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EDITORIAL

The environment is perceptibly viewed as the archetypal instance of a global issue. The natural corollary is that environmental processes have an intrinsically transnational character and are synchronous with the existential aspects of mankind. Here, sustainability is primarily the capacity of a system to maintain its health and continuing existence over a period of time. The idea of sustainable development has dominated thinking on environmental and developmental issues since it was highlighted by the 1987 Brundtland Report. In the contemporary global scenario, the fate of individuals families and communities is being influenced by climate change. The basic impacts of contemporary environmental challenges necessitate a sustained intellectual-cum-scientific endeavors to explore avenues for evolving relative symmetries between ecology and development.

The current special issue of Dehradun Law Review, a law journal of Law College Dehradun, Uttaranchal University is a sincere effort, exclusively focused in the direction of sustainable development a well cherished goal of the global community as defined, explained and institutionalized under the dynamic framework of U.N. system. Out endeavour in this respect is to offer in depth analyses of multi-faceted as well as multi-dimensional aspects of sustainable development which remain a pressing concern for the entire global community.

The issue at the disposal of readers include articles such as Creating An Inclusive and Equal Future: Breaking Free from Gender Norms and Stereotypes for Gender Equality, Need To Recognize Reader's Right to Access University Libraries: One Nation, One Library Card, Evaluating the Impact of Green Infrastructure and Ecosystem Services on Urban Poverty and Food Insecurity in India, Catalyzing Sustainable Development: Leveraging Research and Innovation to Combat Climate Change- Pathways for Achieving Sustainable Development Goals, Hazardous Waste Management and Protection of Environment: Needs New Implementation Mechanisms to Achieve Sustainable Development Goals, Radical Environmentalism Vs the Pragmatic Approach: Perspectives from India,

Examining the Progress and Challenges in India, "Trans" Equality of Opportunity: Tapping the Affirming Fabric of The Constitution, Alternative Dispute Resolution - An Ancient Indian Practice as An Alternate to Realize Sustainable Development Goal- 16, The Role of A.I and Cyber Forensics in Achieving SDG 5 and 16 Dealing in Specific Reference to Cyber Offences Against Women, 'The Ones Who Are Left Behind': Tracing Space for Non-Binary Individuals in Sustainable Development Goals 2030 Agenda, Advancing Sustainable Development Through Legal Innovations in Digital Identity and Social Media Privacy, Investigating The Contributions of Geographical Indications (GI) Towards Sustainable Development of a Region: Overview and Insights from Muga Silk GI of Assam and Examining Legal Approaches and Challenges in Addressing Ecocide in India: A Critical Analysis offering invaluable insights dealing with the various differentials of ecology and sustainability.

Evolving new paradigms and theorizing are, no doubt, commendable intellectual efforts but always require constant scrutiny & critical inputs which remain the exclusive domain of readers. Hence, we sincerely solicit constructive criticism with humility and humble submission from our readers as well as the intellectual fraternity. At the same time we specially thank the contributors of articles for their herculean efforts to make this special issue dealing with issues beginning with eco-anarchism to eco-feminism and eco-centrism, presentable in the hands of our respected readers.

God Sped!

CONTENTS

CREATING AN INCLUSIVE AND EQUAL FUTURE: BREAKING FREE FROM GENDER NORMS AND STEREOTYPES FOR GENDER EQUALITY

Dr. Kiran Dennis Gardner* *Former Dean and Professor (Law), Alliance University, Bengaluru, Karnataka, India*

Kavitha Christo Nelson** ***Research Scholar, Alliance School of Law, Alliance University, Bengaluru, Karnataka, India*

Abstract

Deep-rooted gender norms, stereotypes, and discriminatory practices against women and girls continue to hinder progress toward gender equality. Gender equality and women's empowerment are fundamental human rights. Gender inequality is a global challenge that impacts women and girls in various aspects of life, including education, health, employment, participation in decision-making, and access to resources. This paper explores the development and reinforcement of gender norms and stereotypes, highlighting their influence on societal expectations and women's impact on individual behaviour, identity, and other manifestations in various aspects of life. The Sustainable Development Goals (SDGs) aim to ensure equal opportunities, rights, and freedoms for women and girls, reducing poverty, enhancing productivity, and building resilient societies. Empowering women and girls impact families, communities, and globally. SDG 5 addresses gender-based violence, discrimination, harmful practices, and limited access to resources and services for women and girls nationally and internationally. This paper spotlights the mere essence of the formation of SDGs for gender equality and women's empowerment as a response to an urgent need to address gender inequalities, fulfil human rights, and promote a more just, inclusive, and equitable world for all.

Keywords:

Discrimination; Gender Equality; Gender-based violence; Gender norms; Gender Stereotypes; harmful practices; Sustainable Development Goals; SDG-5; Empower Women

1. Introduction

"Women's Rights are Human Rights," a phrase of the feminist movement, though initiated in the 1980s and nevertheless achieving the same to date, is always in a dilemma. Eliminating gender-based discrimination requires a comprehensive understanding of addressing the discrimination and violations faced every minute by women and girls around the world. International instruments have played a major role in uplifting women and girls globally. The 17 Sustainable Development Goals (SDGs) are intended to be universally applicable regardless of their level of development and provide a roadmap for global efforts to address pressing challenges and achieve a more sustainable and equitable future for all.

SDGs prioritize gender equality and empower women and girls as goal-5 to achieve by 2030, based on the principle of *"leaving no one behind" (LNOB).* The mere meaning of LNOB is to ensure focus on all the vulnerable and marginalized populations ensuring progress for all people. The principle of LNOB is essential for the achievement of SDG 5 as it emphasizes the need to address the targeted challenges and barriers faced by women and girls of all ages, most vulnerable groups, indigenous women, women from minorities, and those women and girls living in rural areas which aim to ensure that no women or girl is excluded from benefits of gender equality and women's empowerment contributing to sustainable development[1]. This initiated the Prime Minister of India to initiate the *"Sabka Saath Sabka Vikas"*[2] which emphasizes the government's commitment to fostering equitable development and ensuring that the benefits of development reach every section of society, that aims to bridge the socio-economic gaps, uplift the marginalized and vulnerable communities, and promote social harmony and unity among all citizens.

2. SDG 5, Gender–Inequalities, Persistent Challenges, and Root Causes: A Global Scenario

SDG 5 spotlights women's empowerment along with other SDGs towards

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[1]United Nations Sustainable Development Group, 2023, "Leave No One Behind."
[2]Government of India, "Sabka Saath Sabka Vikas."

the focus on ending all discrimination and overcoming barriers with initiatives that promote advancement in gender equality in all areas of life. SDG 5 has 9 targets and 14 indicators that aim to eliminate violence, harmful practices, and discrimination against women and girls in public and private spheres.[3] SDG 5 emphasizes the need to promote women's equal participation and equal access to economic resources and the importance of women's leadership and decision-making in economic and business spheres. SDGs call for public and community participation, creating spaces for women in decision-making on community development, planning, and resource allocation.

SDG 5 calls for gender-responsive policies, laws, and institutions that promote women's rights, gender equality, and inclusive decision-making towards strengthening institutional mechanisms ensuring women's voices are heard and considered in all decision-making processes. SDG calls for enhancing data collection systems to inform evidence-based policies and interventions to analyze sex-disaggregated data to monitor the progress that promotes women's participation and decision-making.

SDG 5 was initiated to perpetuate the inequalities due to deep-rooted gender stereotypes and discriminatory social norms faced by women and girls. Globally, women and girls experience gender-based violence, including sexual harassment, human trafficking, intimate-partner violence, and other harmful practices such as female genital mutilation and child marriage. Worldwide around 3/4th of countries did not stipulate the minimum age for a girl to marry as 18 years, and more than half of the countries deny equal rights to enter marriage and/or initiate divorce. In most parts of India, it is still prevalent to see honour killing if the girl chooses her marital life according to her wish with another caste or community male partner, which denies her right to equality and right to life due to the narrow-minded people who decide whom their daughter or a girl must marry whether she likes him or not.[4]

A new trend of girl trafficking in Hyderabad, as many Arab men had been arrested for marrying young girls for a contractual period and for consideration and leaving them in vain after their contracts.[5] Muslim personal laws permit a girl of 15 years competent to marry where it is universally 18 years, and the Supreme Court still examines the same. Male chauvinists

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[3]Goal 5, United Nations Department of Economic and Social Affairs. Achieve Gender Equality and Empower All Women and Girls."
[4]Mansi Tyagi, "Honour Killing in India" (2021).
[5]"Contract Marriage Racket" Indian Express (2017).

and perpetrators rape young girls less than 18 years even with the consent of the girl, as would be charged under the Protection of Children from Sexual Offences (POCSO) Act, 2012, to evade such sexual assault charges, they marry the survivor as Rape accused marriages.[6]

Female circumcision, a customary practice dating back to pre-Islamic times, involves mutilating or injuring female genitalia. As this practice is prevalent in Egypt, Africa, the Middle East, and Asia, the UN initiated the Prohibition of Female Genital Mutilation Act (2011). Some countries consider Female Genital Mutilation a criminal offence, while India lacks specific legislation. Strict laws and effective implementation mechanisms are needed to prevent inhumane harmful practices against women.[7,8]

Girls face barriers to equal access to quality education due to early marriages and reduced economic prospects, cultural norms, and limited educational opportunities for girls leading to lower literacy rates. Educational barriers lead to economically and mentally insecure women and girls, where 1 in 3 women i.e., around 736 million between the age of 15 and older, are subjected to intimate partner violence, sexual violence, and physical violence, as stated in the statistical report of the United Nations (UN). Though 83 % of countries have enacted laws to safeguard women against violence, around 57% are subjected to abuse every single day. In intimate relationships, literate and illiterate women and young girls sometimes face difficulties making informed decisions on sex and reproductive healthcare globally.[9] Most women and young girls are unaware of the impact of uncontrolled pregnancies and abortions, and this is evident that there is no appropriate sex education on reproductive health and reproductive rights, the importance of family planning, sterilization of males and females, and contraceptives.

Women face not just sexual harassment at the workplace but also economic disparities in unequal pay for equal work, barriers to leadership positions and entrepreneurship, and limited access to financial resources.

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[6]Ratna Singh, "Delhi High Court Flags Disturbing Pattern of Rape Accused Marrying Survivor to Avoid Sexual Assault Charges (2023).

[7]Prohibition of Female Genital Mutilation Act, 2011, "Global Database on Violence Against Women."

[8]Kirti Bhargavadown, "Does India Need a Law to Curb Female Genital Mutilation? What Has FGM to Do with Religion?" Outlook India (2022).

[9]Martin, "United Nations: Gender Equality and Women's Empowerment" United Nations Sustainable Development. (2022).

According to the facts and figures of the UN, only 28.3 percent of women share managerial positions worldwide until 2020.[10]

Kirti Bhargavadown, "Does India Need a Law to Curb Female Genital Mutilation? What Has FGM to Do with Religion?"

These gender-pay gaps, occupational discrimination, and lack of supportive policies hinder the upliftment of women and women's economic empowerment. Nearly half of the countries restrict women from working certain jobs or industries. In India, though the exclusive man's recruitment in National Defence Academy has opened for women, the Supreme Court denied prescribing a 50 percent reservation for female cadets.[11,12]

Education and employment are crucial for women's empowerment and gender equality. Ensuring equal access to quality education and dismantling barriers can foster women's leadership in the workplace. However, women's leadership and political decision-making will remain at 14.4% globally until 2021. In India, women's sarpanch hold positions at Panchayat Raj levels, but male members manage politics.

Despite women being equally capable of such work and performance, they are often paid lower than male workers in most workplaces, their domestic work, including caring for family members and the elderly, is neither appreciated nor valued. This vulnerability often leads to women remaining unpaid domestic workers throughout their lifetime, with women spending 2.5 times more on this work than men, contributing to 75 % of the world's unpaid care, and domestic work is performed by women.[13]

Economic empowerment is crucial for gender equality and sustainable development, but women still face challenges in accessing economic stability. Property ownership offers economic security, decision-making power, and participation in economic activities. However, barriers like financial illiteracy, lack of collateral, and gender biases restrict women's access to credit and loans. To overcome these barriers, fostering women-led enterprises, increasing participation in non-traditional sectors, and technology-driven industries can promote gender equality and reduce economic disparities.

