.[49] The Court also referred to Article 51-A which focuses on the fundamental duty of every citizen to protect the environment which includes the aquatic environment as well.[50]

In a celebrated case of '*Karuna Society for Animals v. UOI*'[51] it was held that right to life also includes right to enjoy pollution free marine environment.

CONCLUSION & SUGGESTIONS

The paper analysed the causes of marine pollution, the reasons which are the factors of accelerating the cause and the Judiciary which are passing judgments to protect the environment but how far did we reach to protect the marine life and the right to clean water is a conclusion to be drawn out.

The World Health Organization has stated that at present the world needs 89 million plastic medical masks, 1.6 million protective goggles which is manufactured with polypropylene. This will take nearly 500 years to degrade in the ocean. [52] The single plastic use has turned to be a new added threat to the aquatic environment.

The recent upsurge of biomedical waste has upsurged to high numbers and the handling capacity to manage waste is limited due to which nowadays medical waste are being dumped in the rivers and oceans which is a problem both for human and aquatic life. The NGT has taken Suo moto cognizance for indiscriminately dumping of bio medical waste in Tamil Nadu and Karnataka as the pain stricken fishermen had to encounter masks, syringes, blood bags and various Covid testing kits in the river and its banks. [53]

[49] The Constitution of India 1950, Article 48-A.
[50] The Constitution of India 1950, Article 51-A.
[51] 'Karuna Society for Animals v. UOI', (2016) 14 SCC 303.
[52] Nalini Ravichandran, 'Discarded single-use plastic masks and gloves are choking ocean beds', Monogabay, (oct 29,2020), https://india.mongabay.com/2020/10/discarded-single-use-plastic-masks-and-gloves-are-choking-ocean-beds/.
[53] Ibid.

India pro-actively joined the 'UN Clean Sea campaign' which required to formulate a 'National Marine litter Policy' as the first step but it got halted due to the pandemic. Marine litter in oceans is a threat because as soon as the litter enters the ocean we lack resources to clean up the litter.

The World Wildlife Fund for Nature has also initiated the idea that all Countries should join and focus on aquatic plastic pollution as this issue cannot be solved only by one country nor can it be solved overnight.

The suggestions that the research initiates through this paper is that it is the duty of the Government and various NGO's to make aware of the threat of plastic pollution on human and aquatic species as a crisis which may create future problems. Schools should include chapters on it and sensitize it through various programs and activities to reduce plastic use.

Secondly, it is the duty of the various Government concerned to double the plastic waste management system through which plastic waste can be treated.

Thirdly, strict penal laws should be initiated to the plastic manufacturers if the plastic produced by them is found in the marine ecosystem

WASTE-IMPACT ON HUMAN HEALTH AND ENVIRONMENT AND MANAGEMENT

Padir Prashant Baban[54]

ABSTRACT

Though, Global advances in human science and technology, the Industrial Revolution in England in 1837, and the information technology revolution of the late 19th century brought about radical changes in human life. This global change has led human beings to live a comfortable life but at the same time created numerous problems in their own lives including hazardous waste as well as various kinds of problems created from hazardous waste generated from electrical and electronic goods. Environmental problems are on the rise around the world due to the necessities of our modern lifestyle such as electronics, computers, mobiles. We have become so advanced that our life without machines has become very difficult. Even if it is a small task, you have to rely on this machine. Because machines are being used extensively to make our lives more comfortable. To meet these needs, the demand for electrical and electronics items is increasing day by day and is emerging as the biggest cause of e-waste generation. The biggest problem is e-waste, thus in this world of technology e-waste is such a big and fast growing waste that it has become a major crisis for the whole world. So what is e-waste? Why this crisis for you?

Keywords: E-Waste, Sources, Classification, Procreation, Amalgam, Pollutant, Issues, Management

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Introduction

Global advances in human science and technology results towards the Industrial Revolution in England in 1837, and the information technology revolution of the late 19th century brought about radical changes in human life. We have become so advanced that our life without machines has become very difficult. Even if it is a small task, you have to rely on this machine. Because machines are being used extensively to make our lives more comfortable. When we use e-waste or electronic waste, we throw it away. To meet these needs, the demand for electrical and electronics items is increasing day by day and is emerging as the biggest cause of e-waste

[54] Research Scholar**,** Shri Shiv Chhatrapati College, Junnar, Pune, Maharashtra

generation. As our population grows, so do our needs, which in turn increases the amount of e-waste. Which if not properly managed can pose a major risk in the future. Thus in this world of technology e-waste is such a big and fast growing waste that it has become a major crisis for the whole world. Thus what is e-waste? Why this crisis for you?

What is e-waste?

E-waste is a complete form of any Waste electrical or electronic equipment (WEEE). It used to be a waste of electronic goods that you used for your convenience, but now that it has deteriorated. Which has been discarded. This includes working and broken items that are thrown in the garbage or donated to a charity reseller like Goodwill. Often, if the item goes unsold in the store, it will be thrown away. **Ordinary people often say that e-waste has nothing to do with us. But everyone is concerned with e-waste. Not only do we use mobiles, we use computers, but we also use calculators, electronic clocks.**

As defined by the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, e-waste is any *"electrical or electronic equipment, which is waste, including all components, subassemblies and consumables, which are part of the equipment at the time the equipment becomes waste".*

European Union Waste Electronic and Electrical Equipment (EU WEEE) Directive; Waste from electrical or electronic equipment refers to "*all components, sub-assemblies, and consumables, which are part of the product at the time of discarding*".

Organization of Economic Cooperation and Development (OECD; E-waste can be classified as "*any appliance using an electric power supply that has reached its end of-life*".

Sources of E-waste

Environmental problems are on the rise around the world due to the necessities of our modern lifestyle such as damaged mobile phones, laptops, television sets, and computers. E-waste is a major source of information for IT companies. E-waste is made from any of your electrical or electronic items such as: Old-fashioned computers, mobile phones, electronic toys, depleted cells of computers, TVs, monitors, cell phones, VCRs, CD players, fax machines, printers, motherboards, chips, wireless devices and other peripheral items, copiers and fax machines, telephones, tablets, video cameras, stereo equipment, cathode ray tubes, transformers, cables and batteries, lamps and light bulbs (including mercury containing CFL and fluorescent bulbs), large household appliances (refrigerators, washers, dryers, microwaves), toys and sports equipment, tools, medical devices (some microscopes, electronic blood pressure monitoring devices, electrocardiogram machines, spectrophotometers, etc.). If not disposed of properly, they produce harmful substances such as beryllium, cadmium, mercury and lead.

Future source of E-waste

Moreover new trend of using environment friendly vehicles i.e. E-Vehicles car batteries which contains Amounts vary depending on the battery type and model of vehicle, but a single car lithium-ion battery pack (of a type known as NMC532) could contain around 8 kg **of lithium, 35 kg of nickel, 20 kg of manganese and 14 kg of cobalt**, according to figures from Argonne National Laboratory.

Classification of E-waste

There are many sources of e-waste but according to your understanding they are mainly classified into three categories.

White objects:

These include in-house that are-

Large household appliances (refrigerators/freezers, washing machines, dishwashers)

Small household appliances (toasters, coffee makers, irons, hairdryers)

Brown goods:

This includes Consumer equipment (televisions, stereo equipment, and electric toothbrushes)

Gray items:

These include Information technology (IT) and telecommunications equipment (personal computers, telephones, mobile phones, laptops, printers, scanners, photocopiers) and more.

Other Common items of electrical and electronic waste are:

1. Lighting equipment (fluorescent lamps)
2. Electrical and electronic tools (handheld drills, saws, screwdrivers)
3. Toys, leisure and sports equipment
4. Medical equipment systems (with the exception of all implanted and infected products)
5. Monitoring and control instruments
6. Automatic dispensers.

How E-waste Produce/ Reasons

Growing population, which is a big reason for increasing needs e-waste generation. In addition there are other factors that pose a significant risk.

1. Technology: Now is the time for modern technology, because of which technology is growing rapidly. Moreover, modern technology is adding to the new electrical equipment. E-waste generation has also increased due to the sudden growth and demand in this sector in the last two-three decades. This new technology is bringing new products and equipment to the market. People don't want to use old things even though they are spoiled now.

2. Human Psychology: Ordinary people also spend a lot of money on brand names. If the sales of a computer increase, if it is not used properly for a long time, it will become e-waste. With the power of this money people now feel the need to use new items instead of their old ones and this old stuff then becomes e-waste.

E-waste Composition/Structure

E-waste normally contains valuable, as well as potentially toxic materials *and falls under 'Hazardous and Non-hazardous" Categories. Mainly, it consists of ferrous and Non-Ferrous materials*. The composition of e-waste depends strongly on factors such as the type of electronic device, the model, manufacturer, date of manufacture, and the age of the scrap. For instance, a mobile phone contains more than 40 elements, base metals such as copper and tin, special metals such as lithium, cobalt, indium, and precious metals such as silver, gold, and palladium. Circuit boards found in most of the electronic devices may contain arsenic, cadmium, chromium, lead, mercury, and other toxic chemicals. Obsolete refrigerators, freezers, and air conditioning units contain ozone depleting Chlorofluorocarbons (CFCs). The prominent materials such as barium, cadmium, copper, lead, zinc, and other rare earth metals are contained in end-of-life (EOL) cathode ray tubes (CRTs) in computer monitors, and televisions. **Pollutant in E-waste**

Pollutants are toxic substances which are presented in electronic and electric equipment's. Toxic pollutants and their presence/ occurrences in waste electrical and electric equipment mainly are:

POLLUTANTS IN WASTE ELECTRICAL AND ELECTRIC EQUIPMENT (WEEE)	***OCCURRENCE***
ARSENIC	**TRANSISTORS, LIGHT EMITTING DIODES, LCDS, SOLAR CELLS, MICROWAVES**
BARIUM	**CATHODE RAY TUBES, ELECTRONIC TUBES, LUBRICANT ADDITIVES**
BERYLLIUM	**MOTHERBOARDS OF COMPUTERS, POWER SUPPLY BOXES WHICH CONTAIN SILICON-CONTROLLED RECTIFIERS AND X-RAY LENSES**
CADMIUM	**CHIP RESISTORS, SEMICONDUCTORS, RECHARGEABLE BATTERIES, FLUORESCENT LAYER (CATHODE RAY TUBES), PRINTER AND TONER**

	INKS, PHOTOCOPYING-MACHINES, CIRCUIT BOARDS, COMPUTER BATTERIES
LEAD	**SOLDER OF PRINTED CIRCUIT BOARDS, GLASS PANELS AND GASKETS IN COMPUTER MONITORS, CATHODE RAY TUBE SCREENS, LEAD-ACID BATTERIES USED IN VEHICLES, RECHARGEABLE BATTERIES, SOLAR, LASERS**
COPPER	**CONDUCTOR IN CABLES AND WIRES, COILS**
COBALT	**RECHARGEABLE BATTERIES AND COATINGS FOR HARD DISK DRIVES, INSULATORS**
LITHIUM	**LITHIUM AND RECHARGEABLE BATTERIES, MOBILE PHONES, PHOTOGRAPHIC EQUIPMENT'S**
MERCURY	**RELAYS, SWITCHES AND PRINTED CIRCUIT BOARDS, FLUORESCENT LAMPS, OLD THERMOMETERS, BATTERIES IN CLOCKS AND POCKET CALCULATORS, LCDS**
CHROMIUM	**GALVANIZED STEEL PLATES AND AN ALLOYS, DATA TAPES AND FLOPPY DISCS**
RARE EARTH ELEMENTS	**FLUORESCENT LAYER (CATHODE RAY TUBE SCREEN), SCREENS OF MOBILE PHONES, TABLETS, CATALYSTS, ENERGY-EFFICIENT LIGHT BULBS, MAGNETS**

NICKEL	**RECHARGEABLE BATTERIES, ELECTRON GUN IN CATHODE RAY TUBES**
ZINC , SULFIDE, CHROMATES	**PLATING MATERIAL, INTERIOR OF CATHODE RAY TUBE SCREENS, MIXED WITH REE, STEEL, BRASS, DISPOSABLE AND RECHARGEABLE BATTERIES**
PCBS(POLYCHLORINATED BIPHENYLS)	**PLASTIC, GLUE, TRANSFORMERS, CAPACITORS, MICROSCOPE OILS, ELECTRICAL INSULATORS, ELECTRIC APPLIANCES, TELEVISION, REFRIGERATORS ELECTRICAL HEAT TRANSFER AND HYDRAULIC EQUIPMENT. PLASTICIZERS IN PAINTS, PLASTICS AND RUBBER PRODUCTS**
SILVER	**SWITCHES, CAPACITORS, BATTERIES, RESISTORS**

Table: 1- Pollutant in E-waste

Major Environmental issues

We do not yet know exactly what happens in the environment due to improper disposal of this e-waste, but it is certain that its flow can take a terrible turn.

E-waste degrades soil, air and water components in the atmosphere.

Effect on Soil

If e-waste is not disposed of properly, toxic heavy metals and chemicals enter our "soil-crop-food route". These chemicals are not biodegradable, which greatly increases the risk. When large particles are released from burning, shredding or dismantling e-waste, they quickly re-deposit to the ground and contaminate the soil as well, due to their size and weight. The amount of soil contaminated depends on a range of factors including temperature, soil type, pH levels and soil composition. These pollutants can remain in the soil for a long period of time and can be harmful

to microorganisms in the soil and plants. Thus, it pollutes the soil, which can then take on a larger form.

Effect on Water

E-waste contaminate

s water in two major ways:

1. **Landfills:** Dumping e-waste into landfills that are not designed to contain e-waste can lead to contamination of surface and groundwater because the toxic chemicals can leach from landfills into the water supply.
2. **Improper recycling:** Improper recycling produces toxic byproducts that may be disposed of using existing drainage such as city sewers and street drains. Once these products have been introduced into the local water supply, they can cause further pollution by entering surface water such as streams, ponds, and rivers.

When these electronics contain heavy metals such as lead, barium, mercury, lithium (mobile phone and computer batteries), heavy metals are not disposed of properly, they can reach groundwater channels, drains. Later they are found in surface streams and small ponds. Through these pathways, acidification and toxification are created in the water. Clean drinking water becomes problematic to find. Acidification can kill marine and freshwater organisms, disturb biodiversity and harm ecosystems. If acidification is present in water supplies, it can damage ecosystems to the point where recovery is questionable.

Effect on Air

We all know that a lot of these things come in the electronic waste, wires, blenders and many other things that people burn to get, which makes air pollution a common thing.

The environmental impact of the processing of different electronic waste component:

E-WASTE COMPONENT	**PROCESS USED**	**POTENTIAL ENVIRONMENTAL HAZARD**
CATHODE RAY TUBES	**BREAKING AND REMOVAL OF YOKE, THEN DUMPING**	**LEAD, BARIUM AND OTHER HEAVY METALS LEACHING INTO THE GROUND WATER AND RELEASE OF TOXIC PHOSPHOR**

PRINTED CIRCUIT BOARD	**DE-SOLDERING AND REMOVAL OF COMPUTER CHIPS; OPEN BURNING AND ACID BATHS**	**AIR EMISSIONS AND DISCHARGE INTO RIVERS OF GLASS DUST, TIN, LEAD, BROMINATED DIOXIN, BERYLLIUM CADMIUM, AND MERCURY**
CHIPS AND OTHER GOLD PLATED COMPONENTS	**CHEMICAL STRIPPING USING NITRIC AND HYDROCHLORIC ACID AND BURNING OF CHIPS**	**HEAVY METALS, BROMINATED FLAME RETARDANTS DISCHARGED DIRECTLY INTO RIVERS ACIDIFYING FISH AND FLORA. TIN AND LEAD CONTAMINATION OF SURFACE AND GROUNDWATER. AIR EMISSIONS OF BROMINATED DIOXINS, HEAVY METALS**
PLASTICS FROM PRINTERS, KEYBOARDS, MONITORS, ETC.	**SHREDDING AND LOW TEMP MELTING TO BE REUSED**	**EMISSIONS OF BROMINATED DIOXINS, HEAVY METALS, AND HYDROCARBONS**
COMPUTER WIRES	**OPEN BURNING AND STRIPPING TO REMOVE COPPER**	**POLYCYCLIC AROMATIC HYDROCARBONS (PAHS) RELEASED INTO AIR, WATER, AND SOIL.**

Table: 2-The environmental impact of the processing of different electronic waste component.

Human health Issues

As mentioned, electronic waste contains toxic components that are dangerous to human health, such as Reproductive issues, Developmental problems, Damage to the immune system, Interference with regulatory hormones, Damage to the nervous system, Kidney damage, Hampers brain development in children, May lead to lung cancer, Chronic beryllium disease, Skin ailments, Cadmium accumulations on liver and kidney, Asthmatic bronchitis, DNA damage, Muscle weakness, precursors to cardiovascular disease, Endocrine system disruption.

World Health Organization (WHO)

A WHO report on e-waste and child health Children and Digital Dumpsites, released in June 2021, calls for urgent effective and binding action to protect the millions of children, adolescents and expectant mothers worldwide whose health is jeopardized by the informal processing of discarded electrical or electronic devices.

As many as 12.9 million women are working in the informal waste sector, which potentially exposes them to toxic e-waste and puts them and their unborn children at risk. Meanwhile more than 18 million children and adolescents, some as young as 5 years of age, are actively engaged in the informal industrial sector, of which waste processing is a sub-sector. Children are often engaged by parents or caregivers in e-waste recycling because their small hands are more dexterous than those of adults. Other children live, go to school and play near e-waste recycling centers where high levels of toxic chemicals, mostly lead and mercury, can damage their intellectual abilities.

Children exposed to e-waste are particularly vulnerable to the toxic chemicals they contain due to their smaller size, less developed organs and rapid rate of growth and development. They absorb more pollutants relative to their size and are less able to metabolize substances from their bodies.

Better ways of E-waste management

At present e-waste is managed on three levels. These include **Reduce, Reuse and Recycle.**

Reduce

Reduction means that people should reduce their use of electronic goods, which means that the waste generated from them will also be reduced automatically. The government is urging people to come forward to reduce this waste. In some countries, mobile companies as well as computer manufacturers have been asked to take the initiative. This is why Nokia, a mobile manufacturing company, had appealed to us to deposit your old mobiles with us.

Reuse

The second stage is reuse. E-waste collection companies have been set up in some cities. These companies operate under the orders of the Ministry of Environment and are bound to do so. These companies collect e-waste from big companies and Divide into different types. Items that are reusable are then segregated. For example, many companies sell their old state-of-the-art computers. These computers are donated to organizations in rural areas. So that such items are reused.

Recycle

Recycling raw materials from 'end-of-life' electronics is the most effective solution to the growing e-waste problem. Items like Fridge Washing machines, TVs, Monitors, Keyboards, laptops, telephones, mobiles, hard drives, printers, CPUs, Memory chips, Connecting wires and cables can be recycled. The waste collected for this process is first smashed and various parts like plastic and glass are separated from it. The portion is then sent to companies recycling in each area.

Regulations

The Ministry of Environment, Forest and Climate Change notified the E-Waste Management Rules, 2016 on 23 March 2016 in supersession of the e-waste (Management & Handling) Rules, 2011.

Laws to manage e-waste have been in place in India since 2011, mandating that **only authorized dismantlers and recyclers collect e waste**. E-waste (Management) Rules, 2016 was enacted on October 1, 2017. Over 21 products (Schedule-I) were included under the purview of the rule.

Some important things for e-waste management.

1) Always support green engineering.

2) Only buy electronic goods from shopkeepers who take them back to recycle in case of damage.

3) Citizens should always use recycled products.

4) Monitor the life of your hardware devices so that e-waste can be greatly reduced.

5) Large enterprises should buy recyclers which can be used for a long time.

6) Never keep a bad cell phone, dump system. Send to organizations where recycling is ongoing instead.

What happens in India?

India ranks fifth in the world in e-waste generation. About 70 % of this e-waste comes from computer equipment alone, 12 %from the telecommunications sector, eight per cent from medical devices and seven per cent from other devices. Government, public and private sector companies together generate more than 75 % of e-waste, while only 19 % of e-waste is generated

domestically. The city of Mumbai is a leader in e-waste generation in India. It is followed by New Delhi, Bangalore and Chennai. Maharashtra is leading in terms of states, followed by Tamil Nadu and Uttar Pradesh. Lead is found in most of these electronic wastes. Which accounts for 43 % and produces more than 72 % heavy metals.

According to the Central Pollution Control Board (CPCB), India generated more than one million tons of e-waste in 2019-20. Compared to 2017-18, the waste generated in 2019-20 has increased by seven lakh tons. Notably, there were no guidelines or standardized methods for disposing of this waste. This type of waste was treated in the same manner as the general scrap. This unscientific method was dangerous to health and the environment and urgent action was needed. That is why e-Waste (Management and Handling) Rules - 2011 was prepared.

Conclusion

The dangerous nature of Electronic Waste is one of the fastest growing environment problems of the world. E-waste management is a great challenge for governments of many countries. E-waste mainly, to separately collect, effectively treat, and dispose of e-waste, as well as divert it from conventional landfills and open burning, thus minimizing public health and environmental impacts. Recycling of E-Waste is necessary but it should be conducted in a safe and standardized manor. Lack of awareness and appropriate skills increases amount of Electronic Waste. Increasing efforts are urgently required on improvement of the current practices such as collection schemes and management practices to reduce the illegal trade of e-waste, and also to protect the environment and public health. Reducing the amount of hazardous substances in e-products will also have a positive effect in dealing with the specific e-waste streams since it will support the prevention process.

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FLIGHT BEHAVIOUR BY BARBERA KINGSOLVER AS A CLIMATE CHANGE NOVEL

Soumya. S. J & Dr. N. U. Lekshmi

[55]

ABSTRACT

Climate fiction or cli-fi is a noteworthy genre of literature that considers the challenges posed by climate change. Novels are conventionally concerned with the actions of individual protagonists or sometimes small communities. Climate change writers have taken different strategies to engage their readers to know about the issues. Cli-fi also offers a combination of science and storytelling. Flight Behaviour is a novel about a woman's journey to independence and the issues of global warming. The novel tells how climate change impacts the earth and cause devastation through unpredictable variations. The story is on the view point of Dellarobia Turnbow, a young mother who yearns to do more in life. Flight Behaviour connects Dellarobia's desire to escape from the grinding poverty and her disappointing marriage with the butterflies' escape from a habitat no longer suitable for their biological requirements.