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[10]Kirti Bhargavadown, "Does India Need a Law to Curb Female Genital Mutilation? What Has FGM to Do with Religion?" Outlook India (2022).
[11]Kush Kalra v. Union of India, W.P. (Civil) No. 1416 of 2020
[12]Awstika Das, "Supreme Court Turns Down Plea for 50% Women Reservation in National Defence Academy". (2023).
[13]"Unpaid Care and Domestic Work: Issues and Suggestions for Vietnam" (2017).

The underrepresentation of women in Science, Technology, Engineering, and Mathematics (STEM) fields remains a persistent issue. In a survey in India, 83 % of the male adult population had a mobile phone, while only 71 % of the female population.[14] Despite progress, women still face barriers in low-paid and high-paid STEM jobs. Women's inclusion in these fields offers diverse perspectives and innovative solutions, benefiting individuals and society.

Gender-balanced teams enhance creativity, productivity, and problem-solving, but unconscious bias and stereotype threats can deter women from STEM careers. Early interventions, inclusive education, parental support, educators, and media can boost girls' interest in STEM subjects. Collaborative efforts, policy reforms, and cultural shifts can create equal economic opportunities, equitable compensation, and workforce success for women.

3. Other SDGs Ensure Empowering SDG 5

    i.   SDG 3 goal spotlights Good Health and well-being, ensuring healthy lives and promoting comprehensive universal access to quality maternal healthcare, including antenatal care, reproductive health services, postnatal care, and ensuring safe and healthy pregnancies and childbirth. This goal focuses on access to family planning, contraception, and safe abortion services addressing gender-based violence and harmful practices calling for achieving universal health coverage and removing financial, geographical, and cultural barriers.

    ii.   *SDG 4 focuses on Quality Education*, ensuring inclusive and equitable education for all. It emphasizes eradicating gender disparities in enrollment and completion rates, promoting gender-responsive curricula, and promoting girls' and women's participation in STEM fields. SDG 4 calls for adequate sanitation facilities, menstrual hygiene management, and gender-sensitive infrastructure in schools and educational institutions.

    iii.   *SDG 8 focuses on decent work, economic growth,* and economic empowerment for women in the workforce. It emphasizes equal access to equal value, economic opportunities, and entrepreneurship in secure working environments. The goal also emphasizes women's representation in leadership positions, policymaking, and management roles. It also emphasizes social protection measures and labour rights for all workers, enforcing labour laws and regulations to protect women's rights, social security, and benefits.

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[14] "Share of Mobile Phone Owners in India in 2021, by Gender and Type," Statista (2023).

iv.	*SDG 9 on access to technology and information* focuses on women's access to technology and information, enabling them to access information, communicate, and participate in digital technologies, remote work, online learning, entrepreneurship, skill development, and lifelong learning. This empowers women to overcome traditional barriers and improve their well-being in health, nutrition, reproductive rights, finance, social media, digital activism, and legal matters. Through other SDGs, this goal promotes resilient infrastructure, sustainable industrialization, and innovation.

v.	*SDG 16 on Peace, Justice, and Strong Institutions* aims to promote peace, justice, and strong institutions by eliminating gender-based violence, domestic violence, and sexual harassment. It calls for ending discrimination and ensuring equal rights for women and girls. Women's participation in peacebuilding and conflict prevention is crucial for promoting and protecting women's rights.

4. India's Role in Empowering Women and Girls

India is a member of the UN, and its commitment to sustainable development has significantly contributed to the global SDGs' achievement by 2030. Through policy measures, initiatives, and international collaboration, India's dedication to sustainable development is crucial for a more equitable and sustainable future for all.

Nonetheless, with evident traces, the evolution of women's rights and women's movements from the colonial era to date is evident with the landmark legislations and policy measures that have shaped the landscape of women's empowerment in India before the Agenda of SDG 2030. The Constitution of India of 1950, The Dowry Prohibition Act of 1961, the Equal Remuneration Act of 1976, the National Policy for Empowerment of Women of 2001, the National Commission of Women, Protection of Children from Sexual Offences Act of 2012, Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act of 2013, etc., are evidential historical progress for India's role in empowering women and girls.

5. India's Initiatives Influenced by The Agenda For Sdg 2030

Towards recognizing the crucial role women play in the country's development, India has initiatives aimed to address various challenges and barriers faced by women and girls, to enhance their social, economic, and political participation, including as below:

5.1 Beti Bachao, Beti Padhao (Save the Girl Child, Educate the Girl Child) launched in the year 2015, aims to address the declining child sex ratio and promote the value of the girl child. This initiative focuses on preventing female foeticide, improving access to education for girls, and ensuring their survival, protection, and development.

5.2 Pradhan Mantri Matru Vandana Yojana is a scheme that provides financial assistance to pregnant and lactating women to support them during motherhood and ensure proper nutrition and healthcare for both the mother and child.

5.3 Mahila e-Haat, an initiative of the Ministry of Women and Child Development, provides an online platform that facilitates women entrepreneurs to showcase and sell their products and services, promoting their economic empowerment and financial inclusion.

5.4 National Mission for Empowerment of Women aims to strengthen women's economic and social empowerment, focuses on eliminating violence against women, and mainstream gender concerns in policy and planning.

5.5 Pradhan Mantri Jan Dhan Yojana (PMJDY)though not exclusively focused on women, this financial inclusion program has significantly benefitted women in India, encouraging them to open bank accounts and gain access to various financial services.

5.6 Sukanya Samriddhi Yojana is an initiative that encourages parents to save for their girl child's future education and marriage expenses by offering a high-interest savings account.

5.7 Swachh Bharat Mission, through an initiative for environmental protection, also promotes access to sanitation and hygiene facilities, which directly impacts the dignity and safety of women and girls, especially in rural areas.

5.8 Support to Training and Employment Programme for Women (STEP), a program that supports skill development and employment opportunities for women and enables them to become financially independent.

5.9 Women Helpline (181), a toll-free helpline, provides support and assistance to women facing violence, harassment, or other issues, offering a safe space for reporting and seeking help.

5.10 One-Stop Centers or Sakhi Centres provide integrated support services to women and girls affected by violence, including medical, legal, and counselling assistance.

5.11 Reservation for Women in Local Government is a remarkable initiative to enhance women's participation in politics, India has implemented a constitutional amendment that reserves one-third of seats for women in local government bodies, known as Panchayati Raj institutions.

A few amendments in existing laws that would safeguard women and girls as the *Maternity Benefit (Amendment) Act of 2017,* increasing the paid maternity leave from 12 weeks to 26 weeks, gives more time for mothers to recover and bond with their newborns.

Education, media, and cultural initiatives are vital in promoting gender equality and breaking down gender-based barriers in economic spheres. The laws are enacted on an emerging need for gender equality; the judiciary plays a major role in uplifting and empowering girls and women.

6. Judicial Inclusion Towards Empowering Women in India

The judiciary continues to advance gender equality and promote women's rights by upholding gender-sensitive interpretations of laws, addressing gender-based discrimination, and protecting women's rights. A few notable cases post Agenda of SDG 2030 are evident in the following cases:

- *Shayara Bano v. Union of India (2017),*[15] a landmark verdict where the Supreme Court declared the customary practice of instant triple talaq (*talaq-e-bid'ah*), an instant divorce, among Muslim men as unconstitutional, granting Muslim women the right to equality and protection from arbitrary divorce.

- *Independent Thought v. Union of India (2017),*[16] Independent Thought v. Union of India, Writ Petition (Civil) No. 382 of 2013(2017) the Supreme Court ruled that sexual intercourse with a minor wife, even with consent and/or within a marital relationship, constitutes rape under the Protection of Children from Sexual Offences (POCSO) Act, 2012 that aimed to protect the rights and well-being of minor girls married off at a young age.

- *Indian Young Lawyers Association v. State of Kerala (2018),*[17] the Supreme Court lifted the ban on the entry of women of menstruating

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[15]Shayara Bano v. Union of India, AIR 2017 9 SCC 1 (SC), (2017)

[16]Independent Thought v. Union of India, WRIT PETITION (CIVIL) NO. 382 of 2013(2017)

[17]Indian Young Lawyers Association v. State of Kerala, WRIT PETITION (CIVIL) No. 373 of 2006.

age into the Sabarimala temple in Kerala, asserting women's right to equality and non-discrimination in matters of religious practices.

- **Joseph Shine v. Union of India (2018),**[18] the Supreme Court struck down Section 497 of the Indian Penal Code, which criminalised adultery but only held men liable. The court ruled that the provision was discriminatory and violated the principle of gender equality.

- **Navtej Singh Johar v. Union of India (2018)[19],** a landmark judgment where the Supreme Court decriminalised consensual homosexual acts among adults, overturning Section 377 of the Indian Penal Code to uphold the rights and dignity of LGBTQ+ individuals, including women, and recognised their right to equality and non-discrimination. This is evident that transgender women who assume to be women would have equal gender equality.

- **Anuj Garg v. Hotel Association of India (2020)**, the Supreme Court held that a woman has an equal right to employment and, when it comes to employment in the hotel industry, cannot be discriminated against based on her gender.

Judiciary has created and continues its commitment to a more equitable and empowering environment for women to thrive and contribute to the nation's progress toward a more inclusive and gender-just society.

Conclusion and Recommendations

Women face disparities in gender norms and stereotypes, hindering their full participation in the workforce and at home. Addressing these disparities requires a multifaceted approach that challenges discriminatory practices, promotes equal opportunities, and supports women's economic empowerment. Addressing these inequalities can enhance individual lives and create a more just society. Advocating for transformative policies and practices can create an inclusive and equitable economic landscape, empowering women to thrive and contribute to their communities and economies. Achieving gender equality in the economic sphere is a matter of justice, sustainable development, and societal progress.

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[18]Joseph Shine v. Union of India, 2018.
[19]Navtej Singh Johar v. Union of India, (2018).

NEED TO RECOGNIZE READER'S RIGHT TO ACCESS UNIVERSITY LIBRARIES: ONE NATION, ONE LIBRARY CARD

Dr. Nidhi Tyagi* *Associate Professor, Department of Humanities & Social Sciences , Graphic Era Deemed To be University.

Dr. Radhey Shyam Jha**
**Associate Professor, Law College Dehradun, Uttaranchal, University

Muktendra Singh Rawat***
***Chief Librarian, Law College, Dehradun, Uttaranchal, University

Abstract

In the year 1931, S, R. Ranganathan formulated five laws of library in which he tried to establish that books must not be kept unused as every book has its reader and vice versa. He also explained that libraries are growing and it is due to its increasing subscribers hence every reader must be paid full attention so as to save his or her time. Nonetheless, these all five laws are for its local subscribers only and if a reader is willing to be benefitted by these laws in the libraries of which he is not a subscriber, would definitely disappoint us at all. Now in the era of technological advancement, there is a need to implement these five laws of library in libraries throughout the nation and to recognize the right of accessing public libraries as well as the libraries of all other institutions which may be kept under the term of 'State' under article 12 of Indian Constitution, especially the university libraries. In this literary work by collecting and analysing the secondary data, the researchers have suggested to introduce 'One Nation, One Library Card' for the readers so that they may access libraries of any place for getting information. It has been also suggested that the 'Right to Information' must include 'Right to Access Libraries'.