Keywords: Cli-fi, Ecocriticism, Environmentalism, Global Warming

Introduction

Cli-fi discusses about climate change as a primary element. In cli-fi, the major element is suppositional in nature. Cl-fi which is the abbreviation of climate fiction or climate change fiction was first used in the early 2000s to describe novels and movies about man made climate issues. Historically, there are a number of literary works that deal with climate change as a natural disaster. Literature, especially novels are a good way to convey the message in a comfortable and engaging way. In *The Guardian*, Rodge Glass states that cli-fi can bring the issue of climate change into greater significance.

[55] Research Scholar, Sree Ayyappa College for Women, Chunkankadai, Affiliated to Monomania Sundarnar University Abishekapatti, Tirunelveli, Tamilnadu, India.

Climate change is a controversial phenomenon and it is the same in the case of fiction. Author has to draw the complexities of the climatic conditions by drawing its impact on the characters in the novel. Most of the characters in climate fictions have the ability to remember how the world is before and after the climate change. Extreme weather changes, variation in precipitation levels, species migrations and extinctions are the major issues connected to climate change. Writers like Amitav Ghosh, Barbera Kingsolver, Paolo Bacigalupi and Margaret Atwood have brought a new trend to cli-fi. They give a logical conclusion to the climate predictions in their novels.

Barbara Kingsolver's *Flight Behaviour* is a prominent entry to the cli-fi genre. In *Flight Behaviour*, Kingsolver embodies her unique way of converting scientific experiences into fictional insights. Kingsolver dares to tear the logging climate convictions. Her exciting concern for the natural world is quite apparent in her novels. *Flight Behaviour* visualizes an entertaining spectacle with the arrival of monarch butterflies in the rural Tennessee. It is explained as "Unearthly beauty, a vision of glory" (15). The butterflies in the novel are not only made to portray their representational presence but also to showcase the human's dominance over nature.

Cli-fi usually consists of an emotional narrative that can make the fiction a sensitive one. Dellarobia Turnbow, the central figure in *Flight Behaviour*, is a farmer's wife in southern Appalachians. She is an active woman but unhappy on her husband's passive and unambitious attitude. Like many other women, she is trapped in claustrophobic rural poverty and the toil of life. To get away from her unfulfilling everyday existence, she starts an illicit assignation with a young telegraph engineer. On the way to him, she stops by the sight of a cold orange flame. The sight is explained as:

The sun slipped out by another degree, passing its warmth across the land, and the mountain seemed to explode with light. Brightness of a new intensity moved up the valley in a rippling wave, like the disturbed surface of a lake. Every bough glowed with an orange blaze. "Jesus God," she said again. No words came to her that seemed sane. (19)

Religious ideologies in cl-fi, help readers feel a sense of respect towards God along with an admiration towards nature. Dellarobia takes the strange explosion of light as some sort of warning by God, like the burning bush in which the Lord confronted Moses. "Unearthly beauty had appeared to her, a vision of glory to stop her in the road. It had to mean something" (21). Her impulse to commit an act of blind self-destruction is transformed into determination to live differently. Dellarobia descends the mountain with a new self-confidence. Kingsolver

simultaneously casts the implication of Biblical intervention in the description of Dellarobia's first encounter with the butterflies. Very soon, it reveals that the "lake of fire" (16) consists of millions of bright orange Monarch butterflies and their arrival is a consequence of global warming.

Most of the cli-fi works revolve around religion and science. When natural disasters appear, people believe it as some curses by God. They deny the actual reasons behind the natural disasters. In *Flight Behaviour*, every one including religious fundamentalists and environmentalists frame the phenomenon to suit their own interests. A local newspaper presents Dellarobia as "Our Lady of the Butterflies" (77). Her husband Cub and her mother-in-law interpret her vision as a sign of divine grace and Dellarobia also believes it herself. Scientific knowledge in *Flight Behaviour* arrives in the form of an entomologist, Ovid Byron. Ovid's exhaustive scientific focus provides an explanation to the distorted path of Monarch butterflies and how it affects the planet. Changes on sides on the Mexican mountains have made the butterflies change their path. They are affected by drought which destroys the plants they eat. The increase in the use of pesticides also affected their healthy existence. Above all, global warming has brought changes in the weather patterns. The northward spread of fire ants and a higher infection rate from parasites limit their flying ability. Climate-related factors are responsible for the butterflies' normal migration pattern. In the Appalachian Mountains also they will face extinction if they are exposed to sub-zero temperatures. Dellarobia understands that the butterflies' presence is a symptom of damage to the earth's fragile ecosystems. Byron says,

> A continental ecosystem breaking down. Most likely, this is due to climate change. Really, I can tell you I'm sure of that. Climate change has disrupted this system. For the scientific record, we want to get to the bottom of that as best we can, before events of this winter destroy a beautiful species and the chain of evidences, we might use for tracking its demise. It's not a happy scenario. (228)

Climate fiction focuses on one major character who is destined to be the leader to convey the real issues. Here, Byron is worried about the lack of public concern over climate change. In Dellarobia's world of little hopes and thankfulness, there is no room for Byron's pessimism. *Flight Behaviour* directs towards Dellarobia's perceptions on environmental risk, ethical commitment to future generations and faith in the ability of people to change things. *Flight Behaviour* deals with a major issue: the ignorance of climate change and lack of eco-centric vision in human beings. Locating the narrative within a small close-knit community, Kingsolver is able to show the disruptive effects of an ecological event. Climate change skepticism underpins the

majority of the community. The people in Feather Town consider the arrival of Monarch butterflies as rebirth of Lord. At the same time, butterflies are irritating the others. Dellarobia's in-laws, Bear and Hester consider butterflies as an object to allure tourists through which they can gather money to pay their debts. Media people like Tina Ultner thinks the butterflies are nothing but the current talk of town from which they can promote their channel and extend their advertisements. The lack of seriousness in conserving the nature can be seen in Bear. Bear irresistibly logs and destroys the trees. He considers the forest as "just trees" (56) and not "gold mines" (56) to be preserved. He tries to wipe out the over wintering Monarchs that stands in between the logging plan by using DDT.

Every disaster proved useful for someone, it seemed, and flooding was good for the gravel business. It also meant money, which brought no complaints. They had been calling this her 'butterfly money', an apt name for such a lightweight source of fund. (213)

Kingsolver is basically an environmentalist, whose writings are mostly didactic in nature like many ecocritical works. Ecocriticism teaches literature and environment from an interdisciplinary point of view. In *Flight Behaviour* Kingsolver introduces Ovid Byron as her mouth piece to recount the truths of global warming. It is only to Ovid Byron, the Monarch Butterflies appear as what they actually are, which is a symbol of global warming. He understands that the pretty butterflies symbolize a terrific future. Ovid's aim is to make the people aware of the actual issue of their village. In the beginning, Dellarobia is also unaware of the climate change issues and the real reason behind the migration of butterflies. Ovid Byron acquaints her with the scientific facts.

Cli-fi aims to inform how climate change rejection is equal to its unawareness. Kingsolver makes no punches in exposing the illiteracy of Appalachian farmers and small-town communities in America to the dangers of anthropogenic global warming. She nevertheless depicts their mental world with sympathy and understanding. Political and commercial interests are present in the background. Rather than making the conspiracies of lobby groups create an environmental apathy, Kingsolver focuses on the everyday worries of poor illiterate people. In a world, where they have little control, these people have delegated the responsibility to take decisions to the media. "Nobody truly decided for themselves. There was too much information. What they actually did was scope around, decide who was looking out for their clan, and sign on for the memos on a wide array of topics" (166).

People do not respond with equal seriousness to all issues with respect to climate. This is one of the difficulties faced by the writers of cli-fi. Kingsolver symbolically represents people's attitude with the help of characters' response towards Ovid's discovery of climate change in the village. The men are typically overweight and lazy. Dellarobia's husband responds to the crisis with a nap. He spends his leisure time drinking beer and channel-surfing television. Many of the men's response are like this. In a life of constant distraction, they avoid a clash with difficult truths. Kingsolver accepts that, media respond to public request but forces people the reject scientific truth. Every environmental story has to be made into a different one. The core aspect of climate denial is addressed in a conversation between Dellarobia and Byron. "It's not that we're all just lazy minded. People can only see things they already recognize. They'll see it if they know it. "How do they see the end of the world? Byron asks. They know it's impossible. She replied" (282). Byron is shocked to hear Dellarobia's reply.

Kingsolver uses different analogies to structure the climatic events in the novel. Unawareness of the environmental change is referred to as "looking without seeing" (52). Byron and the other scientists who dedicate their lives to painstakingly building up knowledge about the process of change. Dellarobia's wildness and defiance also play a vital role in the novel's progress. These qualities are shown to be an integral part of the environmental movement. Along with the main characters, a group of Californian teenagers from "350.org" (415) arrives to protect the butterflies and the British members of "WOMYN" (415). They are described as:

> That's who is knitting the Earth. Well, they are coming from England, Dellarobia said. May be spelling is not their long suit. These girls are kind of rough. But they are good knitters, you should see their monarch butterflies. Are there photos? (415)

Climate fiction brings to the lime light prominence to issues related to climate. In *Flight Behaviour* religion appears in the form denial. In an increasingly secular, materialistic and individualistic society, the people of the Feather Town are suspicious of outsiders and everything foreign. They cling to their traditional values. Their most voluntarily adopted clarification for climate change is a religious one. "Weather is the Lord's business" (261). Dellarobia acknowledges the emotional need to understand the climate issues and she recognizes that the blindness on the issue as a part of the problem of climate change. A sense of moral justice rather than the scientific rationalism is what Kingsolver ultimately champions.

Though cli-fi talks about all climatic and environmental struggles, the major issue it discuses is global warming. Kingsolver's *Flight Behaviour* is anxious about the reformed flight

behaviour of butterflies as an alarming sign of global warming. At the same time, it is a study of human flight behaviour that shows the public's flight over reality. People deny the changes in the patterns of production and consumption in response to climate change related issues. *Flight Behaviour* signifies the beauty of the Monarch species (Danaus plexippus) and expresses an appreciation for the extraordinary intricacy of the instincts which force them to migrate annually over thousands of miles between Mexico and Canada. The butterflies die after every six weeks. Some again fly back to south and assemble at their winter gathering place in Mexican Angangueo. They symbolize the fragile, temporary beauty of nature and the risk of global warming. The risk to their existence thus serves as a touching notice of the fate of future human generations with regards to climate change.

Climate fiction often deals with moral stories that create a fear in the readers' mind in order to become cautious. Kingsolver presents the destruction by discussing the fears posed by climate change. Thought not directly, disaster is presented with a few situations of flood. *Flight Behaviour* avoids the pathetic moment of extinction, but suggests that life on earth will continue. However, this life will be different from the one that is experienced by human beings. A discussion between Dellarobia and Ovid reveals that climate change precedes to a new world, where people must learn to remodify their lives and thoughts.

> Where will they go from here, she repeated. Finally, Ovid said, into a whole new earth. Different from the one that has always supported them. In the manner to which we have all grown accustomed. This is not a good thing, Dellarobia he added A Whole New Earth. (325)

The importance of climate fiction is, it gives a solution to the betterment of the planet. Kingsolver optimistically portrays through Dellarobia's further decisions. According to Ovid Byron, as a result of environmental destruction, the butterflies may find new way to survive. They may alter their traditional migratory patterns. Dellarobia identifies the depth of this change as it is equal to her own situation. She accepts her situation and manages to survive as the butterflies do. She reconsiders her relationship with environment and is able to understand the reality of entering into a new world. She escapes from her narrow and restrictive existence. The butterflies' departure eventually resembles Dellarobia's own way to empowerment. *Flight Behaviour* concludes with a melodramatic sweeping away of the Turnbows' house during flood. As the story unfolds, it turns out to be indebted less to the cultural conventions. Dellarobia experiences an inner journey from illiteracy and lack of scientific understanding to knowing the risks of anthropogenic climate change. This knowledge gives her an urge to change her life. She creates

a new life, leaving her unhappy marriage behind. The butterflies fly off to find new geographical grounds to create a new habitat.

Flight Behaviour is an open ending novel that offers a choice whether to encounter the disaster or to choose flight at last. Presenting the terrible environmental situations, Kingsolver tries to install a second thought to get an instant change in the real world. *Flight Behaviour* voices the necessity of consciousness to preserve the natural world. The combination of science and fiction documents how human beings welcome their own destruction by causing unceasing threats to the natural world. *Flight Behaviour* stresses to reconstruct a harmony between the human and non-human world so that people can bring back the harmony of earth. "Above the lake of the world, flanked by while mountains, they flew out to a new earth" (597).

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ROLE OF LOCAL SELF GOVERNMENT IN PROTECTING ENVIRONMENT

Suhas Narhari Toradmal [56]

ABSTRACT

This paper deal with Role of Local self-government in the protection of environment. The need for environmental conservation is recognized globally. This paper makes an attempt to assess the role of Local Government Institutions in the protection of environment in India. Among different levels of environmental administration in India, the most effective is the presence of local government institutions for the efficient utilization and management of natural resources. This paper discusses relevant policies and practices promoted by these institutions for preserving and protecting environment. At the local government level, there are several mechanisms and agencies through which information regarding public welfare and environment conservation can be communicated to the villagers. These can be used to create the much-needed awareness about the protection of the ecology and the environment. This paper examines how the response to environment management can be strengthened with the better involvement of the institutions and the role of these institutions in some specific contexts of environment management and protection. Among different levels of environmental administration, the most effective is the local level for efficient management and utilization of natural resources. After the enactment of 73rd and 74th Amendments to the Constitution it appropriate to deliberate on the barriers and the way forward in shaping up effective environmental governance at the local level involving the Panchayat Raj Institutions.

Keywords- Local Government Institutions, Environment, Security, Ecology, Climate change.

INTRODUCTION

Mahatma Gandhi had a version for "Gram Swaraj" and this was included as one of the directive principles of the state policy (Article 40: The state shall take steps to organize village panchayats and endow them with such powers and authority as may be necessary to enable them to function as units of self-government) by the framers of our Constitution. Ever since the Constitution became operational, various states have experimented with different models of Panchayat Raj Institutions (PRIs). The progress and success of these models varied from state to

[56] Assistant Professor, C.D. Deshmukh Law College, Ahmednagar, Maharashtra

state depending on the commitment of local leadership, the space given to such institutions to function, and prevalent ethos.

However, this dream of Mahatma was in true sense fulfilled in 1992 when the Indian Parliament through the 73rd Amendment provided the constitutional backing for establishment and functioning of PRIs for rural self governance in the country. The 73rd and 74th Amendments to the Constitution together would always be remembered for creating leadership opportunities for millions of men and women at the grassroots level. This scale was simply unheard of in the annals of human history of democratic governance[57]. At present, all over the country, states have delegated powers to PRIs in terms of Article 243 and the Eleventh Schedule of the Constitution. India has not looked back ever since the enactment of these two major Amendments in terms of democratic decentralization.

POLICES Of LOCAL SELF GOVERNMENT IN PROTECTION OF ENVIRONMENT

Rural Local Bodies, owing to the enormous power vested in them, can be successful in conservation efforts. Rural Local Bodies came into existence in 1992, consequent to the 73rd Constitution Amendment Act 1992. Though were in existence from 1950, it is the 73rd Amendment, which gave enormous powers and responsibilities to these bodies. This process of decentralization has strengthened the "Village Republics".

The environmental dictum, "Think globally and act locally" can be well applied to Village Panchayats. If these Village Panchayats protect their "unreserved forests", there is the likelihood of a change in the appearance of the rural areas. Increase in forest cover would lead to a successive increase in the ground water table, availability of drinking water, wildlife and bird populations. Reserved forests are protected by Forest Departments of every state. But unclassified wastelands and unreserved forests are belonging to the Panchayat.

The Panchayats have the authority to evolve a code of conduct and regulations for rearing livestock. Agriculture, also a subject to be dealt with by Panchayats, may be increased by enforcement of certain disciplines in growing crops (native crops). It is all within the jurisdiction of Panchayats. This article examines how Indian urban local government is responding to the new challenge of protecting environments. It needs to be mentioned that in urban areas, environmental questions in developing countries have to be viewed from two dimensions: namely natural

[57] See Kalish takur, Environmental protection law and policy in India, 2017.

environments and community environments. However, until 1976 there was no constitutional requirement in India to protect and improve environments. India was a participant in the Stockholm Conference where it was decided that all the participating countries would take steps to enact necessary legislation if required. This was the backdrop against which the Forty Second Constitutional Amendment inserted a new Article (48A) in the Constitution of India[58]. which runs thus: "The State shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country."

This amendment also required all the citizens of India to protect and improve natural environments including forests, lakes, rivers and wildlife as well as to have compassion for all living creatures. Significantly, this amendment lists urban forestry, the protection of urban environments and the promotion of ecological aspects as functions of urban local bodies. Thus this amendment is very comprehensive and seeks to deal with the issue by involving not only the state but also the citizens who have to bear the brunt of it.

This double edged strategy adopted in a Parliamentary Act speaks of the serious concern of the Indian people about the protection of environments in general and urban environments in particular. Thus protection of environments is now a mandatory agenda of the Indian state backed by parliamentary legislation. While this makes for a good beginning, one can only expect results when public laws like Article 48A are supported by necessary administrative and political actions.

It is significant to mention here that the Indian judiciary has been playing a very positive and active role in this regard. The apex court in the country has explained that the right to life guaranteed by the Constitution includes the right to enjoy unpolluted air and water. The apex court ruled in another case that environmental issues were to be given utmost priority by the courts in India. It has been observed in another decision by the state level highest court that the right to life encompasses within its ambit the protection and preservation of environments, ecological balance, freedom from air and water pollution, and the sanitation of natural environments without which life cannot be enjoyed.

India's urban local governance received a new lease of life in 1992 following a landmark constitutional amendment, namely, the Seventy Fourth Constitutional Amendment. This Amendment is historic in the sense that it defines urban local self-governing institutions as the

[58] See J.N. Pandye, Constitutional law, 53rd edition, central law agency, 2016

institutions of self government and identifies the basic function of the local government as an instrument of planning for economic development and social justice[59].

The detailed functions of the local government have been laid down in the schedule attached to this amendment. The 12th Schedule in the amendment lists matters like urban forestry, protection of environments and the promotion of ecological aspects as one of the key functions of these local bodies. It is now widely held that only the provision of urban infrastructures is not enough for the development of sustainable cities. There has to be new concern for urban environmental management coupled with the understanding of linkages between infrastructures, productivity and environmental health. The perspective of the architects of the Amendment about environments is reflected in other entries in the schedule, which focus on public health, sanitation, conservancy, solid waste management, slum improvement and so on.

FUNCTIONS

These local bodies can also play a part in the prevention and control of pollution in their respective areas. In as much as these local bodies are responsible for approval of layouts and building plans, they can enforce moves for prevention of pollution. Establishment of factories, industries and workshops can be done only with the approval of local bodies. When applicants approach the local bodies for approval, the local bodies should process applications in compliance and enforce strict measures in order to prevent pollution.

The process of "Empowerment of Women" through local bodies has known many success stories. Women participate in large numbers in the Grama Sabha meetings. The Government of India has succeeded in organizing women through Self-Help Groups. The functioning of these Self-Help Groups has opened the eyes of planners and administrators. The savings that they make and their activities have paid rich dividends. The potential of this workforce has at last been identified, channelised and utilised. Moreover, women, who form one half of the population of our country, now form 1/3 of the total functionaries in PRIs.These women can be further motivated to take up the responsibility to transform society and conserve the environment.

SCHEMES FOR ENVIRONMENTAL PROTECTION BY GOVERNMENT

[59] Supra 1

The Ministry of Environment, Forest and Climate Change is implementing National River Conservation Program, sub-schemes of Conservation of Natural Resources and Eco-Systems, National Afforestation Program & Green India Mission, National Coastal Management Programme, National Mission on Himalayan Studies under Climate Change Program under the Central Sector & Centrally Sponsored Schemes of Government of India. These schemes act as remedial measures for conservation of environment and sustainable development of various ecosystems.

The umbrella Scheme on Conservation of Natural Resources and Eco-systems through its different sub-schemes formulated for protection of corals, mangroves, biosphere reserves, wetlands and lakes conserve the natural resources and these eco-systems of the country. The sub-scheme of National Plan for Conservation of Aquatic Ecosystems aims at conservation of all aquatic eco-systems including lakes and wetlands of the country[60].

National Afforestation Program and Green India Mission contribute towards regeneration of degraded forests and their adjoining areas in the country. National River Conservation Program facilitates in improving water quality of polluted stretches of rivers by preventing pollution loads reaching the rivers through various pollution abatement works. National Coastal Management Program ensures livelihood security to fishing and other local communities to conserve and protect coastal stretches and promotes coastal development based on scientific principles.

National Mission on Himalayan Studies aims at focusing on conservation of Himalayan Ecosystem and sustainable development of the Indian Himalayan Region. The Ministry also monitors implementation of United Nations Convention to Combat Desertification (UNCCD) and has been carrying out enabling activities and other obligations of the Convention[61]. The program aims at networking and forging strategic partnerships among relevant Scientific Institutions and stakeholders for enhancing knowledge data base and scientific inputs in reporting and revising desertification and land degradation.

RECOMMENDATIONS

1. Awareness should be given to people in Rural areas about local self government

[60] See http://www.indian kanoon.com

[61] S. S. Dhaliwal, Good governance in local self-government Publisher Deep and Deep Publications, 2004

2. The lead should be taken by local bodies, encouragement by the state governments given to local bodies
3. Need to create community awareness on cost- effective technologies and to bridge the gap between technology and community;
4. Need to identify local bodies who have produced practices that work at city levels;
5. Need to encourage cities to prepare annual environmental status reports through multi-stakeholders' consultation processes;
6. Need laws/rules/regulations specific to cities should try to facilitate effective implementation strategies;
7. Participatory mechanisms should be structured in a way that gives them legal entity and administrative power

As most of these problems are serious and deep- seated it seems that local governments which are not very strong in countries like India (despite constitutional sanction) are not competent to confront the issue effectively. The union-state, its constituent units and local government outfits should work together to meet these challenges[62]. This kind of partnership can go a long way to creating the necessary objective conditions for effective action in respect to the protection of natural environments – especially in urban setting.

CONCLUSION

To conclude, local self-government is one of the most innovative governance change processes our country has gone through. The noble idea of taking the government of a country into the hands of the grass root level is indeed praiseworthy. However, like any system in the world, this system is also imperfect.

Problems of maladministration and misappropriation of funds are recurring. But this shall not stand in the way of efficient governance; and if these ill practices are rooted out, there would be no comparisons around the world to our system of local self-government. In the Panchayati Raj set up, there are several mechanisms and agencies through which information regarding public good and welfare can be communicated to the villagers. These can be used to create the much-needed awareness about the conservation of the ecology and the environment. All this depends on the lead taken by local bodies, encouragement by the state governments given to local

bodies, the honesty and sincerity of the non-officials who administer the local bodies, and corruption-free controlling authorities.

The author suggests that the pressing requirement for sustainable environmental improvement at the community level is the provision of basic services and the enhancement of livelihood opportunities through a bottom up process of community organization building. While the above suggestion is meaningful, it needs to be followed up by the introduction of new training modules in the training curriculum for locally elected representatives in order to sensitize them about the need for effective environmental management at the community level.

Individuals in slums cannot often work regularly because the unsanitary conditions in the slums make them sick. They have right to life guaranteed by the Constitution. The State and the citizens of the country are duty bound to ensure that individuals in slums can enjoy their life.

Due to this reason that advantaged individuals have to teach them and help them practice how to lead a good life with concern for the environments. We need a new crop of local governors in urban India which is tuned to the idea of protecting environments as a part of good urban governance. They should be familiar with new environmental practices the world over and should be able to adapt them to their own local situations.

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WAR & ENVIRONMENTAL CHANGES: ANALYSIS OF EASTERINE KIRE'S WORKS

R. Poojaa[63]

ABSTRACT

War can be considered as one of the major reasons for changes in culture, environment, human behavior, human thinking, society, climate, land, soil, flora& fauna, water bodies and so on. Thus, war is the man-made destructive agent, destroying the nature and its properties. Countries have faced the evilness of war and many have not recovered from it, whereas many survived to tell tales about the nightmare; writers have produced so many literary works about this and are still writing, as war is inevitable in this world. Literary works produced during war and after war, talks about soldiers, destruction of land, sacrifices, survival, bombing, sleepless nights, memories, nostalgia for past and so on. Among such literary work, the renowned Naga writer Easterine Kire's works can also be included, as her works describe how her land changed after war. Through her works, one can know the environment and landscape beauty of Nagaland before invasion and how it changed after invasion. Her works like Sky Is My Father: A Naga Village Remembered (2018), Mari (2010) is selected for this study, to analyze the effects of war on Nagas and Nagaland. Through this study, changes in environment and people can be understood; the research paper studies the changes in environment and how people suffered by analyzing Easterine Kire's literary works.

Keywords: Changes, Environment, Nagas, Nature, War

Introduction:

Nagaland is one of the North-eastern regions in India with beautiful hills and forests. As Nagas culture is rich in nature, it attracts tourists from all over the world. Peace bearing mountains and calm centered trees hold tales of terror from the past; Nagaland faced so much in the past concerning the major events like The Battle of Khonoma, Japanese invasion and Insurgency. Apart from these major violent events, there are other minor events concerning Britishers and

[63] Research Scholar, Department of English at Avinashilingam Institute for Home Science & Higher Education for Women, Coimbatore.

neighboring tribes. The environment of Nagaland is astounding in its own way; any country before war, used to be in its original form but post war everything would change, as war destroys the originality. Nagaland writer, Easterine Kire, the very first author to write in English, deals with Nagas lives, war, environment culture, gender etc in her works. For this paper, Kire's novels like *Sky Is My Father: A Naga Village Remembered (2018), Mari (2010)* is selected to discuss the environmental changes in Nagaland due to war. Even though *Sky Is My Father: A Naga Village Remembered (2018)* is about The Battle of Khonoma, it narrates the environmental beauty of Nagaland in a more appealing way than *Mari (2010)*; as *Mari (2010)* is about the destruction of environment due to war.

Nature & Nagaland in *Sky Is My Father: A Naga Village Remembered (2018)*

The description of nature in Easterine Kire's works are breathtaking like the breathtaking view of "mountains that form a natural fortress" (Introduction, *Sky Is My Father*). Nagaland's natural environment is beautifully depicted in Kire's work. Kire uses the natural description to narrate the story, to explain the character's mood, to give details about the novel setting and to show off her land's beauty. This passage deals with natural elements like land, village, river etc and their environmental description in the novel.

Land& Village: In the novel *Sky Is My Father: A Naga Village Remembered (2018)*, Kire uses nature as a tool to explain the protagonist's bonding with his land and their land's richness.

> At the Merh*ü* Kuda, he drank in the cool morning air and closed his eyes against the strong wind blowing up from the valley… Impulsively he picked a bit of soil and smelled its earthiness. He felt bonded to the village, to the land, and feelings surged up in him that he'd never known before…
>
> From his vantage point the village of Khonoma spread out before him rather majestically, the fields to his left and the village in front of him and at his back, houses clinging to the cliffs they were built into. The fields ran right through the cleft of land between the two hills, and ploughed down the land next to the river, ending in the borderlands with Mezoma. Fed by the rivers, these fields yielded good harvests each year. The village had never known a year of famine and want. (50, *Sky Is My Father*)

The above extract describes the protagonist Levi's connection and bonding with his land. It is said that he feels that he never had enough knowledge about his land, until he missed his land

and his people. Then the writer describes the beauty of the village, river, richness of cultivating land. The Naga environment was determined to not introduce famine to its people, as it's rich in nature. The writer has done justice in depicting the beauty of land and village in Nagaland.

Water: The environmental description of water bodies is also given important in the novel, *Sky Is My Father: A Naga Village Remembered (2018)*. It is notable that the writer makes sure in describing every natural element in the novel and succeeds in providing a beautiful description. As Nagaland is surrounded by hills in every side, the natural water sources are very common, which flows when it rains.

> "All the men, all except the very old or uninitiated ones, went to the river. The better part of the day was spent in fishing and catching crabs. The river echoed with the men's voices as their basket filled up with more and more fish. Lower down where the water collected in a flat shallow section, some of the men had dammed the river and the young men darted in and out of the water, catching the trapped fish. They also used certain herb, which they place in the river to stun the fish momentarily. Some of the men scoured the stony places by the riverbank in search of crabs…" (54, *Sky Is My Father*)

The above extract shows how Nagas and river are connected. This extract describes the festive fish catching that takes places specially during the Ngonyi. One of the major occupations of Nagas, since years ago is fishing. In Naga culture, fishing is involved in celebrations, which unites the entire village together to engage in that activity. The environmental description of water bodies in Kire's works is very refreshing and brings the life in the running water to feed readers' imagination.

There's a novel by Kire, named *When the River Sleeps (2014)* is set in the forest about a hunter named Vilie, in search of a river; the novel describes the supernatural beliefs of Nagas and their superstitions about the forest and river. The hunter goes on an adventure in search of a stone which has to be picked when the river sleeps and that stone is believed to bring charm to the possessor but it is hard to possess. The novel narrates the journey of the hunter in search of the stone.

Food: Food is one of the important elements in nature, which is provided by nature herself to her people. Nagas take food from the forest, river; they make their own food from soil and fire. Without the rich source of food from nature, Nagas would have been slaved easily by the British

invaders, because their food source was not the Britishers like few parts of India; they didn't have to depend on British, only the nature.

Nagas were good hunters, they hunted animals like deer, rabbit, squirrel etc for food and birds and fish, crab, snail etc from river. "The hunter looked and amazed to see a deer standing nearby… The deer had not seen him and he quickly threw his spear. The animal fell heavily to the ground, speared though the heart." (32, *Sky Is My Father*). Nagas had pork, fish etc in their houses as dried meat. From the fields, they harvested grains like wheat, rice etc; they grew their own vegetables in their gardens and fresh herbs from the forest. "Meat hung over the fore, partially dried. In a corner of the large room, clusters of garlic dangled from a long bamboo. Dried herbs tied with twine hung alongside, food for the winter months when fresh herbs would be difficult to obtain. (22). They brewed non- alcoholic drinks in their houses to serve them for guests and the men of the house.

From the novel, it is known that Nagas used natural wooden utensils for cooking and eating. "His wife was sitting by the hearth ladling out rice and broth into carved wooden plates. Kovi especially liked his wooden plate with separate spaces carved out on it, for meat and tathu. Its wooden legs were convenient, one could use carry hot food about and not burn one's fingers by using this facility." (2). Food is one the best examples for the role of nature in Nagas' lives.

Like the above elements there are others like mountains, forests, trees, herbs etc. The above elements are the basic necessities of human being, they are discussed.

War & Nagaland in *Mari (2010)*

This novel discusses the destruction that happened to Nagas, which caused a great change in Naga environment and natural world, during the Japanese invasion. The Nagas who didn't need anyone's help to make their living except for nature, they had to depend on the during the invasion. The Nagas who didn't know famine or starvation, starved for many days during their refugee time; they were made to take refuge in their own land. The invaders stole food from the Nagas like bandits and killed them; they raped women and young girls. This novel *Mari (2010)* is one of the best examples to show the difference in Naga environment, which happened due to the invasion and violence.

Days before the war, the narrator describes the beauty of Nagaland;

> The orange glow of the setting sun is subdued and the grey of twilight is quickly overtaking it. The silhouettes of the hills and the neighbourhood houses are sharp

> in this half-light… My house is in Bayavü Hill is still close enough to the woods to allow me to hear the sound s of the birds and insects… I was seventeen that Spring when the young green of new plants, the hills bathed with thin mist every evening and the nights velvet with the songs of Bing Crosby. (17- 18, Prologue, *Mari*)

One of the best descriptions about Nagaland's environment in this novel is as follows:

> EVERYONE AGREED that October was the prettiest time of the year, especially when the rains had retreated. Everything had turned ripe yellow and it was a joy to see endless fields of golden paddy before the harvest. We had spent day after day under gentle sunshine and clear skies in these days. The hills turned golden, covered with a wild sunflower that bloomed in Autumn and filled the landscape. (50)

This beauty filled natural environment of Nagaland's fate turned upside down when Japanese invaded. Even though Britishers tried protecting them, the people faced countless atrocities of the Japanese. The changes in Nagaland's environment are discussed in the following passages.

Land & Village: The land was infested with land mines and bullets. One was able to see the ruins of war. As the novel is set in Kohima and surrounding villages, the novel describes the atrocities of war in these places. The narrator sadly says that her beloved house and her green garden were destroyed in the bombing and it was impossible for her to hear the cicadas anymore because of bombing in the forest. The narrator's family was made to evacuate from their house and they took refugee in the nearby villages.

> When we reached the wooden gate of the village, we heard the loud roar of guns and the sounds of grenades and bombs exploding… The village faces Kohima directly and from the high point where we stood, we could see the town and the houses on top of the hills. How shocked we were to see the whole of Kohima ablaze and covered with thick, black smoke.
>
> We could not believe our eyes. The peaceful and charming little town which had been our home all these was going up in smoke! (73)

It was shocking for the Nagas to see such incident, as it was lot to digest. When the Nagas dwelling in town side, were running to save their lives by moving from one village to another village to take refuge. But, "It was paradoxical that in a village that had offered refuge to others,

should now be worrying about seeking refuge itself." (74), as the Japanese approached the villages for ration supplies and to hide in villages to escape from Indian and British soldiers.

After war, the narrator narrates,

> Hardly any houses were left standing. The debris of war, bombed-out houses and shelters, and shell cases littered the streets and the town areas…
>
> But we were not prepared for the dead bodies that littered the streets…
>
> There were trenches dug out everywhere. We saw abandoned rifles every few yards, as well as fragments of mortar shells and grenades." (112-113)

Nagaland that was filled with "endless fields of golden paddy" (50), feasted one's eyes with "wild marigolds" (51), was no more the same after war, because it was filled with "dead bodies" (113) and "mortar shells and grenades" (113). Gardens were graves with dead bodies buried with dates and names carved in the stones; traces of flowers in the garden were not be found, says the narrator.

Water: The environmental status of water bodies is much difference from the description give in the novel *Sky Is My Father: A Naga Village Remembered (2018)*. The water bodies in the previous novel depicted their lifestyle, occupation, festival, environment and nature. The environment of water bodies was pure and healthy; it reflected the period that they lived. In the novel *Mari (2010)*, the water bodies after war became unhealthy and impure. "In the morning, we began our work by cleaning the spring well which lay just below our house." (115). This incident happened soon after, the narrator and Nagas started rebuilding their lives. As water is one of the basic necessities, saving them is impeccable and unavoidable. But still, the monsoon in Nagaland was not affected by the war, so it rained, which sufficed their thirst and the land's thirst. "The monsoons were a blessing because we did not have to suffer for water." (115)

Nagas loved their utensils; those descriptions were detailed in the previous novel. In this novel, their pity situation in the case of utensils is explained. "We collected water in the empty ammo drums left behind by the army." (115). The land of hills, after war suffered from a great loss of lives and nature. It certainly took time for the people and the nature to rebuild. The changed environment of Nagas in regards to water bodies is a pity. There are many more unrecorded events in history regarding their suffering.

Food: As Nagas were used to the lifestyle of abundant food from nature, they starved to death after invasion. It was the cruelest time of their lives, as ration were not available and stored rations were abducted by the Japanese soldiers. They couldn't raise their voice against those atrocities, as they feared them. The contrasting situation regarding food, is quite unimaginable, as Nagas never had a single day of starvation.

> The paddy in the granaries had been burnt and was unfit for consumption. There was not a single animal to be found, neither pigs nor chickens for the Japanese has slaughtered and eaten them all…
>
> 'There's nothing left to eat now,' Vikie*ü* said the next day, 'can you girls try and gather some herbs?' We had scoured the woods nearby for herbs frequently, Zhabu and I went and came back and told her, 'There's nothing left, only the stumps.'
>
> 'Oh, that means we haven't given the plants enough time to sprout back between gatherings.' she said. Food was uppermost in all our conversations. We rarely talked about other things. Just food and shelter. (90-91)

The places that had beautiful orchards were no more. "The orchard was beautiful. Some of the oranges were still green but most were ripe and the trees were bent and heavy with fruit." (51). The land of abundant food, became the land of nothing; the environment of Nagaland and the Nagas abruptly changed due to war. The narrator said, "we gave up hope of finding food…" (90)

Conclusion:

To this end, the environmental changes in Nagaland happened mainly because of war, in which Japanese invasion played a bigger part. Even though the Battle of Kohima played an important role in depicting the warriorship of Nagas, it didn't create much ruckus in the environment and nature; but the Japanese invasion was a different case. Related to these issues, further study can be done in same with reference to various other Naga literary works and also in different genres like poems, autobiography. The scope of the study is defined in finding the difference between Kire's novels that are set in two different time periods. Nagas under British rule enjoyed their time with lots of benefits like education, technology etc; on the contrary they suffered during Japanese invasion, even though their time with adjusting to British rule was not as violent as this. The environmental issues represent the sanity condition of the land; in Nagas' case, it was the war that destroyed the purity in nature.

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CROP DIVERSIFICATION IS THE REMEDY TO PADDY STUBBLE CRISIS AN EXPERIENCE OF PUNJAB'S STUBBLE BURNING PROBLEM

Manpreet Singh[64]

ABSTRACT

Beginning from the 1992 Rio de Janeiro United Nations Framework Convention on Climate Change, the debate and dialogue on the issue of ecological imbalance and environmental degradation went a long way around. Beginning from 1995 Berlin Conference of Parties there are 26 meetings of COPs have taken place to reach on a consensus about the course to reach the target to cut the carbon emissions. The main question of these rounds revolves around the economic and financial responsibility of the goals of environmental sustainability. The developed countries want to throw the entire burden on the shoulders of the developing countries; however, the developing countries are opposing this move by arguing that the developed countries are mainly responsible for the environmental degradation. Therefore, they should take the financial and economic burden of ecological sustainability measures.

The case of stubble burning crisis in Punjab state of India shows the complexities and problems inherent in the initiatives undertaken by the governments of developing countries. Nearly for five years New Delhi, the national capital of India has been facing the problem of smog formation. There is no consensus among the scientists about the real cause of smog formation. Many scientists consider stubble burning in the paddy season as the major cause of smog formation and the degradation of air quality. On the directions of National Green Tribunal and Supreme Court of India, state and national governments undertook some steps to stop the stubble burning. However, there were many problems emerged during the implementation of these steps. The present article endeavours to asses these problems in the large frame of the debates of United Nations Framework Convention on Climate Change.

Keywords: Climate Change, air pollution, environmental sustainability

Introduction

The case of stubble burning crisis in Punjab, Haryana, and the UP states of India shows the complexities and problems inherent in the initiatives undertaken by the governments of

[64] Research Scholar, Panjab University Chandigarh

developing countries to stop environmental degradation. Nearly for five years New Delhi, the national capital of India has been facing the problem of smog formation. There is no consensus among scientists about the real cause of smog formation. Many scientists, experts, and environmental activists consider stubble burning in the paddy season as the major cause of smog formation and the degradation of air quality. However, the farmer organizations and some agricultural experts differ from this view. The National Green Tribunal and Supreme Court of India directed the state and national governments to undertake strict action to stop stubble burning. However, many problems emerged during the implementation of these steps. The present article endeavours to assess these problems in the large frame of the debates of the United Nations Framework Convention on Climate Change.

The Practice of stubble burning and its impacts

Stubble burning is a long-time practice in Indian states mainly responsible for paddy and wheat crops. After the government initiative of the Green Revolution and the introduction of modern technology, mechanization, pesticides, the farmers started the farming of paddy in Punjab, Haryana, and western Uttar Pradesh. Paddy leaves huge stocks of stubble, as the paddy stubble is not useful for animal food. The stubble can be used for industry, power generation, and other industrial purposes but in the absence of an accurate mechanism for that, the farmers have only two options; first to decompose the stubble in the fields and second to burn it in the fields. The decomposition of stubble in the soil takes 6 to 8 weeks but the farmers have to prepare the soil for the next crop within 2 weeks, therefore they choose to burn the stubble in the fields.

"The reduced time window between the harvesting of the paddy crop and sowing of the next wheat crop too has amplified stubble burning cases. Earlier farmers had enough time to manage the stubble. The paddy was sown in May and harvesting was done in September or early October. Farmers had over a month to manage stubble before sowing the next wheat crop. Later, the state government prohibited paddy sowing before mid-June in order to coincide the irrigation of paddy crops with monsoon so that farmers' dependence on underground water could be reduced. Due to this, paddy harvesting has been extended to the end of October. The farmers then in haste to sow wheat crop, which is ideally sown by mid-November, found it easy to burn stubble in order to clear fields for the next crop." (Farmer economist Sucha Singh Gill interview with The Wire)

Due to this time constraint, and the lack of a proper mechanism of stubble management the farmers choose to burn the stubble in the fields. According to estimates Paddy production in India

was 94.5 million tonnes (Mt) in 2017-18 as estimated by the Ministry of Agriculture and Farmers welfare and this produced 141.75Mt of straw. About 40 MT of paddy straw is generated in the north-west India of which Uttar Pradesh, Punjab, Haryana are the major contributors. Uttar Pradesh, Punjab and Haryana produced 20.67Mt, 19.70Mt and 6.86Mt rice straw respectively (CESD 2017). One kilogram of paddy generates 1-1.5 kilograms of straw. In these states, about 80 percent of rice straw sets to fire in fields and of the total open field burning, 48% is contributed by Punjab and Haryana alone. (Gadde et. al., 2009).

The burning of stubble causes serious air pollution and is responsible for many respiratory and lung problems. According to the environmental activists, for the last four to five years the practice of stubble burning caused havoc in the states of Punjab, Haryana, and the national capital. New Delhi has been facing the problem of smog formation in the periods of paddy harvesting. Various factors contribute to smog formation like diesel vehicles, factories, industrial pollution, and construction activities. Experts and scientists differ about the primary cause of smog formation but the growing consensus is that stubble burning is the root cause of this problem. The burning of this raw material emits harmful particulate matter (PM10 and PM2.5) and greenhouse gases (GHGs). It releases 70 percent Carbon dioxide (CO_2), 7 percent Carbon monoxide (CO), 0.66 percent Methane (CH_4), and 2.09 percent Nitrogen dioxide (N_2O) (Gupta et al. 2004) The farmer organizations and other environmental bodies differ with this argument that stubble is the main cause behind smog formation in the capital as statistics show that agricultural air pollution contributes only 8% of the total air pollution. The NGT and Supreme Court of India also observed that stubble burning is not the primary factor behind smog formation and poor air quality of the National Capital. Chief Justice V. Ramanna said on the hearing of the case regarding stubble burning, "The affidavit filed by respondents and after hearing we come to the conclusion the major culprits of pollution are construction activity, industry, transport, power, and vehicular traffic apart from stubble burning in some parts". However, the apex court also observed that during the winter season the stubble plays a crucial role in pollution and smog formation. Therefore, the court and NGT directed the state and central government to tackle the problem of straw during the paddy season. The Supreme Court remarked," It's wrongly reported that stubble contributes only 10 percent to air pollution. It could be up to 50 percent during the current season. We are not into farmer bashing. But stubble burning is a serious problem." (ndtv.com)

Adhering to the court orders central and state governments tried to curb the problem of straw, but they relied mainly on punitive measures and fines. The centre government declared stubble

burning a crime and imposed a fine of rupees five crores along with 5 years of capital punishment for burning stubble. The farmer organizations announced that they will not comply with the orders as there is a complete lack of proper mechanism and financial aid to deal with the problem. Last year, over 52,000 farm fires were reported in Punjab alone after the paddy harvest season. In over 23,000 cases, an environmental fine was imposed on farmers, and 'red entries' were made against their land records. Errant farmers were together reportedly fined Rs 6.1 crore. However, they have deposited only Rs 1 lakh thus far. Collecting fines from farmers is difficult, but more importantly, doing so creates a hostile environment for local agricultural development functionaries (the wire.in)

The farmers demanded rupees 2500 per acre or 100 rupees per Quintal financial aid and subsidized machinery to deal with the problem. Due to the absence of these measures, the farmers continued to burn the stubble. During the farmers' protest at New Delhi against three Farmer Laws, they also raised the demand to tack back the punitive law for stubble
burning, and the government was compelled to take back the ruling.