Key words

Library, Right, Reader, Books, University

1. Introduction

The origin of library and its science is as old as the first text had been written hundreds of years back. Though it is not possible to explain that when exactly the written text came into existence first time but it is explicitly accepted almost in all civilizations that the holy texts were written hundreds of years back and were transmitted from generation to generation by word of mouth. Keeping of these texts for transmission to future generation gave birth to libraries. If we talk about the growth and development of libraries in India, we found that we have many world-famous libraries. The libraries of Nalanda, Nevada and Takshshita were the most renowned as these were equipped with books at large, robust building structure and managed efficiently with the help of trained staff members. Kings of those Eras from Ashok to Akbar contributed in their development. It is a bitter truth that after Akbar the contribution ended and continued till independence. It is also noteworthy here that the concept of libraries for public use was rarely discussed before independence. Till India's independence, there was not a single library in the country except few libraries which were established either by the Individuals, voluntary organization, endowments or by few municipal bodies in some states.[1] These libraries were subscriptions libraries and have a small number of its subscribers. These small numbers of subscribers were the English knowing elite class people and who constituted only 1% of the total population. English books published in U.K were the main assets of these libraries as it is no wonder that only 6455 books were published in India in 1947 and that too in 15 Indian languages. If or making an average of 430 books per language against 1,627 in English alone.[2] To draw attention of government on importance of library and library sciences, the efforts of Dr S. R. Rangnathan is not hidden which paved a way for library legislation and policies.

2. Research Methodology

The relevant data for this research was collected from some primary and secondary sources. Primary Data was collected through a personal interview.

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[1] D. R. Kalia, "A Review of Public Library Development" 6 International Library Review 29-33 (1974).
[2] Ibid

At the same time, the secondary sources were the Books, articles, newsletters, schemes and other publications etc. Efforts were also made to access the non - government organisations that were active in promoting the interest of the readers.

3. Reader Viz. a Viz an Informed Citizen

An informed citizen is one who apart from becoming aware about the government and its governance, knows or seeks to know how the different aspects of politics, geology, sociology, environment and economy that are prevalent. A citizen can be an informed citizen only, when he or she has right to get information from the authorities basically from the government. But this is a half-truth as government under this right as RTI can provide only limited information and that too which is related to the management, administration and governance of the concerned department. The researchers here wish to submit that a citizen can be an informed citizen only when he or she is aware about each and every branch of knowledge either of history, political science, geography, psychology, science or other subjects (as per choice of the reader).

In India Right to Information Act was passed in 2005 to make the citizens of India as Informed Citizens but we have miles to go for getting this goal. A citizen should be able to access any information that he may require from any public authority but what about the information from libraries? Now the remarkable fact is here that libraries are considered to be the ocean of information contained in the form of books, periodicals etc. and one can get verities of information from here; therefore, why not the right to get access in libraries should be a part of right to information.

The issue related to this concern is that the term 'Public Authority' includes only the public libraries and not the other libraries. The researchers here are willing to add libraries maintained by institutions like colleges as well as Universities under the term 'Public Authority' and to introduce 'One Nation, One Library Card'.

4. Rationale Behind 'One Nation, One Library Card'

1. Every reader should be given access to library for getting information from the books irrespective of its availability in public library or the libraries of other institutions.[3] Apart from making him a well-informed

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[3]Muhammad Safdar, Shafiq Ur Rehman, Muhammad Arif, Murtaza Ashiq. "Research data services in libraries: a systematic literature review", Information Discovery and Delivery, 2022,.

citizen, it is needed for the career development and to make him more sensible towards his role in society. Without books it is impossible as web world alone cannot fulfil the reader's need, desire or wishes.

SDG No. 10 (Reduced In equalities)

2. Right to Information comes under Article 21 of Indian Constitution as a part of 'Life and Personal Liberty'[4] and it has been clarified by the Supreme Court in many cases that 'right to life and personal liberty, does not merely mean animal existence but extended to all those aspects of life which go to make a man's life meaningful, complete, and worth living. In this regard authority of using library for getting information, completing academic journey and finally for making career also comes under the interpretation of article 21.

3. In the case of Maneka Gandhi[5] the SC overruled its judgment of the Gopalan Case by taking a wider interpretation of Article 21. It ruled that the right to life and personal liberty of a person can be deprived by law on the condition that the procedure prescribed by that law is reasonable, fair, and just. Depriving a person from getting information by using library should be treated as violation of right of 'Personal Liberty' as RTI comes under Article 21.

4. Right to access library is an integral part of 'Educational Right' under article 21 and 21 A. It is also relevant under welfare schemes as explained under 'Directive Principles of State Policy' and for making the concept of 'Fundamental Duties' more effective in reality.

SDG No. 04 (Quality Education)

5. Right to Information includes inspection of documents and taking its copies by paying the reasonable amount as fixed by the government. Hence 'reading' books by accessing libraries must be included under its interpretation.

6. Private Universities has been declared State[6] by the Supreme Court of India under article 12 of Indian Constitution hence these can be

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[4]Ojilere, Aloysius Ndubuisi. "Quest for a Sustainable Legal Framework for the Protection of Women's Right to Dignity in Nigeria: Lessons from India and South Africa", University of Malaya (Malaysia), 2023.

[5]Maneka Gandhi vs. UOI, AIR 1978 SC 597

[6]Dr Janet Jeyapaul vs. SRM University, AIR 2016 SC 73, Also see Manmohan Singh Jaitla vs. Commissioner, Union Territory of Chandigarh, AIR 1985 SC 364

coined as public authority and a citizen of India must be allowed to access libraries maintained by these Private Universities. Public Universities are state under Art.12 as it is created by an act of legislature; it works as a body of public importance and enjoys monopoly status under state protection. Private Universities are also state as it imparted education in higher studies to the students at large, discharged public functions by way of imparting education, notified and governed under UGC Act, hence "other authority" within the meaning of article 12 of the Constitution.[7]

7. In India Public Libraries are very less in numbers as compared to population and the existing public libraries are mostly in poor condition and not updated with the new edition of books due to bureaucratic

8. India is having 46,746 public libraries throughout India (as per the records of available on the website of Ministry of Culture, Government of India in 2023) against the population of India i.e. 140.76 crores (2021) that means one public library on an average of 30,000 persons which is very poor.

9. Universities have been established almost in all part of India similar to public libraries and thus can be accessed easily.

10. Libraries of Colleges and Universities are mostly well maintained and updated.

11. Libraries of universities and colleges have academic as well as non-academic books, therefore; a reader may get books of his choice easily.

12. As of 26 November 2022, there are total 1070 universities and more than 42,000 colleges of higher education throughout India and each of them is having one library or central library apart from departmental libraries.

13. If reader's entry is permitted, these university and college libraries can fill a huge gap in between library and the population.

14. In the present-day context, the term "book" should be used in a broader context to mean a "Resource" and this resource must be for public use.

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[7]Bineeta Patnaik Padhi v. UOI & Ors. (2021) SCC OnLine Cal 1662

15. Rationale behind introduction 'One Nation, One Library Card' are manifold and some of them are the part of interpretation of five laws as introduced by Dr S. R. Ranganathan[8].

SDG No. 16- Peace, Justice & Strong Institutions

a. The first law constitutes the foundation of library science "books are for use"[9] means that books in libraries are not meant to be shut away from its users. Its implications talk about Open access of books that enhance their use and under this every reader should be allowed to go to the shelves and choose the book of his interest. Here reader means subscribers and researchers have suggested that reader means the subscriber of library service having 'One Nation, One Library Card' publication of details of each and every book of the library is it's another implication which supports researchers view.

b. The second law of library science is "Every Reader His / Her Book" implies that the "books are for use of all" or "books for all."[10] It also implies that every reader has the equal right to get the book of his/her interest and the state, the library authority and other concerned persons are under responsibilities or obligations for the same hence the subscriber of 'One Nation, One Library Card' must be served by the library authorities irrespective of their age, race, or economic status.

c. The Third Law prescribes 'Every Book has its Reader'[11] and desires that every book in a library must find its reader so that the maximum book resources utilization can be done. This law thus also supports the opinion of researchers in relation to 'One Nation, One Library Card'.

d. The Fourth Law says "Save the Time of the Reader."[12] As he is assumed a busy person. In the same way if a reader is on tour and he needs information, why he or she must not be allowed to access the nearby library of that locality. Not only the one library card will

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[8]Patrick L. Carr. "Reimagining the Library as a Technology: An Analysis of Ranganathan's Five Laws of Library Science within the Social Construction of Technology Framework", The Library quarterly (Chicago, IL), 2014, Vol 84, 152-164
[9]Five Laws of Library Science, (2023)
[10]Ibid
[11]Five Laws of Library Science, (2023)
[12]Ibid

save his time but also his toil for getting information from the library of which he or she is a subscriber.

e. The fifth law of library science "the library is a growing organism"[13] means updation and modernization of library and again the researchers have to say that why a reader would be deprived from using the updated, modernized and rich library.

16. Apart from the above, recommendations of Michael Gorman (a British-born librarian and former president of the American Library Association) and Walt Crawford in 1995,[14] are noteworthy in this regard-

   a. Libraries serve humanity.

   b. Respect all forms by which knowledge is communicated.

   c. Use technology intelligently to enhance service.

   d. Protect free access to knowledge.

   e. Honor the past and create the future.

17. In 2004, librarian Alireza Noruzi recommended applying Ranganathan's laws to the Web in his paper, "Application of Ranganathan's Laws to the Web" recommended the same laws for the information on web.

18. In 2008, librarian Carol Simpson recommended Ranganathan's law for media contents due to media richness.

19. The American Library Association affirms that all libraries are forums for information and ideas, and that some of the following basic guiding policies are remarkable. These principles are very much relevant in context of researcher's view.

   a. Books and other library resources should be provided for the interest, information, and enlightenment of all people of the community the library serves. Materials should not be excluded because of the origin, background, or views of those contributing to their creation.[15]

   b. Libraries should cooperate with all persons and groups concerned

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[13]Ibid

[14]Reordering Ranganathan: Impact of the Changing Research and Learning Environments on Library Services,(2023)

[15]Collection Development Policy of Taylor Public Library, (2023)

with resisting abridgment of free expression and free access to ideas.[16]

c. A person's right to use a library should not be denied or abridged because of origin, age, background, or views.[17]

d. Libraries which make exhibit spaces and meeting rooms available to the public they serve should make such facilities available on an equitable basis, regardless of the beliefs or affiliations of individuals or groups requesting their use.[18]

Hence, it's a time to introduce 'One Nation, One Library Card'.

5. Modalities

1. Public access to university libraries must be granted to all irrespective of their age, place of birth, academic background and even nationality.

2. Entry must be through unique Identity card like Aadhar, PAN etc. that must have full details of the reader so as to trace in case of any issue.

3. One open portal under state machinery must be there for registration for the same that may include a reasonable subscription fee for accessing libraries throughout the nation.

4. 'One nation one Reader's or Library Card' would have to introduce under the spirit of five laws of library system.

5. For safety reasons, book loan facility must be regulated or restricted but reading at Library must be open for all who are having the registration as well as Unique ID card issued for the same.

6. Book lending may be allowed on submission of security or on deposition of the full price of the latest edition of the book.

7. On the same online platform, the information of library resources can be uploaded and displayed so as to give an idea of the availability of book as required by the reader.

8. Intelligent system of modern technology should be introduced in the library system so as to make them smarter.

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[16]VLA News - August 2012, (2023)
[17]Ibid
[18]Ibid

9. Library timings must be same for the libraries throughout the nation. This will be helpful for managing library resources and their utilization.

10. Yearly renewal policy of this unique card may be made mandatory so as to know the status of the reader.

11. Separate sitting area may be marked for the readers of outside institution and may be allowed to its internal readers in case of vacancy.

12. Entry and exit can be managed by the biometric punch or by entering the unique code of the library card issued under this scheme.

13. UGC and other regulatory authorities like Bar Council of India, Medical Council of India etc. may declare this 'One Nation, One Library Card' policy mandatory for the institutions for getting recognition.

Conclusion

This step may cause some challenges like infrastructural arrangement, additional staff for maintaining the library administration, specific software, registration of all libraries on web portal developed for this 'One Nation, One Library Card' facility with the full description of library resources and some others. But it is not a mammoth task and can be developed in a short period. Government machinery can provide some financial support for the same so as to lessen the burden of institutions. This may be done by sharing revenue generated through registrations for 'One Nation, One Library Card'. Hence the time has to come to implement this policy of 'One Nation, One Library Card'.