Due to the alarming situation of air pollution in the capital and strong debunking of NGT and Supreme Court, the state and central governments took some measures of financial aid and to provide subsidies on machinery to decompose the stubble.

Mechanism and strategies needed for stubble management

The paddy waste straw has many uses and the problem of stubble burning is manageable if the correct mechanism and techniques are adopted. The experience of north-western India showed that the stubble burning problem needs a multi-pronged approach instead of punitive measures and fines.

Different uses and methods of stubble management

In itself, the huge mounts produced during paddy harvest season appear as a serious problem, however, a well-prepared mechanism, technological advancement, and monetary incentives together can change the situation into a favorable one. Stubble can be used for many industrial purposes. It can be used for papermaking, the cardboard industry, and industrial fuel However, a working mechanism is needed for this. Many researchers and experts suggested different uses of paddy stubble. The agricultural scientist also researched the field and invented some techniques to decompose the stubble in the fields. Here is the list of some uses of paddy stubble;

Incorporation in soil: incorporation of paddy stubble in the soil is one of the best methods of stubble management. It is cheap and also saves many minerals and is valuable for soil and crops. It enriches the carbon content of the soil and saves vital nutrients like nitrogen, phosphorous, and potassium. Decomposed in the soil, straw serves as a natural fertilizer for the wheat crop. With the use of deep plow and organic decomposers, the stubble can be managed and the soil productivity is increased. However, this process needs time. If the farmers are provided with subsidized machinery like happy seeders and cash incentives, the huge amount of paddy is manageable in the fields.

Composting

Composting is another technique that is cheap and plays a helpful role in soil enrichment. It produces nutrient-rich substance (compost) which contains nitrogen (2%), phosphorus (1.5%), and potassium (1.4-1.6%). The compost from agricultural stubble is rich in nutrients and therefore improves the productivity of the soil (Ramasanta et al, 2017). It can improve crop yield by about 4-9 % (Sood, 2013). A popular composting method is Vermicomposting, which generates compost-using earthworms, which significantly improves the productivity of the soil (Singh et al., 1996). There are many ways of compositing including earthworms, microcosoms, and mechanized windrow techniques. However, compositing is time taking process and is only suitable where the field can be kept empty for one month and more.

Biochar: Prepare biochar near the fields is another viable method to manage the stubble. According to a Science direct research paper," Another alternative approach is the production of Biochar from the crop stubble through the process of pyrolysis. Biochar is a finely-divided, carbon-rich, porous substance obtained by subjecting the biomass to a thermo-chemical conversion process with little to no oxygen (pyrolysis) at a temperature of about 350–700°C. Biochar can be used for soil sequestration and conditioning which improves the carbon content in the soil and helps remove atmospheric carbon dioxide. 38 - 49% reduction in emissions could be achieved by adopting the local production of biochar from crop stubble in India. (sciencedirect.com)

Biofuel and power generation: The making of biofuel is getting momentum in the present times. Many crops are used to make biofuel, which may produce a food crisis. However, using stubble to make biofuel is a viable option. The crop stubble can also be used to generate biogas via anaerobic digestion benefiting the producer with bio-methane and a solid effluent that can be used as compost for plants (Sun et al., 2016). The biogas can

be used as fuel for domestic heating, thus reducing emissions from the indoor burning of biomass. The stubble can also be used fr power generation in the power plants along with coal or other fuels. These are effective uses of stubble which are beneficial to reducing the energy burden and management of straw. Stuble is also usable for many industrial purposes. The Papermaking and cardboard industry is one among them.

Other uses: Bacteria and fungi straw decomposition

Effective decomposition of the crop stubble can replace straw burning. Microorganisms are effective for the degradation of cellulose and lignin present in the straw. The rice straw decomposition restores the fertility of the soil by recovering biomass, nitrogen, and other nutrients and returning them to the soil (Zhao et al., 2019). The aerobic mechanism is of greater significance for most soils than the anaerobic one. Besides rice stubble, other agricultural wastes such as coir pith, banana sheath (dried), sugarcane waste, maize, pulse waste, and cotton stubbles are being decayed by the white-rot fungus (Pleurotus sp.). Other commonly used white-rot fungal species are the Platypus, Djamor, or Sajorcaju (Su et al. 2020).

Governmental measures

As shown above, there are many uses of stubble and not only it can be managed but it is put in the service of the people in many ways. However, the main hurdle is finance and proper mechanism. Many studies and field reports show that farmers do not want to burn the stubble and they are ready to manage the stubble in various ways but they are not able to bear the financial cost of it. A huge number of farmers in the state of Punjab, Haryana, and UP are small and marginal farmers. They, themselves cannot take care of the stubble.

If provided with the proper financial help they will be able to do so. If farmers wish to remove stubble manually, they will need at least Rs 6,000-7,000 per acre. To reduce these costs, as well as save labor and time, the Government of Punjab distributed 24,000 tractor-mounted ‘happy-seeders’ to cut down the rice stubble and sow wheat seeds simultaneously. To use a ‘happy-seeder’ over one acre, farmers have to spend Rs 1,000 for rent plus about Rs 2,000 on diesel. (thewire.in)

One happy-seeder clears 10 acres of land in one day and only Punjab needs more than 50000 happy-seeders to prepare the soil within time. Along with that, the farmers need money to bear the cost of diesel and tractor rent which is more than 2500 hundred per acre. If the government

pays the cost they can easily manage the stubble. The Supreme court of India ordered the state and center governments to provide rupees 100 per quintal bonus on the paddy in 2021. The governments claim that they have provided the subsidy however farmers deny this fact. According to many farmers and farmer organizations, there is not a proper mechanism of directly paying the bonus to the farmers. The fact is that the government of Punjab has not used the funds allocated by the central government to manage the stubble crisis. In the absence of this, the farmers resort to stubble burning as an easy option. Last year, over 52,000 farm fires were reported in Punjab alone after the paddy harvest season. In over 23,000 cases, an environmental fine was imposed on farmers, and 'red entries' were made against their land records. Errant farmers were together reportedly fined Rs 6.1 crore. However, they have deposited only Rs 1 lakh thus far. Collecting fines from farmers is difficult, but more importantly, doing so creates a hostile environment for local agricultural development functionaries. (thewire.in)

These statistics and reports show that there is a great lacking of responsibility on the part of the governments. Though a huge hue and cry have been made about the air pollution and bad air quality, the political will to manage the stubble is weak and the government machinery is not working according to the needs. Observing this the Supreme court of India made sharp comments on the performance of the government. The Chief Justice of India remarked, "The government of India, over a period of time, I have observed that the bureaucracy has developed inertia. They want everything to be done by the court - water sprinkling, stopping fires... It's unfortunate on the part of the Executive.".

Crop diversification is the key to dealing with the crisis

As shown above, paddy stubble is a manageable problem but it needs a big amount of money and technological mechanism. However, it solves half of the problem. Another major problem that paddy cultivating states are facing is the continuous dropping of groundwater.

Paddy consumes a vast amount of water and it is creating a water crisis in these states. The northern states of Punjab and Haryana, which grow large amounts of paddy, together with take out roughly 48 billion cubic meters (bcm) of groundwater a year, which is not much less than India's overall annual municipal water requirement of 56bcm. As a result, groundwater levels in these states are dropping rapidly. Punjab is expected to run out of groundwater in 20-25 years from 2019, according to an official estimate. (bbc.com). There were only 7445 tubewells in Punjab in 1961 and the number reached 1.5 million in 2021. (downtoearth.org.in)Agricultural scientists and experts giving warnings for a long time about this crisis. Further Punjab and

Haryana states have a long time dispute of the river waters and the continuous dropping of groundwater will make it worse.

The appropriate alternative to this crisis is crop diversification. Paddy is not a natural crop for Punjab and Harayana. The cultivation of paddy in these states had been started after the government launched the Green Revolution and farmers started farming only for market purposes. The Government of India started guaranteed procurement of paddy with relatively high support price, therefore the farmers tarted the cultivation of paddy. It was the need of that time as our country was not self-dependent in the matter of grain. However, the situation is changed now and our country has sufficient stocks of grain. Therefore, If the government ensures the MSP on different crops like corn, cereals, cotton, maize, and vegetables, the farmers could begin to cultivate these crops. Not It will help to manage the stubble crisis but also reduce water consumption. According to Gian Singh, a former professor of economics at Punjabi University Patiala," People solely blaming Punjab's farmers seem completely unaware of agricultural practices and are blindly urging them to stop planting paddy. In order to prevent the groundwater level from falling continuously, it is important that the Union government must fix remunerative prices of cotton, maize, and other Kharif crops so that these crops can be sown according to the state's agro-climatic conditions."(downtoearth.org.in/blog)

Conclusion

There is no doubt that paddy stubble generated in vast amounts is a serious problem and a huge amount of money is needed to successfully manage it. However, it solves half of the problem, and at a very high cost. The problem of dropping water remains. Therefore, the key remedy to the crisis is planned crop diversification. The government should guarantee the procurement of all the crops at a Minimum Support Price. It will encourage the farmers to cultivate various crops other than paddy, according to the natural climatic situations of these states. It will further support the farmers financially and the crisis of dropping water will also be taken care of.

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EXTENDED PRODUCER RESPONSIBILITY- HOW IT WORKS TO CURB E- WASTE

M. Geetha Priyadarsani[65]

ABSTRACT

We cannot imagine the world today without electrical and electronic goods. They are ruling the human world. The development we see today is only because of the invention of electricity and electrical and electronic goods. In this virtual world they play an important role. Electrical gadgets are very necessary in the present world to make the work easier in all fields like offices, educational institutions, hospitals, super markets, malls, etc. and even change the life style. Hence, the increased use of the electrical and electronic equipment is causing a great threat to the environment. This electrical equipment consists of both valuable and toxic materials and if disposed of without proper care, it drastically affects the heath of the humans and quality of the environment. But this development has degraded the environment in the form of e-waste. Latest variety of electrical and electronic goods are attracting the consumers and this lead to discard of old varieties which in turn is increasing the problem of e-waste. The serious problem which the environment is facing today is the disposal of e-waste. How to recycle this e-waste without degrading the environment is a big question? To reduce e-waste and for proper recycling of e-waste, Extended Producer Responsibility is introduced by the e-waste (Management & Handling) Rules, 2011. With this Extended Producer Responsibility, the producer of the electronic goods is liable for the entire life-cycle of the product like take-back policy, recycling, final disposal. The E-waste (Management) Amendment Rules, 2018 have given EPR targets for producers. Framing of these targets is not enough to control e-waste problem but the Central Pollution Control Board should check periodically whether this is properly implemented or not.

Keywords- E-waste, Extended Producer Responsibility, Environment, Degradation, Sustainable Recycling.

Introduction:

Electrical and Electronic Equipment (EEE) are used in every field in the present virtual world. From multinational companies to common households, the usage of EEE has potentially increased. We find EEE in IT companies, industries, telecommunications, government

[65] Faculty Associate, ICFAI Law School, IFHE Hyderabad.

institutions, educational institutions, shopping malls, common households. Without these EEE we cannot imagine the functioning of any activities in these above institutions. Today the world is running towards smart cities and smart homes. Where ever we are, we are able to manage our works through these smart devices. Urbanization, industrialization, increase in income are the main reasons for the growth of EEE. Due to the pandemic situation, the use of EEE have increased. The virtual meetings and virtual classes have increased and due to this everyone is using smart devices and this in turn increases the e-waste in future. According to 'Global e-waste monitor 2020' it is estimated that the amount of e-waste will exceed 74 million tons by 2030. Thus in 21st century, e-waste is the growing problem faced by the world at large and the environment. How to dispose this e-waste, is the challenge posed before the world today?

In 2019, worldwide 53.6 million tons of e-waste was generated and out of this only 17.4% was recycled formally according to the report of 'Global e-waste monitor 2020'. Can you guess what happened to the remaining 82.6% of e-waste. It may have been discarded in waste bins, landfilled, incinerated, sent to underdeveloped countries for reuse or as scrap metal or collected and improperly recycled by the informal sector.

Coming to India, it is in the third position in generation of e-waste[66]. Even the recycling of e-waste in India is not carried safely and properly because nearly 90% of e-waste collection and handling is in the hands of informal sector. The collection process of informal sector is well organized than the collection process of the formal sector. E-waste contains several precious metals and hazardous chemicals. If e-waste is recycled by the formal sector, then the precious metals like gold, silver can be extracted and used as secondary materials. According to 'Global e-waste monitor 2020', the value of raw materials in the global e-waste generated in 2019 is equal to approximately $57 billion USD. But as only 17.4% is recycled by the formal sector the total raw material is not able to be extracted. E-waste contains several hazardous chemicals like mercury, lead, cadmium, etc. and if they are disposed improperly and in unsafe conditions, they effect the human health and also the environment. Extended Producer Responsibility is introduced to curb the problem of improper recycling of e-waste. The producer or the manufacturer is liable for the entire life-cycle of the EEE like take-back policy, recycling and the final disposal.

[66] Report of Global e-waste monitor 2020

What is E-waste and Extended Producer Responsibility

'e-waste means electrical and electronic equipment, whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes[67].

'Extended producer responsibility' means responsibility of any producer of electrical or electronic equipment, for their products beyond manufacturing until environmentally sound management of their end-of-life products[68].

International Conventions:

Basel Convention- The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal adopted in 1989, came in to force in 1992. The main aim of this convention is to protect human health and environment against hazardous waste. Due to large emergence of e-waste the convention started to concentrate on e-waste issues from 2002, and aimed to stop illegal trafficking in e-waste, to frame environmentally sound and safe policies for e-waste management and to building capacity around the world to manage e-waste.

Rotterdam Convention (Netherlands, 1998)- The main objectives of this convention is to control transboundary trade of hazardous chemicals, to protect humans and environment from these hazardous chemicals and to see that these hazardous chemicals are used properly.

Stockholm Convention (Sweden, 2001) The Stockholm convention was aimed at Protection of Human health and the environment from chemicals.

Nairobi Convention- The Nairobi Declaration held in Nairobi, Kenya in 2006, aims to bring awareness about e-waste challenges and solutions, to promote knowledge, technology for sound management of e-waste from developed countries to developing countries, to use green design for e-products and encourage EPR, to stop illegal trafficking of e-waste, to see that nations make up good e-waste legislations.

[67] 3-k of E-waste (Management & Handling) Rules, 2011
[68] 3-l of E-waste (Management & Handling) Rules, 2011

Indian laws:

Indian environment is protected by the Environment Protection Act, 1986. Even before this Act has come in to existence the environment issues are dealt by the judiciary, constitution, Indian Penal Code and also through industrial laws. Due to the emergence of e-waste, E-waste (Management & Handling) Rules 2008, have been framed. Before these rules, e-waste was treated under the Municipal Solid Waste Management and regulated by Hazardous Waste (Management, Handling & Transboundary Movement) Rules, 2008.

Later the Ministry of Environment & Forest, Govt. of India issued notification on E-waste (Management & Handling) Rules, 2011 and these came in to effect from 1st May, 2012. For effective implementation of e-waste recycling, these rules have introduced EPR, where producer is responsible till the end of life of the product. These rules are applicable to producer, consumer, collection center, dismantlers, recyclers. Exemption under these rules is given to micro and small enterprises. Due to drawbacks in these rules regarding EPR Authorization from multiple SPCB's, collection centers not being included in EPR authorization, micro and small enterprises are exempted and lack of regulation on bulk consumers, etc., they are amended and E-waste (Management) Rules, 2016 came in to effect from 1st October, 2016. The main highlights of the rules are EPR Authorization, effective e-waste collection mechanism, safe and sound recycling, minimize illegal recycling and reduce hazardous substances in e-products. EPR authorization will be given by Central Pollution Control Board (CPCB) and additional options like Producer Responsibility Organization (PRO), e-waste exchange, deposit refund schemes are introduced and also bulk consumers need to file annual returns. As per E-waste (Management) Rules, 2016, firms are supposed to ensure collection of 30% of generated e-waste during the first two years (2016-2017 and 2017-2018) and 40% during 2018-2019 and 2019-2020.

On 22nd March, 2018, The Ministry of Environment, Forest & Climate Change (MoEF & CC) amended the E-waste (Management) Rules, 2016. Later E-waste (Management) Amendment Rules, 2018 came in to force. These amended rules introduced Producer Responsibility Organization registration and also change in collection targets of e-waste. E-waste collection target through weight is 10% in 2017-2018, 20% in 2018-2019, 30% in 2019-2020, 40% in 2020-2021, 50%in 2021-2022, 60% in 2022-2023 and 70% after 2023 of the quantity of waste generation as indicated in EPR plan. These amended rules have also given a collection target to new producers and their targets are lesser than the targets of other producers. The CPCB will bear the cost to verify the compliance of reduction of hazardous substances in electrical and electronic equipment.

Enforcement Authorities and their duties in e-waste management in India-

According to Schedule IV of E-waste (Management) Rules, 2016, Rule 17, Central Pollution Control Board, State Pollution Control Boards or Committees of Union Territories, Urban Local Bodies, Port authorities and Customs authorities are the persons having powers to manage e-waste.

CPCB, Delhi grants and renews EPR Authorization, maintains information about EPR on its website, coordinates with SPCB's, prepares guidelines for environmentally sound management of e-waste, conducts random check for producers who have not applied for EPRA, conducts training programmes and sees that hazardous substances are not used in EEE.

SPCB's or Committees of Union Territories does inventorisation of e-waste, grants and renewals of authorization to manufacturers, dismantlers, recyclers, refurbishers and conducts inspection of e-waste centers.

Urban Local Bodies (Municipal Committee or Council or Corporation) have the duty to segregate e-waste and channelize to authorized dismantler or recycler.

Port Authority under Indian Ports Act, 1908 and Customs Authority under the Customs Act, 1962, can verify the EPR Authorization, inform CPCB of any illegal traffic in e-waste and take action against importer.

EPR Authorization Procedure:

According to Rule 13 of E-waste (Management) Rules, 2016, every producer of EEE listed in Schedule I, shall make an application for the EPR Authorization to CPCB within a period of ninety days starting from the date of these rules coming in to force. For obtaining EPRA, the producers should give details of awareness plan, system of collection, transportation & storage, dismantling & recycling, its service provider's/channel partners like logistic partners, PRO's, dismantlers, recyclers and budget for EPR in the EPR plan. CPCB approves EPR plan and grants EPRA, which contains information on yearly collection targets.

According to list of producers granted EPR Authorization under E-waste (Management) Rules, 2016 there are 1926 EPRA producers as on 24th January, 2022[69]. There are 68 Producer Responsibility Organizations registered with CPCB as on 8th November, 2021[70].

[69] https://cpcb.nic.in/epr-authorization-status/
[70] https://cpcb.nic.in/list-of-registered-pro/

E-waste generation:

The problem of e-waste is a serious issue which the whole world is facing today and the main sources of e-waste are manufacturers, bulk consumers, households and importers of e-waste. The e-waste generated from these sources if recycled properly and scientifically will improve the health of humans and also the ecosystems. The e-waste generated is collected and recycled in the following ways- e-waste is formally collected by the authorized authorities like producers, municipal bodies and this is recycled scientifically. Because of unawareness among the public regarding the effects of e-waste and disposal of e-waste, it is being thrown in the dust bins along with the household waste and this is going in to the landfills and the precious materials are not being recovered and this type of disposal is affecting the environment a lot. Some of the e-waste is collected outside of formal systems in countries with a developed e-waste management infrastructure and in this the metal recycling and plastic recycling is done but the precious metals are not extracted fully and they are sent to other countries for extraction. Coming to the last type of managing the e-waste is through e-waste collected outside of formal systems in countries with no developed e-waste management infrastructure. This is done by the informal sector and this type of unscientific recycling is damaging the human health and also degrading the environment.

E-waste and Sustainable Development Goals:

The Sustainable Development Goals 2015 adopted by the United Nation Member States had laid emphasis on sustainable development of the environment. There are 17 goals and mainly they focus on reduction of environmental pollution and aim for good health of humans and ecosystems. Goal 3 emphasizes on good health and well-being and the aim of target 3.9 is to reduce the deaths and illnesses caused from hazardous chemicals and air, water and soil pollution and contamination. Goal 6 aims to provide clean water and sanitation and through target 6.3 by 2030 it wants to improve quality of water and increase recycling and safe reuse of water globally. Goal 8 which highlights on decent work and economic growth through its targets 8.3, 8.5, 8.8 aims to provide decent job creation for all and to promote safe and secure working environment. Goal 11 which aims for sustainable cities and communities through its target 11.6 aims to improve air quality, municipal and other waste management. Goal 12 which emphasizes on responsible consumption and production through targets 12.4, 12.5 by 2020 aim to achieve sound management of chemical and all wastes throughout their life cycle and see that waste is not released in to air, water and soil. By 2030, it aims to reduce waste generation through prevention, recycling and reuse. Goal 14 highlights about life below water and through target 14.1 by 2025 it aims to reduce marine pollution of all kinds.