EVALUATING THE IMPACT OF GREEN INFRASTRUCTURE AND ECOSYSTEM SERVICES ON URBAN POVERTY AND FOOD INSECURITY IN INDIA

Jyotirmoy Banerjee*   *Assistant Professor, Amity Law School, Amity University, Bengaluru*

Saloni Bahl**   ***Research Scholar (Law), Sardar Patel University of Police, Security and Criminal Justice, Jodhpur*

ABSTRACT

The rapid urbanization and increasing population in India have exacerbated urban poverty and food insecurity challenges. In response to these issues, policymakers and researchers have recognized the potential of green infrastructure and ecosystem services as sustainable solutions to alleviate urban plight. This study evaluates the impact of green infrastructure and ecosystem services on India's urban poverty and food insecurity. The research employs a mixed-methods approach, combining quantitative analysis and qualitative assessments to examine the interplay between green infrastructure and urban poverty comprehensively. Using a combination of satellite imagery and geospatial data, the study maps the distribution of green spaces and analyses their accessibility to urban populations. Concurrently, household surveys and focus group discussions provide valuable insights into the perceptions, experiences, and challenges vulnerable communities face regarding food security. Green spaces foster social cohesion, community engagement, and improved mental well-being among residents. Therefore, the research emphasizes the need for targeted policy interventions prioritizing green infrastructure development in low-income neighbourhoods and areas facing acute food insecurity. By understanding the complex interactions between urban development,

green spaces, and vulnerable communities, policymakers can make informed decisions to create sustainable and inclusive urban environments that promote both social welfare and environmental conservation.

Keywords

Green Infrastructure, Ecosystem services, Urban poverty, Food insecurity, India.

1. Introduction

Urbanization is a defining phenomenon of the 21st century, as rapid population growth and rural-to-urban migration have led to the swift expansion of cities and towns across the globe. This trend has been particularly pronounced in India, with a significant portion of the population now residing in urban areas. While urbanization offers numerous opportunities for economic growth, technological advancement, and cultural exchange, it also presents many challenges, including urban poverty and food insecurity. Urban poverty is a multifaceted issue characterized by low incomes, limited access to basic services, inadequate housing, and social marginalization[1]. As cities expand and become more densely populated, the gap between the rich and the poor often widens, exacerbating the problem of urban poverty. The impoverished urban population faces numerous hurdles in accessing education, healthcare, and employment opportunities, leading to a vicious cycle of deprivation and limited upward mobility.

Food insecurity, however, is a critical concern that stems from inadequate access to sufficient, safe, and nutritious food. As urban centers grow, food systems become increasingly complex, and access to food becomes more challenging for vulnerable communities[2]. Factors such as rising food prices, limited availability of fresh produce, and lack of income to purchase adequate food contribute to food insecurity in urban areas[3]. In response to these pressing challenges, researchers, policymakers, and urban planners have focused on the potential of green infrastructure and ecosystem services as sustainable solutions to address urban poverty and food insecurity. Green infrastructure refers to the network of natural and semi-natural spaces, such as parks,

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[1] Riley, E., Fiori, J., & Ramirez, R., "Favela Bairro and a new generation of housing programmes for the urban poor" 32 *Geoforum* 521-531 (2001).

[2] M.D. Anderson, "Rights-based food systems and the goals of food systems reform" 25 *Agriculture and Human Values* 593-608 (2008).

[3] H. C. Godfray, J.R. Beddington & I. R. Crute, "Food Security: The Challenge of Feeding 9 Billion People" 9 *Science* 812-818 (2010).

gardens, urban forests, and green roofs, strategically designed and integrated into the urban landscape to provide ecological, social, and economic benefits[4].

On the other hand, ecosystem services are the valuable contributions that ecosystems, including green spaces, provide to human well-being. These services include air and water purification, climate regulation, soil fertility, pollination, and recreational opportunities[5]. Green infrastructure fosters the provision of these ecosystem services, enhancing the overall quality of urban life. The synergies between green infrastructure and urban poverty alleviation are multifaceted. By creating accessible and well-maintained green spaces, urban communities have physical activity, relaxation, and social interaction opportunities[6]. These spaces serve as important catalysts for community engagement, empowerment, and social cohesion, thereby promoting a sense of belonging and collective responsibility.

Moreover, green infrastructure offers opportunities for urban agriculture, a practice gaining momentum as cities seek to enhance food security and promote sustainable food systems. Urban agriculture involves the cultivation of crops, fruits, and vegetables within urban spaces, often in small gardens, rooftop farms, or community plots[7]. By producing fresh and locally grown food, urban agriculture can improve food availability, reduce transportation costs, and enhance nutrition for vulnerable populations.

Additionally, household surveys and focus group discussions will provide valuable insights into the perceptions, experiences, and challenges vulnerable communities face concerning food security[8]. By understanding the complexities of urban development, green spaces, and urban agriculture, this research will inform targeted policy interventions to create sustainable and inclusive urban environments that promote both social welfare and environmental conservation[9].

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[4]P. Pamukcu-Albers, "Building green infrastructure to enhance urban resilience to climate change and pandemics" 36 *Landscape Ecology* 665–673 (2021).

[5]A. Zarêba, "Multifunctional and Multiscale Aspects of Green Infrastructure in Contemporary Research" 9 *Problems of Sustainable Development* 149-156 (2014).

[6]G. C. Daily, "Management objectives for the protection of ecosystem services" 3 *Environmental Science & Policy* 333-339 (2000).

[7]H. Besada & K. Werner, "An assessment of the effects of Africa's water crisis on food security and management" 31 *International Journal of Water Resources Development* 120-133 (2014).

[8]D. Shelton, S. Cork & C. Binning, "Application of an ecosystem services inventory approach to the Goulburn Broken Catchment" 8 *Cooperative Research Centre for Catchment Hydrology* 157-162 (2001).

[9] W. Nentwig, *Biological Invasions* (Springer, 2007).

The dynamic and complex relationship between green infrastructure, ecosystem services, urban poverty, and food insecurity presents a crucial area of research and policy focus. By harnessing the potential of green spaces and urban agriculture, India can work towards building resilient and equitable cities, ensuring improved living conditions and enhanced food security for all urban residents[10]. This research seeks to contribute to the growing body of knowledge on sustainable urban development and its significance in addressing critical urban challenges in India.

2. Statement of Problem

Rapid urbanization in India has led to escalating urban poverty and food insecurity issues, impacting vulnerable communities within cities[11]. As urban centers grow, the inequality gap widens, and low-income populations face significant challenges in accessing basic necessities, including nutritious food. Additionally, urban environments often lack adequate green spaces and ecosystem services, which are essential for enhancing the well-being of urban residents and addressing food security concerns. The absence of green infrastructure and ecosystem services can further exacerbate poverty and limit the availability of fresh and locally grown food options for marginalized communities[12]. Therefore, there is a pressing need to evaluate the impact of green infrastructure and ecosystem services on India's urban poverty and food insecurity to develop targeted interventions that foster sustainable and inclusive urban environments.

3. Research Question

- How does the presence of green infrastructure and access to ecosystem services impact the levels of urban poverty in India?

- What are the associations between green infrastructure, urban agriculture, and food security in different urban communities across India, and how can this knowledge inform targeted interventions to alleviate food insecurity?

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[10]H. Asbjornsen, V. Santana & M. Liebman, "Targeting perennial vegetation in agricultural landscapes for enhancing ecosystem services" 29 *Renewable Agriculture and Food Systems* 101-125 (2013).

[11]A. J. McMichael, "The urban environment and health in a world of increasing globalization: issues for developing countries" 78 *Bulletin of the World Health Organization* 1117-1126 (2000)

[12]*Id.* at 7.

4. Methodology & Results

To investigate the research questions pertaining to the impact of green infrastructure, ecosystem services, and urban agriculture on urban poverty and food security in India, a comprehensive survey-based research approach will be employed. The survey will target diverse urban communities across different regions of India to ensure a representative sample and capture variations in urban development, socioeconomic conditions, and access to green spaces. The questions in the survey shall understand and identity about the Demographic Information, Access to Green Infrastructure and Ecosystem Services, Impact on Urban Poverty, Urban Agriculture and Food Security. The research shall adopt a stratified random sampling technique to select participants from various cities and towns in India. Stratification will involve categorizing the cities/towns based on their population size and socioeconomic characteristics[13]. From each stratum, a random sample of households will be selected to participate in the survey. The sample size shall be determined through a power analysis to ensure the statistical significance and accuracy of the findings.

Further coming for the quantitative data from the survey which shall be analyzed using statistical software to derive correlations and patterns between green infrastructure, ecosystem services, and urban poverty, as well as between green infrastructure, urban agriculture, and food security. Combining qualitative and quantitative analyses it shall offer a comprehensive understanding of the complex interplay between green infrastructure, urban poverty, and food security, informing targeted interventions to alleviate food insecurity and enhance the sustainability of urban environments in India.

i. Survey-Based Approach

The following questions have been prepared for the survey, where we received 178 responses from the respondents.

Table No. 1		
S.No.	**Questions**	**Options**
1.	*How often do you visit green spaces (parks, gardens, etc.) in your neighbourhood or nearby areas?*	*a) Daily* *b) Several times a week* *c) Once a week* *d) Rarely or never*

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[13]X. D. Andrianou, "Exposome-based public health interventions for infectious diseases in urban settings" 146 *Environment International* 106246 (2021).

2.	In your opinion, how does the presence of green infrastructure (e.g., parks, urban forests) impact the overall living conditions in your community?	a) Greatly improves living conditions b) Moderately improves living conditions c) Has little impact on living conditions d) Does not impact living conditions
3.	Are you involved in any form of urban agriculture, such as home gardening or community farming initiatives?	a) Yes, actively involved b) Yes, but not actively involved c) No, but interested in participating d) No, not interested
4.	How important is access to fresh and nutritious food options in your household?	a) Extremely important b) Moderately important c) Slightly important d) Not important at all
5.	Do you believe that green spaces and urban agriculture contribute to alleviating food insecurity in your community?	a) Strongly agree b) Agree c) Neutral d) Disagree
6.	Have you experienced any improvement in your household's economic well-being or living conditions due to the presence of green infrastructure and ecosystem services in your neighbourhood?	a) Yes, significant improvement b) Yes, some improvement c) No noticeable improvement d) Not applicable

Table No. 1 – Survey Questions

Question-1 was intended to categorize the respondents in terms of the engagement they have with these apps. We received a total of 178 answers to this question. The recorded answers are shown in Fig-1.

Fig-1: Recorded Answers For Question - 1. Total Answers Recorded 178.

Legend: ■ Daily ■ Several times a week ■ Once a week ■ Rarely or never
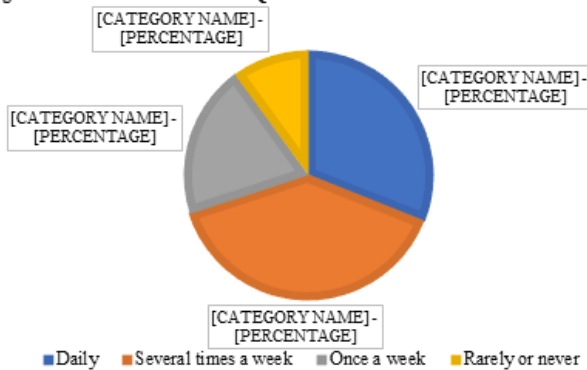
It is shown in the figure that most of the respondents visit green spaces in their neighbourhood or nearby areas several times a week, with 70 respondents (39%) falling into this category. Additionally, 55 respondents (31%) visit green spaces daily. Furthermore, 36 respondents (20%) visit green spaces once a week, while only 17 respondents (10%) reported visiting green spaces rarely or never. These findings indicate that the majority of our respondents frequently engage with green spaces, with a significant number visiting these areas several times a week.

Question-2 was designed to assess the impact of green infrastructure on the living conditions in the respondents' communities. We received a total of 178 answers to this question. The recorded answers are shown in Fig-2.