All these Sustainable Development Goals aim to reduce the pollution caused by chemical and hazardous wastes including e-waste and to see that people are involved in decent work in sound and healthy environment. But how this is possible as much of the e-waste is being unsafely recycled by informal sector. If we see the statistics given by Global e-waste monitor 2020, it clearly depicts that world's e-waste generated is mostly recycled by the informal sector. The people who work in the informal sector are mostly women and children. As e-waste is disposed and recycled in unsafe conditions and due to toxic releases from these e-wastes the health of the women and children is being affected at a large scale. Many children are dying and having serious health problems due to hazardous chemicals and through drinking water which is contaminated with this toxic e-waste. Clean water and sanitation to the people of the globe is a dream. Decent work and economic growth, sustainable cities and communities is difficult to achieve as the e-waste is recycled through informal sector and degrading the health of humans and also degrading the eco-systems. Responsible consumption and production is difficult to achieve as e-waste contains vast raw materials but this can be extracted only if recycling is done through formal sector. As informal sector plays a major role in recycling, we are not able to get the total raw material from this e-waste. To protect the marine life and to prevent marine pollution is a great task as most of the recycling of e-waste is done near the water bodies and the residue left is drained in to these water bodies creating a danger to the marine life.

Conclusion:

The problem of e-waste is the serious issue faced by the present world and we need to do a lot to curb this problem. If we recycle e-waste in a scientific manner, we can extract more secondary raw material and reduce material demand in a secure and sustainable way and this results in building a more circular economy and also we can pass more virgin metals to our next generations.

So, we should use the electronic items to the fullest and discard old items carefully. So the producers should increase the life cycle of e-products and consumers should refurbish and re-use instead of going for new products. Setting up micro-factories, is helpful as it transforms e-waste in to reusable material.

If we analyze the report of SPCB's/PCCS wise review report for the 4th quarter (2019-2020) and 1st and 2nd quarter (2020-2021) and CPCB's observations it shows that many e-waste collection centers are in the list, but they are not working or closed or not traceable at the locations given by the producers in their EPR plan. This clearly indicates that the authorities are not inspecting

properly before giving the permissions. The SPCB's are also giving permission to the dismantlers and recyclers beyond their processing capacity. This is weakening the e-waste legislation. Thus CPCB and SPCB should inspect carefully and give EPR permission and see that EPR is being properly implemented by producers.

The CPCB should see that the producers take-back policy and deposit refund scheme are properly implemented. The consumers should be educated about the take back policy and deposit refund scheme and they should be encouraged to give e-waste to the producers under these policies instead of selling them to persons of informal sectors.

The producers should go for miniature modules and this will help in reduction of e-waste and also the metals will be saved and can be transferred to the next generations.

E-waste disposal awareness should be brought to the consumers through print media, social media, television channels and campaigns by government and non-government organizations. The government should start e-waste management training centers and increase the people who have skill to dispose e-waste scientifically. Even new technologies should be adopted from developed countries and precious metals should be extracted fully. Thus building skilled human capital and new technology helps for scientific management of e-waste.

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UNITARIAN MOVEMENT RESPONSES TO ENVIRONMENTAL ETHICS

Dr. Nabarun Purkayastha[71]

&

Alisha Marba Rani[72]

ABSTRACT

In the last two decades, awareness of various environmental problems has been increasing and there has been various policy making at all levels, local,natioanl as well as international level. Religion and environmentalism has emerged as a subfield in the discipline of Sociology of Religion. Religion being a primary source of values in any culture are conveyed in decisions regarding Environment. Unitarianism is a socio-religious movement in North East India. They are becoming more deeply involved in environmental work. This paper is a reflection on how Unitarianism as a religion have addressed religious commitments towards the environment.

Keywords: Environment, Social Movements, Unitarian, Shillong.

Introduction:

Man is like other organisms, a component of the environment. But unlike other living organisms, man is a unique. The interaction of man with his Creator has impacted in diverse ways, with his activities in his environment in the planet earth. To appreciate the special nature of man, his interactions within the environment,we need to know about man and his environment. We also need to know about movements, which he has evolved in the planet earth. Through a clear understanding of man, environment and social movements, which are keywords in the title of this paper, we will then be in a position to understand how to shapen the course of happenings within the environment.

Environment:

There is perhaps no better way of explaining the keywords in the title of this paper, than to start with the word environment. This has to be so, because the environment outrank man in the planet earth. Environment has become a major issue in the world, as a result of its importance as a major

[71] Assistant Professor, Department of Sociology, University of Science and Technology, Meghalaya

[72] Research Scholar, Department of Sociology, University of Science and Technology, Meghalaya

factor not only in development of nations, but also in the all-important issue of sustainability. So important is environment that Adelegan (2009), quoted a reknowned Nigerian economist Pius Okigbo, as saying, that nations aspiring for outstanding success in the 21st century, must intensity effort in deploying the valuable tool of knowledge, to explore the potentials of their natural environment, to create the wealth they will need in the new century. It is therefore important that no aspect of the national life of the country is left behind, in the bid to have an in-depth understanding of environment. This is particularly so with climate change, a global phenomenon that has been described as the greatest possible threat to the continuing existence of the planet earth (Foley, 1991). In Shillong, the people are claimed to be religious. There is therefore the need for all believers of the diverse religions and all people who ply their trade in religion, to have an in depth knowledge of what environment is. In particular, people should understand their importance and the way they interact and through such interactions influence what goes on in each of them. This precisely, is what this paper has set out to achieve.

Unitarian Movement:

The Khasis are an indigenous ethnic group of Meghalaya in North eastern India who practiced an indigenous tribal religion before the advent of Christianity. They are a matrilineal society and the children take their surname from that of the mother forming a clan under that name from the first mother down the generations. One must not be confused regarding the nature of matriliny in the Khasis. Inheritance is passed down through the female line and all Property acquired by a man belong to his 'mother'. They have a patriarchal system which can be seen in most societies all over the world since in matters concerning the wife and children, the father is the head of the family and the maternal uncles manages of matters relating to family affairs, material and religious connected with the clan. Men and women were considered equal but they have different parts to play. Women are counsellors at home.

The Khasi Society during the 19th Century perceived that their social and cultural elements were lost. It was felt that there was a need to maintain their own identity. The Khasi elders then launched a resistant movement. The Khasi Christians have also in some extent asserted that they wanted to retain their new religion and also keeping their pride in Khasi Culture by retaining their Khasi identity. The Unitarian Movement centered around an individual- Hajom Kissor Singh Nongbri was locally born and founded in 1887. The founder was born at Cherrapunji on 15th June, 1865 who had then converted to the Welsh Calvinistic Church. Later he began to question the rigidness teachings of Welsh Calvinistic Missionaries and started a liberal movement called

'KaNiam Mane Wei Blei'(The Religion which worships One God) on 18th September 1887 at the age of 22. And this was how the movement started.

Unitarian responses:

"Respect for the interdepedent web of all existence of which we are a part."- the principle of the Unitarian Movement. Unitarianism is a liberal religious movement with a significance present all over the world. Ecological views were present in the 1994 publication of the Unitarians, titled *"Unitarian views of Earth and nature*" presented the personal reflection of of six Unitarians about the relation to the natural world. The President of the Movement has rightly said that Environmental sustainibilty should be the basis for economic and social policy. Ecology and environmental concerns has since played a key role in the teachings of Unitarianism. It builts awareness on societal environmental issues. Over the past 10 years, the Unitarians have issued a number of comments and resolutions of which some were: Awareness, Humanity, environmental degradation. They also support equality of respect and oppurtunity for everyone and oppose all oppression and discrimination on the grounds of race or gender, or religious belief. They place their concern on life in this world.

The Unitarian Movement although it took place to change the societal norms. However, it has now took up the initiative of creating awareness and taking part in various activities in order to preserve and protect the environment. One such case can be seen during the recent cleaning drive which took place in as many phases in and around Shillong city. The cleaning phase started in and around Shillong which believed in creating awareness about the evils of single use plastics which have clogged up our drains, streams, rivers. The United Nations Environment Programme (UNEP) report of 2018 titles "Single-use Plastic: A roadmap for sustainability" defines single use plastic as: " Single-use plastics, often also referred to as disposable plastics, are commonly used for plastic packaging and include items intended to be used only once before they are thrown away or recycled. This include among other items, grocery bags, food packaging, bottles, straws, containers, cups and cutlery."

The Operation for cleaning was organised into different phases. The first phase was organised on September 21,2019 at Umkaliar. The next phase was also done on September 28,2019 in Police Bazar area. There were around 300 volunteers. Another cleanup was also held in the River Umiew on November 25,2019 which provides drinking water to the entire population of Shillong. Volunteers were able to collect two pick-up loads of garbage from the river. Such measures has helped a lot in having a cleaner and greener environment.

The Unitarian movement has passed a resolution that human activities inflict irreversible damages on the environment. If not checked properly, many of our current practices put a serious risk on what we wish for the human society. Fundamental changes are important.

It must be emphasized that the Unitarian movement has a role to play in the diverse environments. These challenges include the ecological challenges as well as the sociological challenges. The ecological challenges include such issues as climate change and associated challenges of greenhouse effects, ozone-layer depletion and global warming and environmental pollution. The sociological challenges are those challenges that are arising among the people of developing nations of the world that are compounding the other group of challenges earlier discussed under the ecological challenges. They are challenges that border on poor leadership, bad governance, poverty, political corruption and greed. It is these challenges that are reflecting in poor attitude of leaders to issues of the environment and absence of laws that will regulate activities of people in the environment.

Concluding Remarks:

Unitarians regard the maintenance of a sustainable, diverse and beautiful environment- natural and human- as essential both for our survival and for our well being. For now, all one can say is that unless and until our governments in developing countries of the world appreciate the importance of the environments and give them the appropriate attention they deserve in policy issues, the sustainability of our natural environment will still be under much pressure from the man-made environments-their environments. This is an area the religious groups can come in and assist with proper sensitization of their members on these environmental issues with a view to stopping them or at least mitigate their effects.

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CLIMATE CHANGE CHALLENGES: INDIAN LAW PERSPECTIVES

Kheinkor Lamarr[73]

ABSTRACT

Year 2022 marks fifty years since the environment became an important global issue for the first time during the 1972 United Nations Conference of Human Environment. Since then, concerns over the environment have been a subject of international significance. Amongst the myriad of environmental challenges one of the foremost challenges that the world is collectively faced with these days is the adverse impacts of climate change. The impact of climate change is manifested in the rising temperatures, frequent hazardous weather events, shift in rainfall patterns and rising sea levels. Climate change poses the threat to the health, livelihood and overall well-being of people and raises a number of legal and human rights issues. Developing countries like India with comparatively lower adaptive capacities are amongst the most vulnerable to Climate Change. India is very susceptible to the negative effects of climate change considering its geographical contours, widespread coastline and population. This paper seeks to examine and analyse the challenges associated with climate change and the legal challenges it poses. In this endeavour it examines the international law framework relating to climate change and the 26 th United Nations Climate Change Conference (COP 26). The paper also analyses the Indian position in respect of Climate Change in regard to law and policy.

Keywords: Climate Change, International Law, Indian Law and Police

I. INTRODUCTION

The term environment which is derived from the French root "environ" means "surroundings" refers to both the natural as well as human-made surroundings. All life on earth is impacted by its environment. A sustainable environment is vital and essential to be able to live a dignified and healthy life.

In recent decades, however, the world has been a witness to growing levels of environmental degradation which have consequently raised a variety of serious environmental concerns. Today

[73] Assistant Professor, Khadar Doloi Law College, Jowai Meghalaya

we are observing the depletion of the ozone layer, the loss of biodiversity, desertification and perceiving anthropogenic changes to the climate, a shortage of potable water, soil erosion, etc.

These various environmental concerns and problems that we are today confronted with are for the most both unwanted and unintended as well as "inherently complex" to unravel and solve.[74] Most of the environmental concerns that we face are global in scope and relevance thereby demanding and necessitating a response which is global.

The year 2022 marks fifty years since the 1972 United Nations Conference on the Environment in Stockholm which was the first world conference to make the environment an important global issue. Since then, concerns over the environment have been a subject of international significance. These environmental and ecological concerns have far-reaching grievous consequences for all living organisms.

There are several environmental challenges that the world is facing now. The foremost environmental challenge which the world is collectively confronted with is the adverse impacts of climate change. Climate change discourses have come to dominate nearly all fields ranging from academics to politics and law and almost every aspect of public life. Climate change as an issue of concern is significant because climate change not only impacts adversely on biodiversity and the ecosystems of the planet but has considerable grave human costs.

Climate change poses the threat to the health, livelihood and overall well-being of people and raises several legal and human rights issues. Developing countries like India with comparatively lower adaptive capacities are amongst the most vulnerable to climate change.

This paper seeks to examine and analyse the challenges associated with climate change and the legal challenges it poses and also discusses the Indian law and policy position in respect of climate change. In this endeavour, the paper has thus been divided into four sections. The first section discusses climate change and the challenges associated with it. The second section examines the international law framework relating to climate change. The third section then analyses the Indian position concerning climate change in terms of law and policy. The fourth and final section presents the concluding remarks.

[74] Nagtzaam, Gerry, et al. (2020), *International Environmental Law A Case Study Analysis*, UK: Routledge, p. 1.

II. CLIMATE CHANGE CHALLENGES

Climate change may be understood to mean the "long-term alteration of temperature and typical weather patterns in a place"[75]. It could refer to the climatic change of a particular place or the whole earth. It is of note, however, that climate change occurs naturally on earth. What is of concern for us however is that at present the changes to the climate is taking place at an increased pace.

Human activities have since the 1800s become a major driver of climate change principally due to the burning of fossil fuels[76] leading to the rapid increase of surface temperature. The Intergovernmental Panel on Climate Change (IPCC) published a synthesis report in the year 2015 which presented the conclusion that the warming of the climate is "unprecedented" and "unequivocal".[77] The year 2021 ranked as the 6th hottest year for the globe. It is also the "45th consecutive year (since 1977) with global temperatures, at least nominally, above the 20th century average".[78]

Human-caused climate change is affecting everyone including plant and animal life. Climate change may lead to species movement as well as the destruction of habitats and even pose threats of species extinction.[79] Recent research is already evidencing that climate change has impacted

[75] National Geographic Society, *Encyclopedic Entry on Climate Change*, available at: https://www.nationalgeographic.org/encyclopedia/climate-change/#:~:text=Climate%20change%20is%20a%20long,mid%2D20th%20century%20to%20present.

[76] United Nations Climate Action, *What is Climate Change?*, available at: https://www.un.org/en/climatechange/what-is-climate-change.

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[79] World Wildlife (2018), *Half of plant and animal species at risk from climate change in world's most important natural places*, available at: https://www.worldwildlife.org/press-releases/half-of-plant-and-animal-species-at-risk-from-climate-change-in-world-s-most-important-natural-places.

the migratory movement of animals.[80] This effect of climate change on plant and animal life will subsequently also impact humans by changing what people eat or causing new health risks etc.[81]

Adverse Impacts of Climate Change

Though scientists and climate activists have been pointing out the serious and very tangible consequences of climate change it is relatively recent that this issue has achieved any real focus and attention. People have only just moved past questions of whether climate change is a reality? to actually perceiving its negative effect. For example, climate change has been considered to have contributed to intensifying the 2019-20 Australian bushfires.[82]

The negative impacts of climate change include the rise in sea levels and temperature, changes in rainfall patterns, an increase in hazardous weather events like cyclones[83], a shift in wildlife populations etc. These in turn poses threats to the life, livelihood and general welfare of people.

These negative impacts of climate change give rise to a number of problems and challenges. The problems range from issues of quantity and quality of water to problems of crop yields and desertification to saltwater intrusions.

In brief, five major problems are set to arise or already have arisen out of the various adverse impacts of climate change.

Firstly, the increased surface temperatures significantly affect the availability of both surface and groundwater resources, give rise to droughts and pose significant risks of desertification.

Secondly, Climate change as discussed above poses a significant risk of species migration and even extinction which will invariably affect human beings.

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[80] Sofie Bates (2020), "Arctic Animals' Movement Patterns are Shifting in Different Ways as the Climate Changes", *Earth NASA*, available at: https://www.nasa.gov/feature/goddard/2020/arctic-animals-movement-patterns-are-shifting-in-different-ways-as-the-climate-changes; See also Karina Shah (2020), "Arctic animals are migrating earlier in the year due to climate change", *New Scientist*, available at: https://www.newscientist.com/article/2259144-arctic-animals-are-migrating-earlier-in-the-year-due-to-climate-change/.

[81] Welch, Craig (2017), "Half of All Species Are on the Move - And We're Feeling It", *National Geographic*, available at: https://www.nationalgeographic.com/news/2017/04/climate-change-species-migration-disease/.

[82] Fountain, Henry (2020) "Climate Change Affected Australia's Wildfires, Scientists Confirm", *The New York Times*, available at: https://www.nytimes.com/2020/03/04/climate/australia-wildfires-climate-change.html.
Ghosh, Pallab (2020), "Climate change boosted Australia bushfire risk by at least 30%", *BBC*, available at: https://www.bbc.com/news/science-environment-51742646.

[83] Supra note 5, pp 6-8.

Thirdly, the implications of sea-level rise are also many which include grave ramifications for small island nations and people living in coastal areas. Effects include changing coastal lines, to experiencing flooding, saltwater intrusions and erosion.

Fourthly, the rise in the number and intensity of hazardous weather events pose the problems of displacement and impacts upon the livelihood of people.

Fifthly, climate change also adversely impacts food and water security as well as poses serious health concerns.[84] After being a witness to the grave health ramifications of the COVID-19 pandemic we can realise the seriousness of health issues.

Legal Challenges

The problems arising out of the adverse impacts of climate change have considerable bearing on the legal field. The legal contemplations and reflections over the climate change challenges however are wrought with problems and have powerful reverberations on the notions of justice and ethics. This is primarily so because the communities which are at-risk to the impacts of climate change have for the most part been insignificant contributors towards climate change.[85]

From amidst the many legal challenges that arise out of the impact of climate change, three challenges stand out.

First and foremost is the challenge of Human Rights Protection. This is mainly so as climate change impacts important life aspects like food, health and water thus posing risk to the Right to life, water, food, health as well as adequate housing. The 2015 *Paris Agreement* acknowledged that human rights needed to be considered whilst taking action addressing climate change.[86]

The second is that climate change has security implications and pose a challenge to the sovereignty and territorial integrity of States. As far back as the year 2009 a United Nations General Assembly Resolution recognized and showed concern that climate change and sea-level rise "could have possible security implications".[87] The nature of this challenge is that sea-level rise could alter coastlines and in the case of small island nations completely submerge them

[84] Supra note 5, p. 13.
[85] See Sujatha Byravan and Sudhir ChellaRajan (2010), "The Ethical Implications of Sea-Level-Rise Due to Climate Change", Ethics & International Affairs 24(3):239-260; Glenn Althor, et al. (2016), "Global mismatch between greenhouse gas emissions and the burden of climate change", *Scientific Reports*, 6: 20281, available at: https://doi.org/10.1038/srep20281.
[86] *Paris Agreement*, (2015), FCCC/CP/2015/L.9/Rev.1.
[87] *Climate change and its possible security implications* (2009), UNGA Resolution, A/RES/63/281.

leading to their populations having to migrate to other nations[88]. According to the *Montevideo Convention* of 1933, a State has been understood to have certain qualifications which include, "(a) a permanent population; (b) a defined territory; (c) government; and (d) capacity to enter into relations with other states".[89] Thus one of the important qualifications of a State is "territory" and sea-level rise occurring due to climate change which is a threat to the habitability of small island nations thus poses serious legal challenges over questions of sovereignty and territorial integrity.

The third is human mobility linked to climate change. The migration of people due to environmental factors is an age-old phenomenon. However, the impact of climate change has heightened the seriousness of the issue. This form of mobility is of note because the migration of people due to environmental and climate change in many cases is not of a voluntary nature. By the 1990s the potential of climate change to impact migration was identified. Today we are already noticing instances of people migrating due to the impacts of environmental and climate change.[90]

The legal challenge of migration emanates from the fact that post the demarcation of national borders people can today no longer simply migrate. The situation becomes complex in respect of migration taking place as a result of environmental and climate change as International Law as yet has not recognised such migrants as a category that needs to be protected.

III. International Law on Climate Change

At the international stage more specifically the United Nations, concerns over the environment were not an issue that was much focussed during the initial period following the creation of the United Nations. It was only in 1972 during the World Conference on the Environment (Stockholm Conference) that environment and environmental concerns caught the international limelight. The *Declaration on the Human Environment* and the establishment of the United Nations Environment Programme (UNEP) were two major outcomes of the Conference. The Stockholm Conference has today come to be considered by many to be the foundation for modern International Environmental Law.[91]

[88] See Willcox (2012), "A Rising Tide: The Implications of Climate Change Inundation for Human Rights and State Sovereignty", *Essex Human Rights Review*, 9(1); Benjamin Habib (2015), "Climate Change and the Re-imagination of State Sovereignty", *E-International Relations*, available at: https://www.e-ir.info/2015/11/08/climate-change-and-the-re-imagination-of-state-sovereignty/.
[89] Article 1, *Montevideo Convention on the Rights and Duties of States*, 1933.
[90] See *Ioane Teitiota* v. *New Zealand*, (advance unedited version) (2020), HRC, CCPR/C/127/D/2728/2016.
[91] Supra note 2, p 15.

In the context of the issue of climate change the creation of the Intergovernmental Panel on Climate Change (IPCC) in the year 1988 was an important milestone in bringing focus upon the issue.[92] The IPCC has been instrumental in internationalizing climate change concerns by providing scientific data on climate change through its periodic assessment reports. The most recent report published by the IPCC in 2021 is its *Sixth Assessment Report*. According to this report "Human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years".[93] Further, the report also showcases that climate change impacts have become more complex and increasingly more difficult to manage. It is also undeniable that human beings have been instrumental in the present serious climate change scenario.

The United Nations General Assembly has also addressed concerns over climate change. One of the earliest United National General Assembly resolutions that discussed the concerns of climate change on humankind was in the year1988.[94]

But it is the *United Nations Framework Convention on Climate Change*[95] (UNFCCC) which is the principal international treaty over the subject of climate change and the UNFCCC's Conference of Parties (COP) which has been majorly responsible for the legal and policy developments in the area of Climate Change.

The UNFCCC in Article 1 (2) defines the terminology "Climate Change" to be:

> "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 periods."