Fig-2: Recorded Answers For Question - 2. Total Answers Recorded 178.
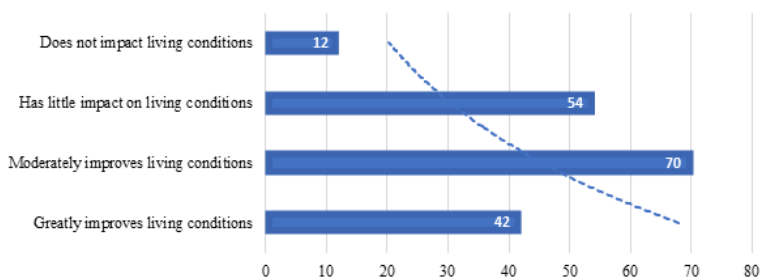
The figure illustrates that a substantial proportion of respondents believe that the presence of green infrastructure (e.g., parks, urban forests) moderately improves living conditions in their community. This response was selected by 70 respondents (39%). Moreover, 42 respondents (24%) indicated that green infrastructure greatly improves living conditions in their community. Additionally, 54 respondents (30%) felt that green infrastructure has little impact on living conditions, while only 12 respondents (7%) believed that it does not impact living conditions. These results indicate that a significant number of respondents acknowledge the positive impact of green infrastructure on their living conditions.

Question-3 was included to determine the level of involvement in urban agriculture among the respondents. We received a total of 178 answers to this question. The recorded answers are shown in Fig-3.

Fig-3: Recorded Answers For Question - 3. Total Answers Recorded 178.
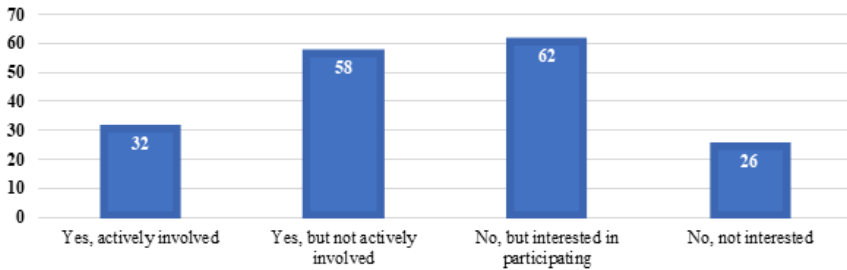
The figure reveals that a considerable number of respondents express interest in participating in urban agriculture. Among the participants, 98 respondents (40%) mentioned being interested in engaging in activities like home gardening or community farming initiatives. Additionally, 78 respondents (32%) reported being involved in urban agriculture but not actively. Furthermore, 46 respondents (19%) stated that they are actively involved in urban agriculture. Conversely, a smaller group of 24 respondents (10%) expressed no interest in participating in urban agriculture. These findings suggest that urban agriculture has garnered considerable attention and interest among the respondents.

Question-4 aimed to gauge the importance of access to fresh and nutritious food options in the respondents' households. We received a total of 178 answers to this question. The recorded answers are shown in Fig-4.

Fig-4: Recorded Answers For Question - 4. Total Answers Recorded 178
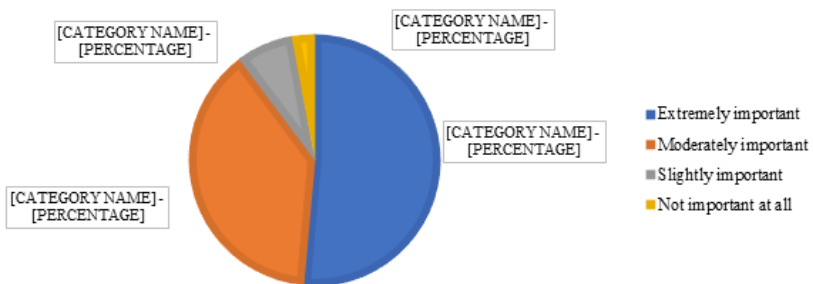
According to the figure, a majority of the respondents emphasize the importance of access to fresh and nutritious food options in their households. 91 respondents (51%) indicated that it is extremely important. Additionally, 68 respondents (38%) consider it moderately important. Meanwhile, 13 respondents (7%) find it slightly important, and only 6 respondents (3%) stated that it is not important at all. These responses highlight the significance of having access to healthy food options for a majority of the participants.

Question-5 sought to understand the respondents' perceptions of the contribution of green spaces and urban agriculture to alleviating food insecurity in their community. We received a total of 178 answers to this question. The recorded answers are shown in Fig-5.

Fig-5: Recorded Answers For Question - 5. Total Answers Recorded 178.
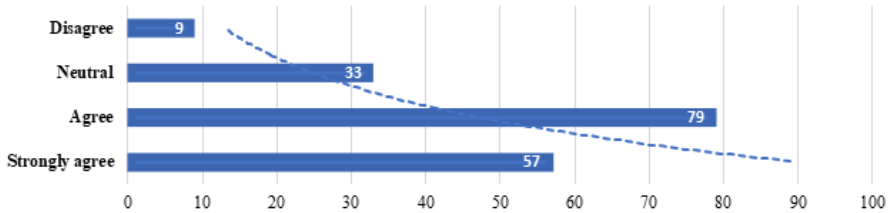
The figure demonstrates that many respondents believe green spaces and urban agriculture contribute to alleviating food insecurity in their community. Specifically, 57 respondents (32%) strongly agree, and 79 respondents (44%) agree with this notion. Additionally, 33 respondents (19%) expressed a neutral stance, while only 9 respondents (5%) disagreed. These responses suggest a prevailing belief among the respondents in the potential of green spaces and urban agriculture to address food insecurity.

Question-6 was included to ascertain any observed improvement in the household's economic well-being or living conditions due to the presence of green infrastructure and ecosystem services in the respondents' neighbourhoods. We received a total of 178 answers to this question. The recorded answers are shown in Fig-6.

Fig-6: Recorded Answers For Question - 6. Total Answers Recorded 178
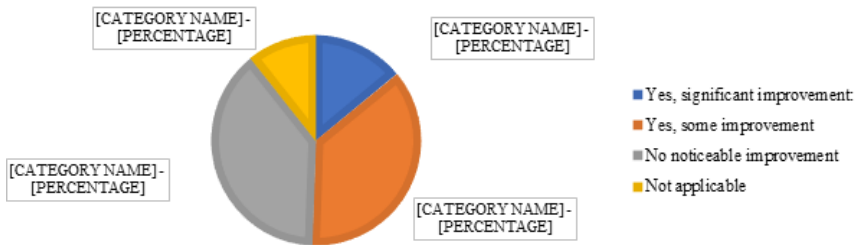
The figure indicates that a substantial number of respondents have experienced some level of improvement in their household's economic well-being or living conditions due to the presence of green infrastructure and ecosystem services in their neighbourhood. Specifically, 65 respondents (36%) reported some improvement, and 25 respondents (14%) stated significant improvement. Moreover, 69 respondents (39%)

mentioned no noticeable improvement, while 19 respondents (11%) considered the question not applicable. These findings imply that many respondents have observed positive changes in their household's economic well-being or living conditions, attributed to green infrastructure and ecosystem services.

ii. Analysis & Results

The survey investigated the impact of green infrastructure, ecosystem services, and urban agriculture on India's urban poverty and food security. Based on the responses from 178 participants, the following key insights can be derived:

a. **Engagement with Green Spaces:** The majority of respondents (71%) reported visiting green spaces (parks, gardens, etc.) in their neighbourhood or nearby areas frequently. Daily visits (31%) and several times a week visits (39%) were the most common patterns observed. This indicates a substantial level of engagement with green spaces among the respondents, suggesting that green infrastructure plays a significant role in their daily lives.

b. **Impact of Green Infrastructure on Living Conditions:** The responses indicated that green infrastructure positively impacts living conditions in urban communities. Over three-quarters of the respondents (74%) believed that green infrastructure either greatly improves (24%) or moderately improves (50%) their living conditions. This suggests that green spaces contribute positively to their neighbourhood's overall well-being and quality of life.

c. **Involvement in Urban Agriculture:** Urban agriculture has garnered notable interest among the respondents, with 72% expressing some level of involvement or interest. About one-fifth of the respondents (19%) reported active engagement in urban agriculture, while 32% were involved but not actively. Furthermore, 40% of the respondents expressed interest in participating in urban agriculture initiatives. This indicates a growing awareness of the importance of urban agriculture and its potential in addressing food security concerns.

d. **Importance of Fresh and Nutritious Food Options:** The survey revealed that the majority of respondents (89%) consider access to fresh and nutritious food options as important. Over half of the respondents (51%) deemed it extremely important, while 38% regarded it as moderately important. This highlights the significance of ensuring

adequate and healthy food choices for urban households, underscoring the relevance of addressing food security challenges.

The survey responses provide valuable insights into the positive impact of green infrastructure, urban agriculture, and ecosystem services on India's urban poverty and food insecurity. Most respondents reported substantial engagement with green spaces, perceived positive effects on living conditions, and expressed interest in urban agriculture initiatives. The emphasis on the importance of access to fresh and nutritious food further underscores the significance of addressing food security concerns.

5. DISCUSSION

a. **Perception of Green Infrastructure's Impact on Living Conditions**—Green infrastructure, comprising a network of natural and semi-natural spaces within urban settings, has become a trending topic in discussions about sustainable urban development[14]. Amidst growing concerns over environmental degradation and urban challenges, the perception of green infrastructure's impact on living conditions has garnered significant attention. A prevailing trend in recent research and public discourse is the recognition of green spaces' positive influence on mental and physical well-being[15]. As urban populations grapple with high stress levels and sedentary lifestyles, green infrastructure offers a breath of fresh air – quite literally. Urban parks, gardens, and green corridors provide havens for relaxation, recreation, and socialization, promoting a healthier work-life balance.

Moreover, green infrastructure enhances air and water quality, mitigating the urban heat island effect, and supporting biodiversity[16]. The trend towards integrating nature-based solutions into urban planning has gained momentum as cities seek ways to combat the adverse effects of climate change. As temperatures rise due to urbanization and global warming, green spaces act as natural coolants, providing relief during scorching summers. Another trending aspect of green infrastructure is its role in fostering social cohesion and community bonding. As

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[14]A. Zahoor, T. Xu, M. Wang & M. Dawood, "Natural and artificial green infrastructure (GI) for sustainable resilient cities: A scientometric analysis" 13 *Environmental Impact Assessment Review* 107139 (2023).

[15]P. Y. Nguyen & T. Astell-Burt, "Green Space Quality and Health: A Systematic Review" 18 *International Journal of Environment Research Public Health* 11028 (2021).

[16]*Id.* at 14.

urban landscapes grow denser, residents crave communal spaces that encourage interaction and a sense of belonging[17].

b. **Contribution of Green Spaces and Urban Agriculture to Food Security**—Green spaces and urban agriculture are increasingly recognized for their vital contribution to food security in urban areas[18]. As urbanization transforms landscapes, the need to address food insecurity becomes more pressing, particularly for vulnerable communities residing in cities. Green spaces, such as community gardens, urban forests, and parks, foster urban agriculture and promotes local food production[19]. Urban agriculture, encompassing diverse practices from rooftop gardens to community plots, offers an opportunity to grow fresh produce within the city limits. Bringing agriculture closer to urban residents reduces the distance between the source of food production and consumption. This proximity results in fresher and more nutritious food options for city dwellers.

The environmental benefits of green spaces and urban agriculture further contribute to food security[20]. Urban green spaces play a vital role in supporting biodiversity, improving air and water quality, and mitigating the urban heat island effect. In turn, these environmental factors positively influence agricultural productivity and the overall health of urban ecosystems[21]. Additionally, urban agriculture projects that incorporate composting and recycling practices contribute to waste reduction and sustainable resource management, closing the loop in the food system[22] (Tendero & Phung, 2019). Educational opportunities presented by green spaces and urban agriculture are equally significant. These initiatives serve as platforms for raising

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[17]A. Uslu & P. ªahin Körmeçli, "Inclusive Landscape Design to Provide Social Interaction in Urban Spaces" 19 *Current Trends in Science and Landscape Management* 09-22 (2017).

[18]*Id.*

[19]L. Taylor & D. F. Hochuli, "Defining greenspace: Multiple uses across multiple disciplines" 158 *Landscape and Urban Planning* 25-38 (2017).