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[92] See IPCC, *History of the IPCCC*, available at https://www.ipcc.ch/about/history/#:~:text=The%20Intergovernmental%20Panel%20on%20Climate%20Change%20(IPCC)%20was%20established%20by,UN%20General%20Assembly%20in%201988.

[93] IPCC (2021), Summary for Policymakers. In: Climate Change 2021: The Physical Science Basis, *Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [MassonDelmotte, V., P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M.I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J.B.R. Matthews, T.K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)], Cambridge University Press. In Press.

[94] *Protection of global climate for present and future generations of mankind*, (1988), UNGA Resolution, A/RES/43/53.

[95] *United Nations Framework Convention on Climate Change: resolution / adopted by the General Assembly*, (1992), 1771 UNTS 107.

The UNFCCC's COP has served as the stage for several vital negations which have led to a number of landmark outcomes like the *Kyoto Protocol*[96] and the *Paris Agreement*[97]. The Paris Agreement was significant as parties to the agreement agreed to strengthen actions that would help lower carbon emissions.

The most recent COP was the 26th COP which took place in Glasgow in 2021. The major outcome of COP 26 was the *Glasgow Climate Pact*. The Pact acknowledges climate change as a common concern for humankind and has agreed to increase efforts towards the curbing of greenhouse gas emissions as well has urged developed nations to help developing nations with finances, technology transfer etc.[98] The Pact also makes a commitment towards "the phasedown of unabated coal power".

In addition to the UNFCCC and its COPs, the 2015 *Sustainable Development Goals* is also of importance (2030 SDGs)[99]. The 2030 SDGs Agenda discusses many global challenges and has 17 Goals. From among these Goals, it is Goal number 13 that specifically deals with Climate Change and is targeted towards strengthening "resilience and adaptive capacity to climate-related hazards and natural disasters"[100] as well as improving the quality of education on the subject of climate change mitigation.[101]

IV. INDIAN POSITION-LAW AND POLICY

Developing countries like India which have lower adaptive capacities are very vulnerable to the adverse impacts of climate change.[102] In the year 2018, a special report of the IPCC showed how India faced a strong future likelihood of being confronted with negative effects of climate change in the years ahead.[103] The most recent 2021 IPCC report also expresses concern that India is likely

[96] *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, (1997), UN Doc FCCC/CP/1997/7/Add.1, 37 ILM 22.
[97] *Paris Agreement*, (2015), FCCC/CP/2015/L.9/Rev.1.
[98] Fiona Harvey (2021), "What are the key points of the Glasgow Climate Pact", *The Guardian*, available at https://www.theguardian.com/environment/2021/nov/14/what-are-the-key-points-of-the-glasgow-climate-pact-cop26.
[99] *Transforming our world: the 2030 Agenda for Sustainable Development* (2015), UNGA, A/RES/70/1.
[100] Goal 13.1, SDGs 2030.
[101] Goal 13.3, SDGs 2030.
[102] IPCC (2022), "Summary for Policymakers [H.-O. Pörtner, D.C. Roberts, E.S. Poloczanska, K. Mintenbeck, M. Tignor, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem (eds.)]. In: Climate Change 2022: Impacts, Adaptation, and Vulnerability", *Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [H.-O. Pörtner, D.C. Roberts, M. Tignor, E.S. Poloczanska, K. Mintenbeck, A. Alegría, M. Craig, S. Langsdorf, S. Löschke, V. Möller, A. Okem, B. Rama (eds.)], Cambridge University Press. In Press.
[103] Hoegh-Guldberg, O. et al. (eds.) (2018), *Impacts of 1.5°C of Global Warming on Natural and Human Systems*, IPCC, available at: https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter3_Low_Res.pdf.

to face increased heat waves and weather hazards[104]. Already it is worth noting that India has started to experience the climate change impacts in the form of increased frequency of extreme weather events, floods, cyclones like *Amphan*, etc.[105]

In the area of environment in general, India has a fairly robust legal framework in place. India has a number of environmental legislations. Some of the major legislations include *The Air (Prevention and Control of Pollution) Act*, 1981, *Forest (Conservation) Act*,1980, *Wildlife Protection Act*, 1972, *The Environment (Protection) Act*, 1986, *The National Green Tribunal Act*, 2010, etc.

Also, India is one amongst the few countries of the world whose Constitution has also incorporated within it concerns for the protection of the environment. The Directive Principles of State Policy and the Fundamental Duties[106] chapters clearly articulate the national commitment towards improving and protecting the environment. The Indian Judiciary has also been pivotal in the interpretation of legislation as well as developing environmental law principles[107]. Article 21 of the Constitution guarantees the right to life. over the years the Judiciary has provided for a liberal interpretation of Article 21. The right to live in a healthy and pollution-free environment has been recognised to be a part of Article 21[108].

In respect of Climate Change specifically, it is the *Ministry of Environment, Forest and Climate Change* (MoEF&CC) which concerns itself with the subject matter of climate change. India does not however have any legislation which specifically deals with climate change and address its negative impacts. India is nevertheless a party to the UNFCCC and has also ratified the 2015 Paris Agreement[109]. At the recent COP 26, the Honourable Prime Minister of India Mr Narendra Modi has pledged to achieve the status of a net-zero emitter of carbon by the year 2070.[110]

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[104] DW Made for Minds, *Climate change: IPCC warns India of extreme heat waves, droughts*, available at: https://www.dw.com/en/india-climate-change-ipcc/a-58822174.

[105] Dipu Rai (2021), How has climate change affected Indian cities?, India Today, available at: https://www.indiatoday.in/diu/story/how-has-climate-change-affected-indian-cities-1876164-2021-11-12; Soumya Sarkar (2020), "Cyclones Rise as Climate Change Heats up Indian Ocean", *India Climate Dialogue*, available at: https://indiaclimatedialogue.net/2020/06/05/cyclones-rise-as-climate-change-heats-up-indian-ocean/

[106] Article 51-A (g), *Constitution of India*, 1950.

[107] See *MC Mehta* v. *Kamal Nath*, (1996) 1 SCC 38 [Doctrine of Public Trust]; *Vellore Citizens Welfare Forum* v. *Union of India*, AIR 1996 SC 2718, [Precautionary Principle, Polluter Pays Principle].

[108] *M.C. Mehta* v. *Union of India*, 1987 AIR 1086; *Subhash Kumar* v. *State of Bihar*, 1991 1 SCC 598.

[109] UNFCCC official website, available at: https://unfccc.int/node/61082.

[110] *India put climate change at the centre of its environmental policies in 2021*(2021), The Economic Times, available at: https://economictimes.indiatimes.com/news/india/india-put-climate-change-at-the-centre-of-its-environmental-policies-in-2021/articleshow/88542444.cms.

However, Bhupendra Yadav India's Environment Minister has stressed the fact that "developing countries must not be denied the opportunity for development"[111].

In terms of Policy India does have a climate change policy. This policy is the *National Action Plan on Climate Change* (NAPCC). The NAPCC includes 8 missions which include the National Solar Mission, Water Mission, Mission on sustainable habitat, etc. The policy is premised on the objective of achieving development whilst also mitigating and adapting to climate change. But this policy was launched in the year 2008. Since then, the seriousness of the climate change issue and the vulnerable position in which India specifically finds itself has become more pronounced and additional areas of concern have also emerged. For example, the issue of human mobility through displacement or migration due to climate change is not addressed in the present Indian climate change policy. The NAPCC also suffers from the lack of having an effective monitoring mechanism. Also, there is a lack of clarity as to the progress of the NAPCC.

V. CONCLUSION

In the words of António Guterres, the Secretary-General of the United Nations "Climate change is the defining issue of our time – and we are at a defining moment"[112].

Climate change is a profound challenge that the world is collectively faced with. The worrying impacts of climate change have steadily grown over the years and it is disturbing to realise that if strong actions are not taken, we may be moving towards a possible point of no return. According to scientific data and reports of the IPCC robust measures are needed to address the serious concerns emanating from climate change.

In the Indian context, India is already grappling with numerous climate change issues. It must be acknowledged that India has made commendable engagement with climate change and its ensuing challenges and made efforts towards mitigating its effects. Though India already has in place a strong environmental law framework, there is still a need to specifically address climate change concerns either through specific legislation or a new updated and more nuanced climate change policy. India is also faced with the challenge of balancing its goal of achieving

[111] Amitabh Sinha (2021), "Countries adopt Glasgow Climate Pact after India, China force amendment on coal reference", *The Indian Express*, available at: https://indianexpress.com/article/world/climate-change/glasgow-climate-pact-coal-subsidy-cop26-conference-7621670/.

[112] Secretary-General's remarks on Climate Change [as delivered] (2018), available at: https://www.un.org/sg/en/content/sg/statement/2018-09-10/secretary-generals-remarks-climate-change-delivered#:~:text=Climate%20change%20is%20the%20defining,boom%20SOS%20across%20our%20world.

development and poverty eradication without putting further negative impacts upon the environment.

In conclusion, at both the international and national stages significant moves have been made to combat the negative consequences of climate change. But there is still much that needs to be done and realised to concretely achieve the goal of mitigating and adapting to the impacts of climate change. Faced with the seriousness of this issue it is incumbent upon all of us as individuals to also rise to the challenge and try and help address this issue to the best of our capabilities. It must be remembered that the Blue Planet (earth) is the only home that we know of. Species migration due to climate change is already taking place but as yet humankind may not migrate to another planet. Thus, it is essential that the concerns revolving around climate change be considered seriously and we all commit ourselves towards reducing its negative impacts.

TODAY'S FOCUS ON CLIMATE CHANGE, THEIR IMPACTS AND ADAPTATION: CURRENT SCENARIO

Amit Trikha[113]

ABSTRACT

The climate of the Earth has provided an environment in which humanity has evolved and human cultures have grown and prospered. It also produces events that disrupt human societies on a regular basis, in some cases precipitating the collapse of entire civilizations, though the exact cause in many of those situations is still debated. Climate change is one of the most pressing environmental issues confronting the globe today. The climate events are disruptive when they cause harm to individuals and the natural, social, and economic assets on which they rely, as well as when societies are unable to manage, respond, and recover successfully. As a result, disruption is dependent on a confluence of events and human sensitivity. In short, climate change means the current rapid warming of the Earth's climate caused mainly by the human activity and if it is left unchecked, it will surely poses an unprecedented threat to human civilization and the ecosystems on this planet. This research paper addresses the changes in weather and climate events relevant to extreme impacts and disasters. Moreover the focus of this study is primarily on the urgency of stepping up climate action and identifying the need to map the compounded impacts of extreme events. The irreversible impact of climate change on India will be considered in this study and we will also discuss some approaches like mitigation and adaptation to achieve improved climatic conditions.

Keywords: Human Intervention, climate change, Mitigation, Adaptation, Greenhouse gas.

Introduction

The world today has been experiencing changes in climates, affecting millions of lives. Already, there has been the bleaching of coral reefs, the sea ice volume in the Arctic has been reaching new lows, an increase in the number of natural disasters worldwide (such as wildfires, droughts, floods) and the mass migration of species. Climate change is associated with various adverse impacts on agriculture, water resources, forest and biodiversity, health, coastal management

[113] Research Scholar, Department of Electronics, Om Prakash Jogender Singh University (OPJS). Churu, Rajasthan.

and increase in temperature. Decline in agricultural productivity is the main impact of climate change on India. Climate change would represent additional stress on the ecological and socioeconomic systems that are already facing tremendous pressure due to rapid industrialization, urbanization and economic development (Butzer, 2012).

In health sector, climate change and the resultant rising temperatures and altered rainfall patterns are creating ideal conditions for transmission of infectious diseases such as dengue, chikungunya, zika, malaria; it may also lead to more deaths, crop failures, mental health problems, pregnancy-related complications and heat and humidity-related morbidity (Global Climate report, October 2021). We are not prepared yet to strengthen the health-care system's resilience. Although there is occasional assistance during floods or cyclones, there is an urgent need to construct an infrastructure that can withstand recurring extreme weather disasters. The National Health Mission, which includes the National Action Plan for Climate Change and Human Health, was launched in 2015 with the goal of improving health preparedness and response at the national, state, and district levels by establishing early warning systems and health surveillance to prevent and mitigate extreme heat. We need better strategic plan and more focused steps to cope up the negative impacts of extreme weather and climate change. The United Nations' Intergovernmental Panel on Climate Change (IPCC), in its periodic reports, has shown how climate change is impacting the world. For instance, monsoons in India have become uncertain and this has impacted the paddy harvest in several states of India (K.S. Kavi Kumar, 2020). Cyclones like Tauktae and Gulab, which bookended the summer monsoon in 2021, have increased and are set to increase further. To prevent the worst projections, a consensus has emerged to limit warming to 1.5°C by 2099, but the need to adapt to climate change has grown increasingly significant and urgent at the same time. Building key infrastructure to deal with extreme climate events including cyclonic storms, droughts, and floods is part of climate change adaptation. India has dedicated National Adaptation Fund on Climate Change (NAFCC), launched in 2015. It is a federal grant that was introduced to fulfill the objectives of the National Action Plan on Climate Change (NAPCC) and support state governments in operationalising the State Action Plans on Climate Change (SAPCC) and implementing adaptation projects. The scope of state action plans is largely restricted to state jurisdiction and there is a need to develop a clear vision on further decentralization at district and city levels (Vineet Kumar, Deputy Programme Manager at CSE).

Rapidly changing environmental conditions

The year 2021, was a mixture of climate activities. There were devastating weather events that highlighted the dangers of a rapidly warming planet. Lockdown-induced blue skies and clear air that showed the potential for a cleaner future. Ambitious plans bookending failed promises and

in-keeping with the zeitgeist of our times, some of us continue believing with fear that humans are destroying the earth, while others dismiss those beliefs as conspiratorial rhetoric. From the vantage point of a country where emissions are projected to double or even triple in the next three decades, Indians have reason for both hope and fear. Our rapid urbanization could be an opportunity for us to experiment with green, technologically advanced cities whereas our rapid population growth could facilitate an economic model of development at any cost. India has rightly argued that as a maturing economy, responsible for far fewer emissions per capita than our friends in the west, we should be given some if not the same leeway that industrialized countries have enjoyed in the past (J. M. Mauskar, 2021).

Climate change is primarily due to Human Influence

The UN's Intergovernmental Panel on Climate Change (IPCC) published a report stating that humans have "unequivocally" caused the climate crisis and that "widespread and rapid changes" have already occurred, some irreversibly. As far as monsoon is concerned, it has weakened in the second half of the 20th century mainly due to aerosols from human activity (R. Krishnan, 2020). According to IPCC report, human-induced climate change is significantly disrupting the land-use surface attributes that are leading to the intensification of extreme events. The emissions of greenhouse gases from human activities are responsible for approximately 1.1 degrees Celsius of warming since 1850-1900, and finds that, averaged over the next 20 years, global temperature is expected to reach or exceed 1.5 degrees Celsius of warming. It warned that without sharp emission cuts in the coming decades, the threshold of 2 degrees Celsius will be "exceeded during the 21st century". Unless there are immediate and large-scale reductions in greenhouse gas emissions, limiting global warming to close to 1.5 degrees Celsius or even 2 degrees Celsius over pre-industrial times will be beyond reach. Over the previous 800,000 years, the current rates of increase in the concentrations of the primary greenhouse gases (carbon dioxide, methane, and nitrous oxide) are unprecedented. Several lines of evidence indicate that these increases are the result of human activity. For more than a century, the basic physics underlying the warming effect of greenhouse gases on the climate has been recognized, and our present understanding has been applied to construct the latest generation of climate models. Climate models, like weather forecasting models, plot the condition of the atmosphere on a grid and use physical principles to predict its evolution through time. They feature a depiction of the ocean, sea ice, and the key processes that influence climate and climate change. The results reveal that such climate models can only recreate observed warming when they include the effects of human activity, particularly rising greenhouse gas concentrations (Jones, G.S., P.A. Stott, and N. Christidis, 2008).

Climate change is already having an impact.

After years of research and analysis on over 29000 environmental data series, we have discovered that 89 percent of them showed warming tendencies. The majority of available data is terrestrial, not oceanic, and is focused in Europe and North America, making it difficult to create a worldwide picture. Nonetheless, the conclusion is that regional climate changes, particularly temperature rises, are affecting natural systems around the world, and that these temperature increases are very likely the result of manmade greenhouse gas emissions (L.C. Dube, 2019). There is a lot of evidence that recent warming is having a big impact on terrestrial biological systems, including things like earlier spring occurrences (e.g. leaf unfolding, bird migration and egg laying; and shifts in ranges of plant and animal species). We may currently see variations in the ranges and abundances of algae, plankton, and fish in the oceans, primarily at high latitudes.

The oceans, which have gotten increasingly acidic as carbon dioxide is absorbed by water and converted to carbonic acid, are probably the most significant result of greenhouse gas emissions. So far, we've seen a 0.1 pH decline on average. Increased acidity is projected to have a significant impact on shell-forming species, but research on this topic is still in its early stages.

Other effects of regional climate changes on natural and human environments are emerging, although many are difficult to discern due to adaptation and non-climatic trends such as land-use change. These include earlier spring planting of crops, increase in forest fires in northern high latitudes and warmer and drier conditions in the Sahel, leading to a reduced length of growing season (Rajnish Saryal, 2018).

India to face irreversible impacts of climate crisis

Extreme weather events are becoming more common throughout South Asia, including India, according to the latest IPCC study. It emphasizes that in the twenty-first century, heat waves will grow more violent and frequent; summer and monsoon rains will also increase and become more frequent. Extreme rainfall occurrences will increase by 20% across the Indian subcontinent. Rainfall will become more frequent and erratic, leading to floods, depressions will strengthen into deep depressions, and cyclonic storms will become more common on the eastern and western coasts, according to the estimates. Droughts and heat waves will become the new normal in South Asia and India. Furthermore, using a climate risk atlas to identify compounding impacts of extreme weather events and climate-proofing infrastructures has become a national necessity for growing economies like India. Because of ocean warming and ice sheet and glacier melting, global mean sea levels will continue to rise in the 21st century, even in the lowest emissions scenarios. This will pose a huge threat to those living in locations vulnerable to sea-level rise in India, which has a coastline of nearly 7,500 kilometers. Chandra Bhushan, CEO of iFOREST,

believes that "In terms of India, we now have a double responsibility. To deal with the increasing impacts of extreme weather events, we need to increase resilience in our economy, infrastructure, and social institutions. At the same time, we must take steps to mitigate the situation."

Glacial retreat in the Hindu Kush Himalayas, compounding effects of sea-level rise, intense tropical cyclones leading to flooding, an erratic monsoon and intense heat stress are likely to impact India in recent years (IPCC report). Most of these impacts are irreversible and hence cannot be remediated even if greenhouse gas emissions decline dramatically. Moreover The Indian Ocean, which includes the Arabian Sea and Bay of Bengal, has warmed faster than the global average. Hence, the coastal regions will see the sea level rise through the 21st century, and it will contribute to more frequent and severe coastal flooding in low level areas and coastal erosion. Along with this, extreme sea level events that were previously seen once in a hundred years, could also happen every year by the end of the century (Swapna Panickal, IPCC author & IITM). This report acts as a warning for our human life and according to it, things that were predicted to happen far ahead in the future are now expected to happen much sooner, including intense heat waves, monsoon disruptions, cloud bursts, extreme rain, etc. The situation will only worsen if we do not act faster and decisively and this can be particularly alarming for India.

Climate change will have a negative overall impact

The future climate change would have a mixed impact across regions, but will be detrimental overall. Even small temperature rises will result in net costs in several low-latitude and polar locales. Other locations may see some benefits from temperature increases of up to 2°C or 3°C before the negative impacts become more widespread. Possible increases in wheat production at a temperature increase of 1°C-3°C at middle and high latitudes, while yield decreases over 3°C are an example of this (Sahana Ghosh, IPCC report, 2021).

Potentially Disruptive Climate Events (PDCE)

When the climate changes, potentially disruptive climate events occur at different rates, intensities, and locations than individuals might expect based on previous experience. Climate science is being used by those in charge of anticipating risks, such as the intelligence and security communities, in the hopes of obtaining useful estimates of changing overall risks of future events of interest, as well as forecasts of when and where such events will occur on timescales longer than those of normal weather forecasts. Climatic models focus on replicating the processes that drive the coupled ocean–atmosphere–land system's inter annual and longer-term climate variability rather than forecasting real day-to-day changes in weather over a week or more. Climate forecasting has mostly focused on two time scales: seasonal and centennial. Seasonal predictions, like weather forecasts, are based on initial values, therefore their capacity to generate

predictions is reliant on data provided by initial ocean conditions, particularly sea surface temperatures, which have a substantial influence on atmospheric circulation (Latif et al., 2010). The total melting of the Greenland ice sheet, combined with a world average temperature increase of 1.9℃ to 4.6℃ beyond pre-industrial levels, could result in 7 m sea-level rises over millennia. Complete melting of the West Antarctic ice sheet would result in a 5 metre rise in sea level. Inundation of low-lying areas would be widespread if this happened.

Change in the frequency of extreme weather and sea-level events will have an impact.

Weather and climate extremes are altering in frequency, severity, regional extent, duration, and timing as a result of climate change, and this can lead to unforeseen extremes. Weather or climatic events can also lead to extreme circumstances or repercussions, even if they are not statistically exceptional, by exceeding a critical threshold in a social, ecological, or physical system, or by occurring concurrently with other events. Some climate extremes (e.g., droughts, floods) may be the result of an accumulation of weather or climate events that are, individually,
not extreme themselves (though their accumulation is extreme. Even if the specific cyclone is not extreme in comparison to other tropical cyclones, a weather system like a tropical cyclone can have a huge influence depending on where and when it makes landfall. On the other hand, not all extremes result in catastrophic consequences. Because mean future conditions in some variables are anticipated to be within the tails of current conditions, changes in extremes can be directly linked to changes in mean climate. As a result, defining extreme weather and climate events is difficult, and assessing climate changes that are relevant to extreme effects and disasters requires consideration of multiple factors (L. C. Dube, 2019).