[20]T. Nogeire-McRae, "The Role of Urban Agriculture in a Secure, Healthy, and Sustainable Food System" 68 *BioScience* 748–759 (2018).

[21]H. L. Tuomisto, "Effects of environmental change on agriculture, nutrition and health: A framework with a focus on fruits and vegetables" 8 *Wellcome Open Research* 2-17 (2017).

[22]M. Tendero & C. G. Phung, "The revival of urban agriculture: an opportunity for the composting stream" 20 *Urban Agriculture: Another Way to Feed Cities* 40-51 (2019).

awareness about sustainable agriculture, healthy eating habits, and environmental conservation.

6. POLICY & MANAGERIAL SUGGESTIONS

Comprehensive policy and managerial measures are essential to fully harness the potential of green infrastructure and urban agriculture in addressing urban poverty and food insecurity. Firstly, policymakers should prioritize incorporating green infrastructure in urban planning and development policies. Implementing regulations that mandate the allocation of green spaces in residential areas and commercial zones will ensure equitable access to nature for all urban residents. Additionally, providing incentives for private developers to incorporate green infrastructure in their projects can facilitate the creation of more sustainable and vibrant urban environments.

Promoting urban agriculture through supportive policies and initiatives is crucial. Policymakers should incentivize community gardening and urban farming projects by providing resources, such as land, seeds, and training, to interested communities. In urban management, city authorities should engage in participatory planning processes involving communities in decision-making regarding green spaces and urban agriculture initiatives.

Today inter-departmental coordination is essential to holistically address the complex challenges of urban poverty and food insecurity. Collaboration between departments responsible for urban planning, agriculture, health, and social welfare can result in more integrated and effective policies and programs. Implementing a "*Food Policy Council*" that brings together stakeholders from various sectors can facilitate cross-sectoral collaboration and foster a comprehensive approach to tackling food security challenges. To address barriers and challenges, managers of green spaces and urban agriculture projects should actively monitor and evaluate. Green infrastructure and urban agriculture projects can be cost-effective in the long run, given their multiple benefits for the environment and urban populations.

Effective policies and managerial strategies are vital to unlock the full potential of green infrastructure and urban agriculture in addressing urban poverty and food insecurity in India. By prioritizing incorporating green spaces in urban planning, promoting urban agriculture, and fostering community engagement, policymakers and managers can create sustainable and inclusive urban environments that enhance all urban residents' well-being and food security. Collaborative approaches and regular evaluations will enable continuous improvement and optimize the positive impact of these initiatives, paving the way towards resilient and vibrant cities for future generations.

CATALYZING SUSTAINABLE DEVELOPMENT: LEVERAGING RESEARCH AND INNOVATION TO COMBAT CLIMATE CHANGE-PATHWAYS FOR ACHIEVING SUSTAINABLE DEVELOPMENT GOALS

Dr. G. Yogalakshmi*   *M.G.R. Educational and Research Institute, Chennai, Tamil Nadu, India

Abstract

"Earth provides enough to satisfy every man's need,

But not every man's greed"

–Mahatma Gandhi

Climate change has become a global emergency, rapidly affecting human well-being and the sustainability of all life forms. The Paris Agreement aims to limit global warming to 1.5°C to avoid the most catastrophic impacts of climate change. As of 2022, the world has already seen an increase in global average temperature of approximately 1.15°C above pre-industrial levels (0.2°C increase per decade). The main driver of climate change is the greenhouse effect, primarily caused by increased CO_2 levels in the atmosphere. The Keeling curve which illustrates atmospheric carbon in parts per million (ppm), has reached a concerning state of 420.99 ppm in 2022.

These data emphasize the urgent need for ambitious and collective action to combat the otherwise irreversible consequences. Certain technological innovations, such as Artificial Intelligence, Geospatial Analytics, Tree-Planting Drones, Agrivoltaics, etc., can play a crucial role in achieving the United Nations' Sustainable Development Goals (SDGs) especially SDG 13, which addresses climate change. This paper explores how technology can contribute to meeting the ambitious climate change control

objectives and the need for strong support from the legal system to backup these initiatives.

Keywords

Sustainable Development Goals, SDG, Climate Change, Research and Innovation in Climate Control, Artificial Intelligence, Geospatial Analytics, Tree-Planting Drones, Agrivoltaics

1. Introduction

Climate change is one of the most alarming global challenges of our time, causing significant threats to ecosystems, economies, and societies. India, as a developing nation with a population of over 1.3 billion, is highly vulnerable to the adverse effects of climate change. Extreme weather conditions, increasing temperatures and rising sea-levels are affecting various regions of our country, exacerbating already existing vulnerabilities and threatening sustainable development. This paper provides an in-depth analysis of how the application of cutting-edge technologies and the support of proper legal systems play a critical role in addressing the multidimensional challenges posed by climate change.

This paper also examines the critical role of legal systems in climate control in India and highlights the urgent need for comprehensive and effective climate action. It explores how the Indian legal landscape aligns with international climate agreements and outlines the specific measures adopted to tackle climate change within the country.

Artificial Intelligence (AI), Geospatial Analytics, Tree-Planting Drones, Agrivoltaics and others, in combating climate change are discussed in this paper. These technologies provide unprecedented strategies to address climate deterioration, including carbon sequestration, renewable energy generation, optimum land and water usage etc.

Challenges in realizing these technologies and enforcing the laws are also discussed in this paper, along with some notable case laws and how they have helped in shaping up the legal landscape in India.

2. Legal Provisions Related to Climate Change in India

In the fight against climate change, legal systems play a critical role in shaping policies, regulations, and enforcement mechanisms to mitigate greenhouse gas emissions, promote sustainable practices, and ensure climate resilience. The legal framework in India, backed by national and international commitments, seeks to address the multidimensional challenges posed by climate change.

The legal foundation for climate control in India begins with its commitment to the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement established in 1992 and 2015 respectively. Kyoto Protocol which operationalizes the UNFCCC was adopted in 1997. As a signatory to these international agreements, India has pledged to take ambitious steps to limit global warming and enhance climate adaptation and resilience.

At the domestic level, India has enacted various laws and policies to address climate change challenges. The National Action Plan on Climate Change (NAPCC) outlines eight missions focusing - renewable energy, sustainable practices, energy efficiency, water, sustainable agriculture, and others. The Green India Mission aims to increase forest cover and biodiversity conservation, contributing to carbon sequestration. Additionally, initiatives like the Smart Cities Mission emphasize climate-resilient urban development.

Article 21 of Indian Constitution which provides protection of life and personal liberty, Article 48A which provides that the State shall endeavour to protect and improve the environment, Article 51A(g) which casts a duty on every Indian citizen to protect and improve the natural environment, Article 32 which enables Indian citizens to approach Supreme Court for fundamental rights, Article 226 which enables High Courts to enforce fundamental rights, Article 253 which deals with the law to give effect to international agreements, etc are some of the constitutional provisions in Indian legal system to protect the environment and quality of life.

Other major laws related to climate change in India are:

- The Wildlife Protection Act, 1972: This protects the wildlife in the country which includes endangered species, and the habitats of them.
- The Water (Prevention and Control of Pollution) Act, 1974: Control and prevention of water pollution is included in this act.
- The Forest (Conservation) Act, 1980: This act regulates forest conservation and ecological balance. This also controls use of forest land for non-forest usage.
- The Air (Prevention and Control of Pollution) Act, 1981: This deals with air pollution and emission control from various sources.
- The Environment (Protection) Act, 1986: Central government is enabled though this Act to protect and improve the environment quality and prevent pollution.
- The Energy Conservation Act, 2001: Efficient energy usage and conservation of energy is covered in this act.

3. Climate Change related Legal Cases

As climate change in mainly anthropogenic (induced by human activities), it should be controlled by appropriate laws. Following Legal cases highlight the human negligence/irresponsible act and how it was penalized/ handled by Indian legal system to ensure a safe/clean environment for all.

M.C Mehta vs. Union of India (The Oleum Gas Leak Case) (1987)[1]: Supreme Court ruled that a company is liable for the gas leakage. This is a milestone case in the history of Indian jurisprudence and law.

M.C Mehta vs. Union of India (Ganga Pollution Case) (1987)[2]: This case deals with pollution in Ganges River and required control mechanisms for cleaning the river, thereby ensuring protection of its ecosystem.

Subhash Kumar vs. State of Bihar (1991)[3]: Unauthorized construction in environmentally sensitive land and its impacts was addressed in this case.

Vellore Citizens Welfare Forum vs. Union of India (1996)[4]: Pollution control of Vellore region in Tamil Nadu is addressed by Supreme Court in this case.

M.C Mehta vs. Union of India (Vehicular Pollution Case – CNG Conversion case)[5] (2002): In this case Supreme Court ensured that sustainable development plays important role in environmental law. Polluter-pays principle and precautionary principle are considered as important features of sustainable development.

Goa Foundation vs. Union of India (2014)[6]: Supreme Court banned mining activities in Goa region to prevent mining practices that damaged the environment.

All these cases played important role in making policies and actions to control climate change and protect the environment in the country. The above list is only indicative. There are many other legal cases and petitions related to climate change and environmental protection.

[1] M.C.Mehta v. Union of India, 1987 AIR 1086 1987 SCR (1) 819 1987 SCC (1) 395 JT 1987 (1) 1 1986 Scale (2)1188
[2] MC Mehta v. Union of India, AIR 1988 SC 1037;(1987) 4 SCC 463
[3] Subhash Kumar v. State of Bihar, 1991 AIR 420 1991 SCR (1) 5 1991 SCC (1) 598 JT 1991 (1) 77 1991 Scale (1)8
[4] Vellore Citizens Welfare Forum v. Union of India, 1996 5 SCR 241, ILDC 443 (IN 1996), 1996 5 SCC 647, 1996 AIR 2715, JT 1996, 375
[5] M.C.Mehta v. Union of India, WRIT PETITION (CIVIL) 13029 of 1985
[6] Goa Foundation v. Union of India, (2014) 6 SCC 590

4. Role of Research and Innovation in Climate Control

4.1 Artificial Intelligence in Climate Change Control[7]

Artificial Intelligence (AI) plays an important role in combatting climate change. Use of Data Analytics, Machine Learning, Predictions, etc. can help in development of efficient climate control solutions. Following is some of the key areas where AI can effectively help.

- **Carbon Sequestration:** AI helps in development and optimization of carbon capture and sequestration. It also helps in predicting the behavior of CO2 capture systems and storage sites to reduce greenhouse gas emissions.

- **Climate Monitoring and Analysis:** AI helps to process data related to temperature patterns, atmospheric conditions, ocean currents, and GHG emissions. AI programs develop climate models for future trends and help to prepare for potential climate changes.

- **Energy Saving and Renewable Energy Integration:** AI can help in analyzing energy usage patterns in different infrastructure elements and predict the usage based on the historical patterns. This analysis can help in implementing energy saving measures which will help in carbon emission reduction. AI systems can be designed to efficiently use clean energy by matching the demand vs. production. This is implemented by integration of various renewable energy sources into the energy grid and controlling the production and distribution based on the demand and supply.

- **High Precision Agriculture:** AI combined with different sensors (IoT based) deployed on the field can help farmers in taking informed decision. This can help the farmers throughout the process (identifying the plant, planting, irrigation, pest control, harvesting, etc.)

- **Climate Modelling and defining Adaptation Strategies:** AI systems process data related to temperature patterns, atmospheric conditions, ocean currents, GHG emissions, develop climate models for future trends and create Climate adaptation strategies for vulnerable regions. It also assists in designing strategies to protect communities, ecosystem and infrastructure from climate changes and extreme weather conditions.

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[7]Climate Change Performance Index (2023), CCPI 2023: Ranking and Results. German Watch, New Climate Institute and Climate Action Network International. https://ccpi.org/

4.2 Geospatial Analytics for Climate Change Mitigation

Geospatial Analytics is based on AI techniques which helps in analyzing data from satellites, remote sensors, and geographic information systems (GIS). This analysis can help in identifying land/forest cover, carbon rich areas, appropriate location for various green energy projects and taking decisions on deforestation/ reforestation, urbanization impact, land usage etc. Following is some of the key areas where Geospatial Analytics can play a vital role.

- **Monitoring forestation and Carbon Sequestration Potential:** Geospatial Analytics plays an important role in maintaining existing forest areas and monitoring effectiveness of the reforestation and afforestation efforts. Geospatial Analytics can also help in identifying regions for carbon sequestration which can help in conservation and afforestation initiatives.

- **Renewable Energy Location Selection:** Geospatial data (wind speed, solar radiation, terrain condition, etc) can help in identifying right locations for installing green energy projects like solar, wind, etc. This data combined with performance of the green energy projects can help in taking better decisions in the future projects.

- **Emission Sources Identification and Land Use Planning:** Greenhouse gas emission from industrial area, power plants, residential area, etc. can be monitored using Geospatial analytics. This analysis helps in planning the land usage based on eco-friendly development practices.

- **Vulnerability Assessment and climate planning:** Risk assessment of climate change impact on a specific area can be done using Geospatial analytics. Based on the historical data from various sources, prediction for the future vulnerabilities and design of more resilient infrastructures can be built using recommendations from Geospatial analytics.

- **Policy Making based on Environmental Impact Analysis:** Geospatial analysis can be effectively used to monitor the impact of various projects/ initiatives. Detection of early impact can help in doing proper course correction, planning for any new projects and identifying better sustainable alternatives.

- **Tracking Progress and Reporting:** Another useful application of data analytics and dashboarding is to help monitor the effectiveness

of various initiatives related to climate control and provide real-time update on the progress to various stakeholders.

4.3 Tree-Planting Drones

Deforestation is a major reason for climate change because of its impact on biodiversity and carbon dioxide content in the air. Drones can be used effectively in reforestation and afforestation initiatives. As these are unmanned aerial vehicles, this can reach areas which are hard to reach and plant trees in large scale. Apart from planting trees, drones can also be used effectively in monitoring the progress and take corrective actions when required. Challenges related to choosing appropriate native trees, potential ecosystem impact, monitoring and maintenance, etc. should be considered while planning tree planting projects using Drones.

- **Precision Planting and Rapid Deployment:** Drones can help in reaching the hard-to-reach areas as well as planting the right seed at the right location. Precision planting is required for optimizing the density and growth patterns of the trees during reforestation and afforestation activities. Also scaling up of tree planting efforts can be done quickly by adding more drones to the project, thereby achieving large volume in short time. This will help in restoring the forests quickly after any natural disaster.

- **Monitoring Plant Growth:** After implementing reforestation projects, drones can help in monitoring the growth of the trees by capturing and analyzing arial data. This can help in taking any corrective actions if the effectiveness of the project is low.

- **Reforestation/Afforestation and Biodiversity preservation**: Traditional techniques used in reforestation and afforestation are less effective compared to Drones. As drones can be more effective in reaching hard-to-reach areas, plant large volume of trees in short time, monitor the progress of the growth, etc., it is used as reactive and proactive measure to promote bio-diversity and support wildlife. Also, the ability to choose the right seed (based on the native vegetation in ecosystems) can benefit the wildlife habitats.

- **Financial Efficiency:** Drones are more cost effective and fast compared to manual efforts. This can help in achieving more with less resource/cost. As technology improves, this will become more affordable and accessible.

4.4 Agrivoltaics: Integrating Solar Panels and Farming

Agrivoltaics/solar farming, involves the integration of solar panels into agricultural lands. This innovation can utilize the same land for generating renewable energy while maintaining agricultural productivity. Agrivoltaics is very effective in optimizing the water usage by reducing the evaporation in the field, making it suitable for arid regions.

- **Land Use Efficiency and Water Conservation:** Agrivoltaics is effective in optimizing the land usage and maximizing the water usage. As the solar panels are installed above the crops, it helps in reducing the water evaporation and thus aid in water conservation in arid or semi-arid regions.

- **Renewable Energy Generation:** While providing water conservation, Agrivoltaics can help farmers to generate green energy (solar) with the help of installed solar panels. This can generate additional income for the farmers with added benefits of renewable energy generation with reduced greenhouse gas emission.

- **Accelerated Crop Yield, Economic Benefits and Sustainable Agricultural Practices:** Installation of solar panels can create microclimate by reducing the temperature fluctuations in the field. This will be beneficial for some crops under certain climate conditions. Increased crop yield along with electricity generated by the solar panels can benefit the formers economically also. Also, it helps in sustainable agricultural practices like organic farming, crop diversification/rotation, etc. While implementing Agrivoltaics, it is important to take following into consideration – solar panel design, water management system, crop selection, suitability of the land, etc. Data Analytics along with AI techniques can help in making these decisions and fine-tune it over a period.

4.5 Other Innovations for Climate Change Control

Apart from the above-mentioned innovative approaches, there are few other techniques which can be considered while making the technology selection. Following are some examples - sustainable materials and construction techniques, carbon capture/utilization methods, efficient storage/connectivity of renewable energy sources, optimization of smart grids for energy distribution, etc.

4.6 Integrating Innovations for Comprehensive Climate Change Control

To improve the efficiency of the Climate Control solution, it is important that we understand how various techniques mentioned above can effectively be combined/integrated to provide a complete solution. Following are some examples – Integration of agrivoltaics with smart grid technologies for better energy distribution, Integration of AI with geospatial data for better decision making/ generating alerts, Integration of tree-planting drones with carbon capture for better carbon sequestration, etc.

5. Findings/ Market Analysis

As per Global Climate Risk Index 2021, India is the 7th most affected nation due to climate change. Because of the growing awareness and national/state level policies, India is rapidly improving on the performance of Climate Change action plans. This is reflected in the Climate Change Performance Index (CCPI) of 2023, which ranks India in 8th position and the best among G20 countries[8].
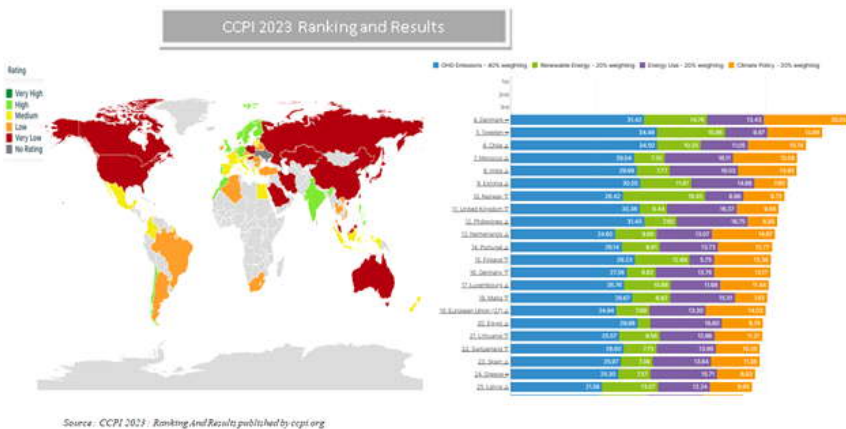
Figure-1: CCPI Ranking and Results

NITI Aayog of India publishes SDG India Index and Dashboard to cover progress made by States and Union Territories towards achieving the Sustainable Development Goals [8]. Overall SDG score in 2020-21 is 66 (from 60 in 2019) while performance score on SDG 13 is 54 (from 60 in 2019). This score is calculated based on the 5 targets and 8 indicators defined by United Nations (UN).

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[8]"Climate Change Performance Index" German Watch, NewClimate Institute and Climate Action Network International (2023).
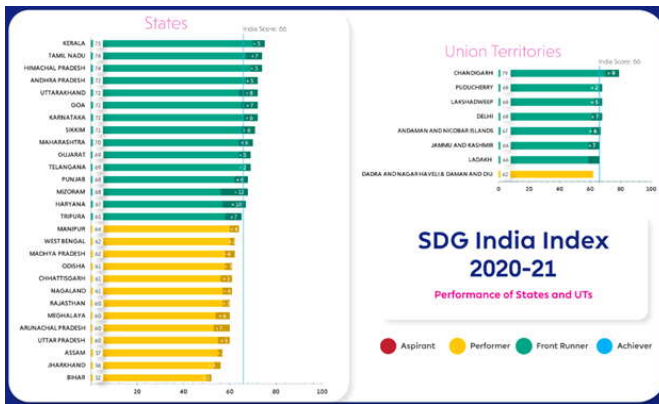
Source: NITI Aayog – Reports on SDG – SDG India Index 2020-21

Figure-2: SDG India Index

As per the global progress chart 2023, published by UN[9], around 60% of the SDG 13 indicators are in "Fair progress, but acceleration needed" state while 40% of the indicators are in "Stagnation or regression" which requires serious attention.

Source: UN Sustainable Development Goals – Progress Chart 2023

Figure-3: UN Report on SDG 13 Target Progress

In India, some of the renowned schemes to support SDG 13 goal implementation are as given below. Also, some of the Indian and Global companies which are working on solutions for Climate control leveraging different technologies / Research and Development (R&D) are also included in the below list.

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[9]"Sustainable Development Goals – Progress Chart 2023." United Nations(2023).

- India's PM-KUSUM scheme supports the implementation of agrivoltaics projects. There are around 20 projects in states like Gujarat, Uttar Pradesh, Rajasthan, Telangana, Haryana, Maharashtra, and Kerala which are mainly in Pilot phase. The present status of these projects can be seen in the interactive map provided by The National Solar Energy Federation of India (NSEFI) and the Indo-German Energy Forum (IGEF)[10]. The central government provides 30% subsidy, while the state government also provides another 30% subsidy for farmers to install solar panels in farmlands as part of this scheme.

- Cumulative agrivoltaics installation globally stands around 14 gigawatts in 2021 (as compared to 2.2 gigawatts in 2018). China, North America and Europe share the world's major agrivoltaic installation capacity.

- 'Hara Bhara" is a campaign launched by Marut Drones to grow 50 lakh trees in 12,000 hectares in Telangana with the help of their "Seedcopter drone". This aims at planting 1 billion trees by 2030 in the country to accelerate reforestation. Marut has partnered with Uttar Pradesh Government under the 'Vriksharopan Jan Abhiyan 2023' and has launched drone seeding initiatives in Agra and Firozabad districts. Also in the Aravali Mountain range, the Indian government has initiated a drone-based pilot project for reforestation. Drone seeding initiatives mainly use native tree species like Neem, Chilbil, Jamun, Babool, Aru, Seesham, Mahua, Indian Tulip, Custard apple, White teak, and Bamboo.

- Other notable drone seeding firms across the globe are Mast Reforestation – USA, AirSeed Technologies - Australia, Dendra Systems – UK, World Vision Kenya – Africa, Flash Forest – Canada, etc.

- Ministry of Science and Technology has come up with National Geospatial Policy in 2022 [11]to strengthen geospatial sector in India. This policy provides guidelines for the next 13 years to promote India's Geospatial data collection and setting up a framework to use the data effectively to address various citizen services including climate control. As of 2022, Union and State governments collectively spent around 300 Cr INR on Geospatial related programs.

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[10]"Agrivoltaics Map. NSEFI, IGEF." National Solar Energy Federation of India (2023).
[11]"National Geospatial Policy. Department of Science and Technology." Ministry of Science and Technology (2022).

- The Indian Space Research Organization (ISRO) has developed an array of satellites and related technologies to support various geospatial use cases. ISRO's - The Indian Remote Sensing (IRS) satellite series, Cartosat, Resourcesat, and Oceansat and their geospatial platform - Bhuvan helps in geospatial data collection and sharing. National Spatial Data Infrastructure (NDSI) helps in sharing geospatial data among different agencies (citizens, society, private enterprise, and government) based on common conventions and technical agreements, standards, metadata definitions, network, and access protocols.

- United Nations Platform for Space-based Information for Disaster Management and Emergency Response (UN-SPIDER) is a platform for space related technologies provided by UN for disaster and emergency management. Non-profit organizations like "The Earth Archive" are trying to create 3D digital twins of the earth by collecting baseline data. There are other private companies like Fugro, Skymet Weather, GalaxEye Space, Flotanomers R and D, AccionLAND, Hydenmet and others are actively working on this domain.