Surprises arising from poorly resolved climate Dynamics

Many extreme occurrences, such as hurricanes, tornadoes, and other severe storms, as well as floods, heat waves, and wildfires, occur over a period of days to two weeks. How such severe events will change in a warming climate is a fundamental subject for climate scientists. Weather statistics are no longer stationary as a result of this warming, and the link between weather and climate has emerged as a study focus. Climate change models nowadays are widely regarded as adequate representations of the long-term secular trend in climate. However, running high-resolution numerical weather prediction models (and its inherent rapid physics, such as cloud–radiation–precipitation interactions) in climate mode is required to acquire a better understanding of how climate change will effect extreme weather (W. Cramer, 2018).

Adaptation is required to address the effects of past emissions-induced warming.

It can be said that even if emissions were stabilized now, global temperatures would increase on average by a further 0.6°C by 2100. Furthermore, some current targets to reduce emissions

assume a global average temperature increase of about 1.5℃ above present (i.e. 2℃ above pre-industrial temperatures). A significant amount of potential impact will therefore need to be adapted to, regardless of how effective are our efforts at mitigation. The range of possible adaptive responses is vast, ranging from simply technological (e.g., marine fortifications) to behavioral (e.g., changed dietary and recreational choices), managerial (e.g., changed farm practices), and regulatory (e.g., planning regulations). However, neither the effectiveness nor the cost of various solutions in totally lowering risks are known. This is true for greater long-term warming quantities, according to the IPCC authors, who concluded that adaptive capacity cannot be anticipated to cope with significant amounts of long-term warming (M.M. Rojas, 2017).

While there is a recognized need to adapt to changing climatic condition, there is an emerging disclosure of limits to such adaptation. Limits are traditionally analyzed as set of immutable threshold in biological, economic or technological parameters. The issues of values and ethics, risk, knowledge and culture are all societal limits to adaptation, but all these limits are mutable.

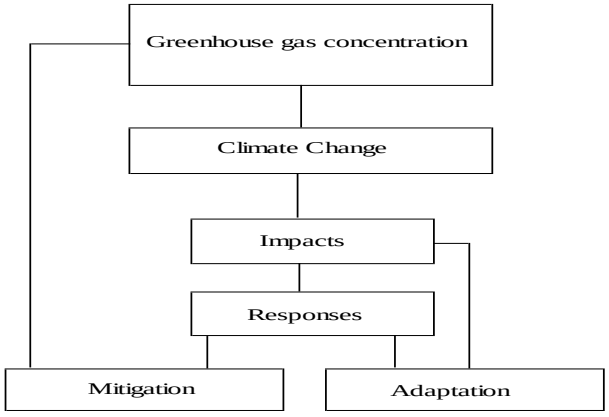

Fig.1.0 Mitigation and Adaptation as two pronged approach.

Many impacts can be avoided, reduced or delayed by mitigation

A small number of impact assessments have now been completed for scenarios in which future atmospheric concentrations of greenhouse gases are stabilized. Although these studies do not take full account of uncertainties in projected climate under stabilization, they nevertheless provide indications of damage avoided or vulnerabilities and risks reduced for different amounts of emissions reduction. **To tackle the issue of climate change, we will require a combination of adaptation and mitigation efforts, but this will be hampered by a lack of information on the costs and benefits of adaptation.** Even the most strict mitigation initiatives will not be able to prevent some of the effects of climate change in the coming decades. These ramifications are already being felt. This necessitates flexibility, especially when dealing with immediate

consequences. Unabated climate change, on the other hand, is likely to outstrip human ability to adapt in the long run (Cruz R V O et al., 1996).

As a result, developing a portfolio or mix of policies that includes mitigation, adaptation, technological development (to improve both the strategies - adaptation and mitigation), and research is critical (Tol, R.S.J. 2005). The combined effect of mitigation and adaptation is explained below:

PARAMETER	**MITIGATION**	**ADAPTATION**
SPATIAL SCALE	**IT IS A GLOBAL ISSUE AND PRIMARILY PROVIDES GLOBAL BENEFITS.**	**IT IS A LOCAL ISSUE AND PROVIDES BENEFITS AT THE LOCAL SCALE.**
TIME SCALE	**MITIGATION HAS A LONG-TERM EFFECT BECAUSE OF THE INERTIA OF THE CLIMATIC SYSTEM.**	**ADAPTATION HAVE SHORT TERM EFFECT ON THE REDUCTION OF VULNERABILITY.**
SECTORS	**IN THE ENERGY, TRANSPORTATION, MANUFACTURING, AND WASTE MANAGEMENT INDUSTRIES, MITIGATION IS A TOP PRIORITY.**	**ADAPTATION IS A TOP PRIORITY IN WATER AND HEALTH SECTOR.**
FUNCTIONALITY	**IT INVOLVES TAKING THE NECESSARY PRECAUTIONS TO MITIGATE THE**	**IT INVOLVES THE REDUCTION OF EMISSION OF**

	EFFECTS OF CLIMATE CHANGE.	**GREENHOUSE GASES.**

Fig. 1.1 Difference between Mitigation and Adaptation

However, assessing the benefits of various strategy combinations is currently hampered by a lack of data on potential impact costs, a lack of comparable data on the damage that could be avoided through adaptation, and, most importantly, a lack of understanding of how these impacts will vary across different socioeconomic development pathways. It's critical that these knowledge gaps are swiftly filled (W.N.Adger, 2009).

Problems in Implementing Environmental Policies in India

Environmental regulations play a critical role in promoting long-term development. It establishes a legal foundation for safeguarding people and the environment. In India, environmental protection has been elevated to the status of a basic legislation. According to the Indian constitution, every individual has the human right to live in a pollution-free environment, we have environmental protection measures in the constitution and other statutes that reflect the sustainable development concept. Notably, the government has passed various legislations to curb the damage caused to the environment such as the Environmental Protection Act, 1986, Forest Conservation Act, 1980, Water Prevention and Control of Pollution Act, 1974, Biological Diversity Act, 2002, Public Liability Insurance Act 1889 and National Green Tribunal Act, 2010. However, despite all these laws, it is increasingly evident that we have dramatically altered the ecosystem, started to exhaust the already limited natural resources, and polluted the environment which makes difficult for all living organisms to live a quality life in their ecosystem. According to the United Nations report, 'Environmental Rule of Law,' which is the first-ever global evaluation of environmental rule of law, inadequate enforcement of environmental legislation has been a global trend over the last four decades. It also claims that a lack of political will is one of the most significant obstacles to enforcing environmental laws and regulations. Moreover, lack of independent regulatory body for environmental governance, lack of adequate funds to the Pollution Control Boards, ineffective pollution control mechanism, fast pacing population, ignorance of environmental issues, consideration of humans as superior to ecosystem and nature are few important reasons for the poor implementation of environmental policies and laws in India (Rajnish Saryal, 2018).

Conclusion

In the context of the current debate about climate change, it is necessary to show, far from being inactive in India, that considerable actions in terms of policies, programs and projects are being taken. Technology transfer can speed up the modernization process and additional funds can accelerate government in the control of energy conservation. However, Poor populations will be at greatest health risk from climate change because of their lack of access to material and information resources. Long-term improvement in the health of impoverished populations will require income redistribution, increased employment opportunities, better housing and stronger public health infrastructure. Services with direct impact on health, such as primary care, disease control, sanitation and disaster preparedness and relief, also must be improved. Furthermore, reducing socioeconomic vulnerability continues to be a primary objective. Implementation of adaptation measures surely will have future benefits due to reduction in impacts associated with current climate variability. Apart from this, Intensive research is also needed on the processes of "adaptation decision-making", including identifying the roles and responsibilities of individuals, communities, nations, institutions and the private sector in adaptation. It is now clear from the entire discussion that the magnitude and character of the problem of global climate change is such that a community-wide understanding and satisfactory response is required.

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CLIMATE CHANGE-RELATED SEA-LEVEL RISE AND ITS SOCIETAL REPERCUSSIONS

Mamta Abrol [114]

ABSTRACT

Climate change has a significant impact on sea level rise. It has attracted international attention since rising sea levels will have major consequences in numerous places of the planet in the future. There are several problems that science has to solve in relation to sealevel rise. In the past, how much did climate change contribute to sea-level rise? In the future, how much will the global mean sea level rise? How severe will the effects of the expected sea-level rise be, and will human civilization be able to cope with them? This study tries to provide answers to these issues by conducting a thorough evaluation of the relevant literature. First, the current state of observable sea-level rise is described, together with studies of its causes and future estimates. The repercussions are then studied, together with other climate change consequences, from a global perspective. Finally, in order to understand the significance of the sea-level rise issue for human society, responses to negative repercussions will be examined.

Keywords: Climate Change, Sea Level, Human Civilization

Introduction

One of the most dramatic repercussions of climate change is sea-level rise. The world's attention has been drawn to the high estimated rates of future sea-level rise. Nations in low-lying areas and tiny islands, in particular, are afraid that flooding and coastal erosion would reduce their land areas, forcing a considerable proportion of their people to move to neighboring countries. As a result, as the effects of climate change become more obvious, this subject has garnered more international attention. Physical processes such as tides and waves cause the sea level to fluctuate throughout time and space. The height of the sea surface averaged over a period of time, such as a month or a year, long enough to eliminate oscillations produced by tides and waves, is described as mean sea level at a certain location. The global mean sea level has a regional dispersion. Global mean sea level refers to the average sea level throughout all of the world's seas (GMSL). Because processes that dominate at regional and

[114] Research Scholar, OPJS University, Churu, Rajasthan-

local scales alter the global mean change, changes in local mean sea level frequently differ from those in GMSL. In this study, we use the term "sea-level change (rise)" to refer to the change (raise) in mean sea level in a broad sense, covering both global and local changes. When the phrases "global (local) sea-level rise" and "global (local) mean sea level rise" must be distinguished, a particular term such as "global (local) sea-level rise" is used.

Changes in sea level are caused by a variety of factors, not just those connected to climate change. For the past few hundred thousand years in the Holocene, the mean sea level has seen considerable fluctuations owing to the alternating of glacial and interglacial eras. The difference in mean sea level reached nearly 120 meters. Tides, waves, and tsunamis are all examples of significantly shorter-term variations in sea level. Climate change-related sea- level change has its own distinct features within such a vast spectrum of variations. Given the potential for severe consequences, scientific study is expected to provide answers to a slew of issues. They contain the following questions: To what degree did climate change contribute to the growth in GMSL in the past? How much will GMSL rise as a result of climate change in the future? How significant will the effects of predicted sea-level rise be, and will human civilization be able to cope?

Based on a review of recent research in the relevant domains, this study seeks to provide answers to these issues. First, the current state of observable sea-level rise is described, together with studies of its causes and future estimates. Then, from both a global and a Japanese viewpoint, this article will look at the effects of sea-level rise, as well as other climate change variables. Finally, we'll talk about how we're going to deal with the negative consequences. The Intergovernmental Panel on Climate Change has examined the most recent scientific understanding in a methodical manner (IPCC). Since its inception in 1988, the IPCC has released four major assessment reports. According to the First through Fourth Assessment Reports, anticipated sea-level rises by 2100 will be 31–110 cm (business as usual scenario), 13–94 cm, 9–88 cm, and 18–59 cm, respectively. 2–5) The IPCC employed several climate models and scenarios for greenhouse gas (GHG) emissions in each of the assessments. The main reason for the variations in the expected rise in mean sea level is because of this. The figures presented in the Fourth Assessment Report (AR4), which was released in 2007, are particularly low. Because there was a lack of solid knowledge of the dynamics of these ice sheets, including collapse and outflow, the evaluation did not take into consideration the contribution of the Greenland Ice Sheet (GIS) and West Antarctica Ice Sheet (WAIS). As a result, some academics believe that these projections represent the low end of potential sea level increase.

Following the publication of the IPCC AR4, progress has been made in a number of areas relating to sea-level rise. More detailed and accurate sea-level change data became available for the previous variations in GMSL from the 19th to the 21st centuries, thanks to improvements in processing techniques applied to satellite altimeter data combined with tide gauge data (Cazenave and Llovel, 2010; Church and White, 2011; Ray and Douglas, 2011). 6–8) Global warming causes an increase in ocean heat content, which therefore becomes a key contributor in mean sea-level rise due to thermal expansion of sea water. Various strategies for correcting prior data obtained by the expendable bathythermograph (XBT) were also developed in order to generate a more trustworthy estimate of changes in ocean heat content. Although reliable quantitative measurements of the ice sheets in Greenland and Antarctica are still challenging, knowledge of the mechanisms governing the increase/reduction of ice sheet mass has evolved. New forecasts of future sea-level rise have been produced based on the development of process-based models, such as atmospheric and oceanic general circulation models, for both the twenty-first century and beyond (AOGCMs). Semi-empirical models for projection are constructed in tandem with process-based models by linking previous data on global mean temperature and mean sea-level, despite the empirical relationship having no physical scientific basis. Many studies have been conducted in the subject of impact assessment to better understand the possible effects of sea-level rise. The present paper provides an overview of the sea-level rise issue based on a review of these and other relevant publications.

Sea levels have risen, since the end of the nineteenth century

We'll start by looking at observed sea-level variations over the last 100 years. The measurements were made in two ways: one using tidal gauges, and the other using radar altimeters mounted on satellites. Because dense and consistent measurements are required for whole oceans, it is difficult to determine the height of global mean sea level directly. The Permanent Service for Mean Sea Level (PSMSL), which is operated by Proudman Oceanographic Laboratory, Bidston Observatory in the United Kingdom, has gathered the data collected by tide gauges. PSMSL now receives data from about 1900 tidal gauges in nearly 200 countries. Despite their enormous number, tidal gauges are disproportionately distributed over the Northern Hemisphere. Because uncorrected tidal gauge data also reflects land movement at the observation location, the study for a long-term change in the global mean sea level relies on tide gauges that are located on stable ground. Moreover, throughout the current interglacial era, the earth's crust has continued to rebound (visco-elastic reaction) from the melt of huge

glaciers. Glacier Isostatic Adjustment is the term for this (GIA, see 3.4 for further discussion). As a result, in order to determine the mean sea level, the GIA land movement must be corrected. According to Lemke et al. (2007)12), the GIA correction ranges from about 1 mm/year (or more) near former ice sheets to a few tenths of a millimeter per year in the far field; the error in tide-gauge based models ranges from about 1 mm/year (or more) near former ice sheets to a few tenths of a millimeter per year in the far field. The GMSL change due to GIA is estimated to be 0.15 mm/year.

Topex/Poseidon, a satellite altimeter launched in 1992, was the first spacecraft to make observations. This research will continue with the use of succeeding spacecraft like Jason-1 and Jason-2. The distance between a fixed reference surface (usually a conventional reference ellipsoid) and the sea surface is determined by the satellite altimeter. Satellite altimetry has been the primary method for precisely and constantly measuring sea level since the early 1990s. This is owing to its benefits over tidal gauges, such as a regular worldwide coverage

with many return cycles and the lack of effect of land movement. The Topex/Poseidon altimeter had rather substantial inaccuracies at first, but thanks to altimetry system adjustments and data processing, the precision of the estimate has greatly increased.

Changes in sea level and the factors that cause them, as well as their contributions

1. Factors causing changes in sea level.

What causes long-term increases in mean sea level is the next question. To address this topic, we'll look at the numerous elements that influence mean sea level. Changes in the overall volume of sea water, as well as movements of the earth and ocean bottom, result in changes in the size and form of ocean basins. Winds, atmospheric pressures, ocean currents, and waves, among other things, play an influence. As a result, there are several variables with varying temporal and geographical scales.

A. Factors related to changes in volume of sea water contained in ocean basins

I. Thermal expansion of sea water
II. Growth/decay of land-based glaciers and ice caps
III. Growth/decay of ice sheets, such as Greenland Ice Sheet (GIS) and West Antarctica Ice Sheet (WAIS)

IV. Terrestrial water storage, i.e., dam reservoirs, lakes, etc, and depletion of groundwater

B. Factors related to changes in the size and shape of the ocean basins

I. Isostatic adjustment of land mass, especially Glacier Isostatic Adjustment (GIA)
II. Tectonic movement including ground subsidence/uplift associated with earthquakes
III. Ground subsidence/uplift due to compaction of the ground, pumping up of ground water, etc
IV. Sediment inflow from land

C. Other factors causing local/temporal changes in sea level

I. Changes in ocean currents
II. Changes in atmospheric pressure
III. Tide, tsunami, storm surges and waves
IV. Natural inter-annual variations, such as the Pacific Decadal Oscillation (PDO)

Many of the elements listed above are individual factors that are directly linked to changes in sea level. These causes, in general, induce sea-level variations as a result of geophysical occurrences or events. The glacial-interglacial cycle is the most prominent of these events that causes changes in sea level. During the last 500 thousand years, this has happened six times, the estimated mean sea level and air temperature in Antarctica show comparable temporal trends. During the previous 140 thousand years, during the last interglacial period, 130 to 120 thousand years B.P., global mean sea-level was several meters higher than it is today. The last glacial epoch began roughly 120 thousand years ago, and during the glacial maximum 20 thousand years ago, the mean sea level was around 120 meters below the current level. The present interglacial period began 15 thousand years ago, and sea level

began to increase as the ice sheets melted. Furthermore, sea level was 2 to 3 meters higher than it is now during the warm era from 7000 to 6000 years B.P. The Jomon Transgression, as it is known in Japan, is caused by the visco-elastic reaction of the plate on which the Japan islands are located to the rising GMSL. This research focuses on the change in mean sea level from 100 years ago to the end of the twenty-first century, a significantly shorter time scale than the alternation of glacial/interglacial eras. In the parts that follow, we'll look at the most recent scientific understanding on sea-level change over a 100-year time period, with an emphasis on important direct contributors.

1. **Factors affecting variations in the amount of seawater in ocean basins.**

Thermal expansion of sea water and melting of land-based ice are two major variables that have influenced recent sea-level change. Melting and outflow of ice sheets in Greenland and Antarctica are examples of the latter.

Heat is transmitted from the atmosphere to the ocean when the concentration of GHGs in the atmosphere causes a rise in air temperature. The surface mixed layer, where water temperature and density are virtually consistent owing to intense wind mixing of surface waters, absorbs the majority of the ocean's heat. The heat from the mixed layer is then transferred to the deep layer through the thermocline. Because the ocean's heat capacity is nearly 1000 times that of the atmosphere, it is estimated that the ocean's heat storage accounts for about 90% of the heat received by the globe over the last 40 years. This heat storage capacity is 20 times more than the atmosphere's. As a result, rising ocean heat content is recognised as a leading indication of global warming. It's also worth noting that the ocean will take millennia to establish thermal equilibrium since heat convection and diffusion in the ocean is a lengthy process. This indicates that the water will continue to absorb heat for over a thousand years, but the air temperature will stabilise in a considerably shorter time.

Increased heat storage boosts water temperature, causing sea water to expand thermally. As a result, ocean heat storage is a key element in global warming-related mean sea-level rise. We need to know the regional distribution of sea water temperature to determine the ocean's thermal expansion. The vertical distribution of temperature was observed using an expendable bathythermograph (XBT) and a mechanical bathythermograph (MBT). XBT observations began in the mid-1960s, whereas MBT data is accessible from World War II until roughly 1990. ARGO floats have lately become popular for monitoring ocean parameters such as temperature and salinity. It's been hypothesised that the XBT and MBT data have a large positive temperature bias. For example, when an XBT falls in the ocean, the vertical locations are estimated using the XBT's falling velocity formula, resulting in inaccuracies in temperature data at deep. Intensive investigations were conducted to fix mistakes and conduct statistical analysis for the current XBT and MBT data, resulting in new estimates for historical changes in ocean heat content (e.g., Ishii and Kimoto, 2009; Levitus et al., 2012)

3. **Regional distribution and sea-level increase compared to the rest of the world**.

We've just looked at global mean sea level averaged over whole seas thus far. Changes in sea level, on the other hand, have a geographical distribution. Local changes in density structure,

ocean currents, the frequency of low pressure systems, and other factors are thought to be responsible for this dispersion. In addition, real variations in local mean sea level are a mix of those caused by changes in ocean volume as well as local crustal and land movement. Relative sea-level rise occurs when a combination of variables causes an increase in sea level (RSLR). Because the external factor influencing coastal zones is sea-level rise relative to

land, it is required to calculate the RSLR in order to assess the effects of sea-level rise. Glacier Isostatic Adjustment is a common crustal movement (GIA). This is a long-term rebound of sections of the earth's crust that were buried beneath massive ice sheets during the last ice age. This movement may be seen in northern Europe, northern North America, Siberia, and the Antarctic region. Since GIA persists now, it produces a sea-level fall relative to land rather than a rise; for example, from 1880 to 2010, Stockholm in Sweden witnessed a sea-level decline of 3.82 mm/year, while Bergen in Norway saw a sea-level loss of 0.54 0.21 mm/year. The distribution of GIA is calculated by assuming a viscoelastic body and analysing the reaction of the crust to the departure of massive ice sheets (e.g., Peltier, 2009)

Land subsidence, on the other hand, is a common local occurrence because they are made up of a loose deposition of sediments, deltas generated by huge rivers experience sinking owing to compaction. Land subsidence is also caused by human activities such as the extraction of ground water for industrial purposes and irrigation. For example, large-scale sinking occurred in Bangladesh's Ganges delta and Thailand's Chaophraya delta (17 mm/year from 1960 to 1994). Flooding and storm surges were more likely as a result of this. Aside from such processes, plate tectonics and earthquake-induced uplift/subsidence are additional elements that influence local alterations. In the Ojika Peninsula, Miyagi Prefecture, the Great East Japan Earthquake in 2011 caused 1.2 meters of subsidence.

Sea-level increase projections

1. Twenty-first-century projections

Sea-level rise projections are based on semi-empirical and atmospheric and oceanic general circulation models (AOGCMs). Process-based models are what they're called. These are models that represent physical processes that cause sea-level rise, such as ocean thermal expansion, land-based ice melting, and ice sheet shifts. In general, AOGCMs compute thermal

expansion of the seas directly, whereas other elements, like as glacier melting and ice sheet changes, are estimated using output from AOGCMs as boundary conditions by models unique to each target phenomena. The physical processes of the climate system are coupled with future scenarios for GHG emissions in future forecasts utilizing AOGCMs. The IPCC's Special Report on Emission Scenarios (SRES) has been frequently utilised for this purpose. The SRES scenarios are made up of six alternative GHG emission scenarios based on diverse demographic, sociological, economic, and technological change routes.

In comparison to 1980–1990, global average temperature is expected to rise by 1.1–6.4℃ by the end of the century. The noteworthy characteristic is that the amount of the temperature increase changes depending on the emission scenario, which is based on the SRES scenario's socioeconomic growth route. Even under the B1 scenario, which assumes the lowest GHG emission route, the temperature increase by the end of the century will be 1.8 ℃ (with a probable range of 1.1–2.9 ℃). The temperature rise for the most fossil fuel-intensive (A1FI) scenario is anticipated to be 4.0 ℃, with a plausible range upper limit of 6.4 ℃. If the global average temperature rises by this much, the Arctic and the midlands of big continents would see significantly larger rises, with severe consequences for those regions. Higher estimates of GMSL increase based on semi-empirical models were released in tandem with the

improvement of process-based models. Even in the forecast of thermal expansion and estimations of the overall volume of mountain glaciers and ice caps, according to Rahmstorf (2007), substantial errors persist. The uncertainties surrounding polar ice sheets are significantly greater. A semi-empirical model based on an assumed linear connection between global mean temperature increase and the rate of sea-level rise has been created as a realistic alternative to process-based models for estimating increases in the GMSL. Rahmstorf (2007)33) applied the connection to the projection of sea-level rise after calibrating the model with historical data.

The Representative Concentration Pathways (RCPs), a new set of scenarios, was recently presented. A great deal of work has gone into developing new assessments for future climate change using RCPs. The IPCC Fifth Assessment Report, due out in 2014, will include revised GMSL predictions that take into account the new scenarios and progress gained since AR4.

2. Large sea-level rise is a possibility.

The possibility of a massive sea-level rise of many meters is a big concern. Each factor associated with sea-level change, has its own time scale. For example, because the ocean's heat

capacity is far greater than the atmosphere's, it takes over 1000 years for the ocean to attain thermal equilibrium once the atmosphere does. The deep ocean circulation has a significant influence in this ocean warming between Norway and Greenland, as well as near Antarctica, deep-ocean water forms. Cold, thick water descends from the surface to the deep sea at these locations, where it is eventually transferred to larger ocean basins.

The prospect of a large sea-level increase of many meters is a major source of anxiety, each component linked with sea-level rise has its own time scale. Because the heat capacity of the ocean is significantly larger than that of the atmosphere, it takes over 1000 years for the ocean to reach thermal equilibrium once the atmosphere does. This ocean warming is mostly influenced by deep ocean circulation. Deep-ocean water forms between Norway and Greenland, as well as near Antarctica. At these areas, cold, dense water drops from the surface to the deep sea, where it is eventually transmitted to bigger ocean basins. Even if it occurs in the remote future, such a high sea level would have massive global consequences if it occurs. The only way to combat this issue is to slow the rate of climate change by drastically reducing GHG emissions. Despite the fact that information regarding the behaviour of the GIS and WAIS is still limited, a proactive strategy is vital for preventing triggering the collapse of the GIS and WAIS.

In summary, there are two types of dangers associated with sea-level rise: immediate consequences and extremely long-term repercussions. When preparing answers, we must consider both time scales

Assessment of coastal impacts

What are the consequences of a further rise in mean sea level? This section will examine the findings of relevant research in order to answer this question. The following are some of the most common effects of rising sea levels.

1) Inundation and flooding of low-lying coastal regions have been worsened.

2) Coastal erosion has risen

3) Consequences for coastal ecosystems such salt marshes, mangroves, and coral reefs

4) Infiltration of salt water into estuaries and aquifers

5) Changes in river channel sediment deposition

6) Higher-order affects on the natural environment and human civilization that are a result of the fundamental impacts described above

As stated in the IPCC AR4, several researches have been conducted to investigate these implications. The findings of these investigations will be presented in this part, with an emphasis on important topics.

Impacts of coastal inundation and flooding

(a)Coastal floods and inundation effects

(b) An overall evaluation.

Inundation and floods are two of the most serious consequences of rising sea levels. If sea level rises at a rapid rate, and storm surges and big waves are added to the mix, inundation regions are projected to grow dramatically. Many studies have been conducted to estimate the impacted regions and persons at risk owing to such flooding on a worldwide scale (e.g., Nicholls et al., 1999; Nicholls and Cazenave, 2010).

Maruyama and Mimura (2010) used a combination of sea-level rise projections and 1/100- year storm surges assessed along world coasts to predict a worldwide risk of flooding.

- In a "No Protection" scenario, the global flooding area is 1.32 million km2, which is marginally decreased to 1.25 million km2 in a "Protection" scenario (SRES A2 scenario). Because protection will not be implemented on beaches with low population density or in nations with slow economic development, even the "Protection" option does not indicate a significant reduction.
- The current population at danger (those living in places affected by a 1/100 year storm surge) is predicted to be 270 million people throughout the world. By 2100, this population will have risen to 670 million people in the absence of coastal protection and 450 million people in the presence of coastal protection, respectively (A2 scenario). It's worth noting that the A2 scenario yields the highest figure, and the amount of individuals at risk varies depending on the scenario. For example, in 2100 (with protection), the number of persons at risk for A1B, B1, and B2 is estimated to be 90, 90, and 240 million, respectively.
- Approximately 80% of those at risk reside in Asia and the Pacific today. Because this region has mega-deltas of big rivers, coastal mega-cities, and tiny island countries, this

proportion would not vary significantly during the twenty-first century under the A1B scenario. As a result, the Asia-Pacific region is particularly vulnerable to flooding and inundation.

- On the other side, Asia is likely to have rapid economic expansion. Despite massive population expansion, if coastline protection is updated appropriately, the population at risk will be decreased to a level below the existing amount. Similarly, the IPCC AR4 determined that the population at danger is greatest in Asia and Africa's

  populated deltas, and those low-lying, tiny islands, where safe migration options are scarce, are particularly susceptible.

Impacts on coastal landforms and ecosystems.

(a) Erosion of sandy beaches.

Beach erosion has long been a focus of attention among the effects on coastal landforms. It is already a prevalent issue throughout the globe. Beach erosion is a problem in many nations, and it's caused by a variety of factors including reduced sediment supply from rivers, land subsidence, and disruption of long shore sediment transport by man-made buildings. Erosion will be exacerbated when the sea level rises, forcing waves to act on higher portions of the beach profile. Sandy beaches have a dual purpose: they serve as a natural breakwater that protects inland settlements while also providing enjoyment. If sandy beaches vanish as a result of sea-level rise, higher places along the coast will be impacted by waves and storm surges. This reality will require us to reinforce existing seawalls and construct new ones, such as those along the Japanese coasts. Beach erosion has long been a problem in Japan, owing to the loss of sediment sources and the disruption of sediment flow by coastal infrastructure like jetties and breakwaters. These impacts were not taken into account in Bruun Rule assessments since these factors varied regionally.

(b) Impacts on coastal ecosystems.

Salt marshes, tidal flats, and mangroves are among the habitats found along the coast. If there is a shortage of sediment supply from land and no hinterland for migration, they are regarded to be experiencing the negative consequences of sea-level rise. Because certain mangrove species breathe by aerial roots that just above the water surface, they cannot thrive in an environment with greater sea levels and salt. As a result of the altered habitat, they will relocate to higher elevations or change species. They can't move landward since the landward border is typically already created for human activities. As a result, mangrove habitat would be reduced.

In Thailand, for example, a large-scale retreat and reduction of mangrove regions is already occurring due to ground subsidence (relative sea-level rise).

Heat stress is a threat to coral reefs. This is not a sign of rising sea levels, but it is projected that a 1–3°C increase in sea water temperature will produce more frequent coral bleaching, resulting in coral reef destruction. Another big issue about climate change's ecological consequences is this.

Responses to adverse impacts of climate change and sea-level rise

Mitigation and adaptation are the two primary categories of climate change responses. The goal of mitigation is to stabilise the climate system through reducing GHG emissions and sequestering GHGs in forests, among other things. Mitigation can be regarded to avoid a "unmanageable scenario" caused by major climate change since it tries to maintain climate change within the level to which human civilization and the ecosystem can adapt. A large- scale irreversible shift, including the breakup of the GIS and WAIS, is part of this untenable condition. Because retreat provides the benefit of maintaining the coastal ecology, it is frequently prioritised above ecosystem-based adaptations like increasing coral reefs and mangroves. However, in the aftermath of the devastating Indian Ocean Tsunami in 2004,

hurricane Katrina in 2006, and the Great East Japan Earthquake and Tsunami in 2011, people once again recognised the importance of strong coastal protection structures, as well as their limitations, particularly for coastal megacities and places with critical facilities such as large industries and nuclear power plants. Coastal megacities with populations of more than 10 million people are expected to rise in Asia as a result of population expansion and economic development.As a result, by the middle of the twenty-first century, climate change consequences will outnumber population and economic activity increases. As a result, it is self-evident that climate change and sea-level rise must be factored into urban and infrastructural development.

At the same time, the coastal zone is marked by a diversity of ecosystems and strong primary productivity. Coastal cities, transportation, fishing, tourism, and recreation are all examples of human activity. It has long been recognised that integrated coastal management (ICM) is critical for ensuring the coexistence and well-being of various activities and services. As a result, it is critical that coastal adaptation be included in the ICM.

Conclusion

The current state of scientific understanding of the sea-level rise issue, as well as its environmental and societal consequences, is examined in this study. The following is a summary of the important points mentioned in this review.

- Intensive research has been conducted on the elements that influence current sea-level rise. Their findings come close to providing a quantitative explanation for the previous sea-level increase budget. Thermal expansion and melting of mountain- based glaciers and ice caps prevailed over the twentieth century. Although the functions of the Greenland Ice Sheet (GIS) and the West Antarctic Ice Sheet (WAIS) were previously unclear, new research have revealed that these ice sheets have been melting and outflowing since the end of the twentieth century.
- The anticipated global sea-level rise of 2100 poses a severe danger to coastal zones across the world. When tropical storm intensity is combined with sea-level rise, the population at danger of inundation is projected to reach several hundred million people. As a result, we must treat climate change as a security concern in order to ensure the safety of such a vast number of people, particularly in Asia and Africa.
- Some research show that tropical cyclones may become more intense as a result of climate change, although there is still a lot of uncertainty. Collaboration between climate research and coastal engineering should be encouraged to limit the range of uncertainty associated with the dangers of greater storm surge and waves.
- It is unavoidable that countermeasures against negative repercussions (such as coastal adaptation) be implemented. To this purpose, we require effect forecasts on a local scale, which poses a significant challenge to the research community. Integrated coastal management is critical for ensuring the coexistence and well-being of the natural environment and human activities in the coastal zone as part of coastal adaptation.
- Small islands, as well as Asia and Africa, which have experienced rapid population expansion and economic development in the twenty-first century, are particularly vulnerable to sea-level rise and climate change. To increase social capacity for adaptation, a mix of hard measures, such as infrastructure development, and soft
- measures, such as urban planning and catastrophe risk reduction, should be enhanced in these regions.
- We can see from this review that the topic of sea-level rise spans a wide variety of fields, from natural science, engineering, and applied sciences to social sciences and

humanities. As stated in this paper, progress has been made in each field, spurred forward by widespread interest throughout the world. On the other hand, increasing scientific understanding and the accuracy of predictions for bridging research results in order to build effective remedies against the consequences of sea-level rise remains a major issue. This is an area that desperately requires inter-disciplinary collaboration, and the author hopes that progress will be made in that direction.

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THE RELATIONSHIP BETWEEN HUMAN RIGHTS AND THE ENVIRONMENT

Ilasara Darisa Kharkongor[115]

ABSTRACT

The relationship between human rights and the environment has become a global discussion. The right to life is an inalienable human right. Clean air, water and sustainable resources are the primary sources of a healthy life and lifestyle without which our overall wellbeing cannot be achieved. Human rights and the environment are interlinked and intertwined. Without a healthy environment, we are unable to fulfil our aspirations. In India a separate ministry namely the department of environment was established in 1980 to ensure a healthy environment for the country. The use of existing human rights and the need for new human rights for a safe and clean environment. Climate change is a global problem. That is why locating the right to a decent environment within the corpus and institutional structures of economic, social and cultural rights makes more sense. In that context the policies of individual states on energy use, reduction of greenhouse gas emissions, land use, and deforestation could be scrutinized and balanced against the evidence of their global impact on human rights and the environment.

Thus, the aim and objective of this paper is to examine the laws relating to human rights and environment.

Key words: human rights, environment and sustainability.

Introduction

All human beings depend on the environment in which we live. A safe, clean, healthy and sustainable environment is integral to the full enjoyment of a wide range of human rights, including the rights to life, health, food, water and sanitation. Without a healthy environment, we are unable to fulfil our aspirations. We may not have access to even the minimum standards of human dignity.

[115] Assistant Professor, Shillong Law College Dhankheti.

The human rights and the environment mandate, created in March 2012 and extended in 2018, examines the human rights obligations as they relate to a safe, clean, healthy and sustainable environment. It also promotes best practices relating to the use of human rights in environmental policymaking.

Human rights and the environment are intertwined; human rights cannot be enjoyed without a safe, clean and healthy environment; and sustainable environmental governance cannot exist without the establishment of and respect for human rights. When the environment suffers, people suffer. Climate change increasingly interferes with the realization of fundamental, internationally recognized human rights- including the right to life, to health, to culture, to food, to self-determination, to property, and to development. The importance of the environment to the fulfilment of human rights is widely accepted at international law. Human wants and needs are never ending and its unfortunate that we, as humans, possess rights to the environment beyond what is necessary to support our basic human needs. As the impact of our species on the natural world intensifies, so does the knowledge of our dependency on it.

What is the relationship between Human Rights and the Environment?

The relationship between human rights and the environment was first recognized by the UN General Assembly in the late 1960s. In 1972, the direct relationship between the environment and the right to life was recognized by the United Nations Conference on the Human Environment. The Preamble stated that Man is both creature and moulder of his environment, which gives him physical sustenance and affords him the opportunity for intellectual, moral, social and spiritual growth.

Principle 1 of the Stockholm Declaration established a further foundation for linking human rights and environmental protection, declaring that Man has the fundamental right to freedom, equality and adequate conditions of life, in an environment of a quality that permits a life of dignity and well-being. In 1982 the World Charter for Nature acknowledged that Mankind is a part of nature and life depends on the uninterrupted functioning of natural systems which ensure the supply of energy and nutrients. In 1992, the United Nations Conference on Environment and Development (also known as the Earth Summit) stated that Human beings are at the centre of concerns for sustainable development.

Human beings are entitled to a healthy and productive life in harmony with nature. The Declaration also provided for the right of access to environmental information and of public participation in environmental decision making. In 2002, the World Summit on Sustainable Development merely acknowledged the position that there exists a possible relationship between environment and human rights.

In addition, the UN Human Rights Commission adopted several resolutions linking human rights and the environment, such as Res. 2005/60 entitled Human rights and the environment as part of sustainable development. The resolution called on states to take all necessary measures to protect the legitimate exercise of everyone's human rights when promoting environmental protection and sustainable development and reaffirmed, in this context, that everyone has the right, individually and in association with others, to participate in peaceful activities against violations of human rights and fundamental freedoms.

The resolution emphasized the needs of the vulnerable members of society and also encouraged efforts towards the implementation of the Rio Declaration on Environment and Development.to ensure this right, although there is little evidence of work to make this happen. Over the last year there has been increasing interest in these issues. ANPED have made this a key focus for work towards the 2002 Summit. As part of this work ANPED is building links with NGOs and other agencies in all parts of the world. There is no doubt that the timing of this activity is appropriate: the 2001 meeting of the UN High Commission on Human Rights has called for an international seminar on these issues to be jointly run by UNEP and the UNCHR.

Human rights include the right to life, equality, political participation and association. They are couched most clearly in the Universal Declaration of Human Rights (1948) and International Covenant on Civil and Political Rights (1966). When realised civil and political rights are fundamental to guaranteeing a political order supportive of sustainable development. They can protect civil mobilisation around environmental protection and equity. Economic, social and cultural rights are often referred to as 'second generation 'rights. These provide substantive standards for an individual's well-being.

The International Covenant on Economic, Social and Cultural Rights (1966) provides an example. The Covenant provides, amongst others, the right to health which recognises the need for environmental improvement. It also provides for self-determination including the right of all peoples to manage their own natural resources. These second generation rights often have a direct

bearing on the human and environmental condition. Although existing first and second generation rights can provide for a degree of global and environmental protection if effectively mobilised, they are indirect environmental rights. They therefore suffer from a lack of clarity and precision on environmental protection and equity. What is required to strengthen the use of universal human rights are direct policy, legislation and institutional changes which recognise a specific right to a healthy environment and which takes into account both substantive and procedural issues. All human beings depend on the environment in which we live.

Over the years, the recognition of the links between human rights and the environment has greatly increased. The number and scope of international and domestic laws, judicial decisions, and academic studies on the relationship between human rights and the environment have grown rapidly.

Indian Laws Relating to Environment and Human Rights :

The chapter on fundamental duties of the Indian Constitution clearly imposes duty on every citizen to protect environment. Article 51-A (g), says that It shall be duty of every citizen of India to protect and improve the natural environment including forests, lakes, rivers and wild life and to have compassion for living creatures.

Article 47 provides that the State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties. The improvement of public health also includes the protection and improvement of environment without which public health cannot be assured. Article 48 deals with organisation of agriculture and animal husbandry. It directs the State to take steps to organise agriculture and animal husbandry on modern and scientific lines. Article 48 -A of the constitution says that the state shall endeavour to protect and improve the environment and to safeguard the forests and wild life of the country.

Right to environment is also a right without which development of individual and realisation of his or her full potential shall not be possible. Articles 21, 14 and 19 of this part have been used for environmental protection. According to Article 21 of the constitution, no person shall be deprived of his life or personal liberty except according to procedure established by law . Article 21 has received liberal interpretation from time to time after the decision of the Supreme Court in Maneka Gandhi vs. Union of India, (AIR 1978 SC 597). Article 21 guarantees fundamental

right to life. Right to environment, free of danger of disease and infection is inherent in it. Right to healthy environment is important attribute of right to live with human dignity.

In India a separate ministry namely The Department of Environment was established in 1980 to ensure a healthy environment for the country.

The main acts for environment protection in India are as follows:

1. The Forest Conservation Act, 1980
2. The Prevention of Air and Water Pollution, 1974, 1981 (The Central Pollution Control Board) (CPCB) was constituted under this act.
3. The Air Prevention and Control of Pollution, 1981.
4. The Atomic Energy Act. 1982.
5. The Environmental Protection Act, 1986. (It came into force soon after the Bhopal Gas Tragedy)
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14. The Municipal Solid Waste (Management and Handling) Rules, 2000.
15. The Ozone Depleting Substance (Regulation and Control) Rules, 2000.
16. The Biological Diversity Act 2002.

When we talk about saving the environment, sustainability is what must first comes to mind.

What is sustainable environment?

Environmental sustainability is the responsibility to conserve natural resources and protect global ecosystems ton support health and wellbeing, now and in the future. In simple terms, environmental sustainability is the practice of interacting with the planet responsibly.

Why do we need a sustainable environment?

Sustainability improves the quality of our lives, protects our ecosystem and preserves natural resources future generations.
Renewable energy, such as solar, wind, hydroelectric, and biomass, are some examples of sustainable practices. Sustainability in agriculture include crop rotation, crop cover and smart water usages, while sustainability in forestry involves selective logging and forest management.

The principles of sustainability are the foundations of what this concept represents. Therefore, sustainability is made up of three pillars: the economy, society and the environment. These principles are also informally used as profit, people and planet.
Thus we can say that, environmental rule of law is central to sustainable development. It integrates environmental needs with the essential elements of the rule of law, and provides the basis for improving environmental governance, it highlights environmental sustainability by connecting it with fundamental rights and obligations.

Conclusion:

Climate change is a global problem. It cannot easily be addressed by the simple process of giving existing human rights law transboundary effect. It affects many states and much of humanity. Its causes, and those responsible, are too numerous and too widely spread to respond usefully to individual human rights claims.
Every singe human right you might want to exercise depends on having some place where you can live.
A transition to sustainability is necessary for the safeguarding of the subsistence of our livelihood depends on direct access to nature. In the short term, more efficient fuel use and agricultural production can ease the pressure on life-serving ecosystems and local communities, greater bargaining power can also enable communities to get more compensation and a larger share of the profits.
In the longer term, the conflicts over environmental human rights can only become globally sharper if the global consumers are able to maintain its demands for natural resources. Environmental law seeks to manage human impacts on the environment. While some areas of environmental law are designed to ensure the protection of the environment, others are designed to control human use of natural resources by setting up a system of environmental approvals. It plays a huge part in protecting humans, animals, resources and habitats. Without these laws, there

would not be no regulations concerning pollution, contamination, hunting, or even response to disasters.

Human rights must work to protect human beings by protecting land we live on , air we breathe , water we drink and soil where our food grows in. We cannot have a life of dignity, freedom and equality without having some minimum environmental standard.

On October 8th,2021, the UN Human Rights Council adopted a resolution recognizing that the right to a clean, healthy and sustainable environment is a human right. This decision is a major step forward.

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At present the College is imparting 3 Year LL. B Course and 5 Year B.A LL. B Course. Thousands of students have passed out from this College and many of them are in high positions in various parts of the country in various capacities including Hon'ble Judges of the High Courts, Advocate General & Additional Advocate General of the State. One of the former teachers of the College Shri S N Phukan has scaled to the high office of the Chief Justice of the High Court of Himachal Pradesh and later became Judge of the Supreme Court of India. Justice Home Choudhury of Gauhati High Court, Justice A.P. Subbah of Gauhati High Court, later of Sikkim High Court and Justice B. Lamare of the Gauhati High Court were the Students of the College. At present Hon'ble Justice S.R. Sen of the High Court of Meghalaya and Justice Nelson Sailo of Gauhati High Court were the shining

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