- Artificial Intelligence and Machine Learning (AI/ ML) is a concept which can cut across all the projects mentioned above and finds its usefulness in varied manner. There are many governments funded startups (Under different schemes like Startup India initiative by The Department for Promotion of Industry and Internal Trade (DPIIT), New Generation Innovation and Entrepreneurship Development Centre (NewGen IEDC), Technology Development Program, etc.) effectively use AI/ML to provide improvements/effectiveness to the existing process in climate control.

- Few companies which are effectively using AI/ML for building solutions for climate control in India are - Iowaaska Technologies, NatureDots, BrahmWorks, etc. Other AI/ML technology companies across the globe which are contributing in Climate Control related solutions are Immersion4, Sipremo, Kettle, Mortar IO, The Ocean Cleanup, One Concern, Refiberd, Pachama, AgroScout, Watershed, Eugenie.ai, Hummingbird Technologies, NCX, Raptor Maps, FarmWise, etc.

6. Discussion on Challenges and Limitations

Innovative techniques discussed in this paper can play a vital role in implementing effective climate control system. But there are few challenges and limitations one should be aware of. Policy gaps can negatively affect the widespread

adoption of these solutions. Also cost barriers related to the selected technology and technology limitations should be considered during the concept stage itself to prevent severe impact at later stages. Ethical concerns related to the use of AI systems and the related data privacy issues need to be addressed based on the local policies. Inclusion of marginalized communities in the solution to make it more compatible and effective under different conditions/ regions is also one important factor that needs to considered while selecting the solution.

Though India is well positioned to take advantage of the technology/ innovation, there are other challenges for climate control system implementation like, awareness, inadequate enforcement, insufficient financial support, etc. Complementing climate friendly laws with strict enforcement and better stakeholder collaboration is the key for effective implementation in Indian environment.

Conclusion

Innovative techniques and solutions discussed in this paper (AI/ML, Geospatial Analytics, Tree-Planting Drones, Agrivoltaics and others) will play a crucial role in achieving UN's SDG 13 goals. With proper integration/collaboration of various techniques, these innovative solutions can be more effective than the traditional practices in combating climate change and controlling greenhouse gas emissions. These technologies need to be practically supported by Government schemes and large business houses, while being available to the common man. Only by the appreciation and acceptance of the potential benefits of these innovative practices at a larger extent, we can ensure sustainable development for the present as well as the future generations.

Role of the legal systems in India is also very crucial in creating the roadmap and enforcement of the climate control policies. The need of the hour is serious enforcement of a strong legal framework for combating climate change and advanced collaborations with the world forums to protect the environment and the planet.

HAZARDOUS WASTE MANAGEMENT AND PROTECTION OF ENVIRONMENT: NEEDS NEW IMPLEMENTATION MECHANISMS TO ACHIEVE SUSTAINABLE DEVELOPMENT GOALS

Dr. E.Prema*

*VIT School of Law, Vellore Institute of Technology Chennai Campus, TN, India

Dr. V.Shyam Sundar**

**Dr Ambedkar Government Law College, Pudupakkam - 603103, TN, India

Abstract

The earth environment tends to absorb many changes but often reacts late. Climate change and diseases are one such example. Likewise, technology and chemicals can pose significant risks to health and the environment when they are improperly or not managed, especially to the poorer communities most exposed to these negative consequences. Moreover, certain substances limit and obstruct human development, impair physical and mental development. There are many international conventions for the protection of the environment. However, due to many reasons, such as economic benefits or revenue, countries act beyond the obligations. The present study analyses conventions relating to hazardous wastes and India's implication on relevant international conventions. The current research would study the effectiveness of the legislation through the lens of Sustainable Development Goals.

Keywords

1. Introduction

One of the major challenges worldwide is integrating sustainable development with growth in the economy and well-being. This can be accomplished by separating environmental damage from economic development and getting more done with fewer resources. For sustainable consumption and production patterns to be promoted and for the transition to a more environmentally friendly and socially inclusive global economy to be achieved, divergence of resources and effects is essential. To guarantee that demand and consumption are both sustainable techniques, it is necessary that it is critical to respect the earth's biophysical constraints and to keep present world consumption rates as low as possible to align them with the biological ability to offer ecological services and benefits, which is currently being exceeded. According to Resolution 1 (UNEP/EA.4/Res.1) of the United Nations Environment Programme (UNEP/EA.4/Res.1), "A circular economy" is one of the existing sustainable growth models in which materials and goods are planned to be restate, reconditioned, recycled, otherwise managed to recover and thus kept in the economic system for as long as humanly possible, including the funds from which they have been derived, and waste, highly dangerous waste, is minimized or avoided, and greenhouse emissions are avoided or minimised are avoided or minimised." The concept of circularity has significant philosophical and historical roots. The Input, or cycling in real-world systems, is a centuries-old notion with echoes in many fields' philosophical traditions. It resurfaced in industrialised nations after WWII, when investigations of non-linear systems using computers indisputably exposed the world we live in as complex, interconnected, and so unpredictable — like a metabolism rather than a mechanism. By drastically boosting digitalization, dematerialization, visibility, and feedback-driven intelligence, alpha numerical world has the capability to expedite the transformation to the above economy.

2. Hazardous Wastes

A toxic material is one that has qualities that make it potentially dangerous to human and environmental health.[1] (United States Environmental Protection Agency, 2023) Hazardous waste can take on many forms, include liquids, particles, gases, and slurries, and can come from a range of places, including industrial waste and batteries. Before a substantial to be classed as harmful waste, it must first be categorized as solid waste. As a result, assessing whether a substance identifies hazardous waste begins with the identification

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[1]United States Environmental Protection Agency (EPA), *The Basics of Hazardous Waste*.

of solid trash. According to the Basel Convention, 1989, Annex III,[2] (Unep, 2014) these elements include the following:

- Combustible Liquids/Solids
- Toxic
- Ecotoxic
- Viral Substances
- Poisonous
- Toxic
- Ecotoxic
- Disease Substances
- Incendiary

Unless they have any hazardous characteristics indicated in Annex III, wastes fall into most groups listed in Appendix I of the Basel Convention, 1989.

- Diagnostic wastes;
- Disposal of oils/water, oil and gas co-products combinations, emulsions;
- Wants to waste from manufacturing, implementation, and use of resins, latex, phthalates, glues/adhesives;
- Wastes from surface modification of metals and plastics;
- Wastewater effluents certain substances such as copper, zinc, and lead; and
- Wants to waste usually contains certain substances such as copper, zinc, household waste; or
- Residues resulting from household waste incineration.

3. Hazardous Wastes & Sustainable Development Goals

To understand the impacts due to increase of hazardous wastes, it is essential to understand the difference between users and customers. In a circular economy,[3] (European Parliament, 2023) biological resources have been the

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[2] Basel Convention on The Control of Transboundary Movements of Hazardous Wastes and Their Disposal.

[3] "Circular economy is a model of production and, which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended." "Further, Additionally, it entails minimising waste. Recycling helps to keep a product's components as economically viable as feasible when it reaches the end of its lifespan as a product. These can be productively applied repeatedly, adding more value. The standard, linear economic paradigm, built on a take-make-consume-throw-away cycle, is disregarded by this. This concept depends on many inexpensive, readily available energy and materials. News, European Parliament."

only ones that can be called consumable, whereas technological materials are utilised. For example, it makes no sense to compare air conditioners and automobiles consumption to that of food. This is a small but significant distinction in how we think about materials.

Furthermore, it raises questions about the value of possessing objects in the traditional sense. What is the point of buying a drill if all you want to do is drill are there any gaps on your wall where you could put a picture? The service that a product provides is more important than the thing itself. Many technical realities of changing our industry from linear to circular are made easier by comprehending this mental transformation.

In 2015, 17 goals of the 2030 Sustainable development Agenda were endorsed by countries centred on the protection of the environment and other challenges such as gender inequality, etc. The nations are under an obligation to implement these Goals at the municipal level. Countries began to analyse their growth, development and management using the Sustainability Objectives as a lens (hereinafter referred as SDG). SDG 3 ensures healthy lives and promotes well-being for all at all ages, under which target, 3.9 deals with reducing the number of fatalities and diseases caused by chemical pollution and poisoning of the air, water, and soil. SDG 6 calls for the availability and long-term access to water and sanitation for all people and under its target, 6.3 focuses on the conservation through lowering pollutants and improving water quality contamination of water by hazardous chemicals, boosting global recycling and safe reuse.

Additionally, SDG 12, which ensures sustainable demand and consumption patterns, under its Indicator no: 12.4.1 and 12.4.2, discusses the state parties' obligation to provide information relating to international conventions on hazardous materials and substances mandated under such agreements. Therefore, as an outcome, nations are under compulsion to balance their growth and development with the protection of the environment. World nations, while considering the production of any materials that would become a hazardous waste, must consider its disposal in a cost-effective, executable method such as a circular economy to protect the environment from degradation. The Chemicals and hazardous wastes concerns were specifically elaborated under chapter 19 & 20 in Agenda Twenty-One. It identified two major issues which deals lack of sufficient information for the risk assessment and resources of assessment of chemicals for data are at hand. In Chapter twenty has five important targets prevent or limit the production hazardous wastes.

4. Why Hazardous wastes Disposal is a Global Issue?

To protect the natural recourses from depletion, many countries are approaching and advancing to new technologies to handle hazardous wastes. However, when few lower economies are targeted to illegally dump the hazardous wastes, where there is a transboundary movement of these harmful wastes have become a global issue. Additionally, the countries that manage the wastes appropriately and protect the environment are also effected by the activities of neighbouring states such as mishandling or negligent in handling the hazardous waste results in damaging the environment at large. Climate change is a classic example of the above discussed issue.

In India, the judiciary has established its effective control in protecting the environment from the adverse effect caused by all wastes. In underdeveloped nations, public health priorities include infectious illnesses, malnutrition, and mortality among children. While nations develop and acquires or strengthens economic resources, it becomes more prosperous. As a result, health concerns about hazardous chemical wastes receive increasing attention. Even if a country's industry produces minimal hazardous waste, importing hazardous trash or wastes for disposal or recycling might pose health risks. Due to variances in how hazardous wastes are categorised, it's difficult to compare the release of harmful wastes produced in various nations. In most nations, open dumping is a frequently utilized method, which has a different approach to waste disposal and incinerates large amounts of hazardous wastes. Hazardous wastes which are leaked in the earth's atmosphere or environment, negatively influence humans by contaminating the air and water. In a successful hazardous waste management plan, waste reduction, recycling, and reuse should be prioritised above disposal. Low-cost systems for controlling hazardous wastes are especially needed in developing nations.[4] (Kôji Nogawa, 1979) Few manufacturing regions around the world has experienced severe chemical contamination that has caused serious harm to the environment, human health, genetic structure, and reproductive health. Restoring these areas will require significant financial investment and the building of novel techniques.[5] (United Nations, 2016)

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[4] K. Nogawa *et al.* A Comparison of Cadmium in Rice and Renal Effects Among Jinzu River Basin Inhabitants. Environ. Res. (1979).

[5] Sustainable Development, *Chemicals and Waste*. Department of Economic and Social Affairs.

5. Transboundary Movement of Hazardous Wastes

Wastes producers are constantly confronted with the challenge of how to dispose, must pick from a choice of removal and possible treatments for their wastes. It is possible, that people are increasingly deciding to export waste materials to other countries. Although it's impossible to estimate how much hazardous materials crosses state borders each year, the quantity of hazardous waste transported across state lines has in recent years, and there has been significant increase. Between 1 million to 400 million tonnes of hazardous waste per year is produced (man-made chemicals).[6] (The World Counts, 2023) The Organisation for Economic Co-Operation and Development (OECD), a forum that works to address economic, social and environmental challenges at global level. In 2009, the OECD came out with a 'Guidance Manual for the Control of Transboundary Movements of Recoverable Wastes'. While compared to the Basel Convention, OECD framework, the afore-mentioned guidelines, (Council Decision C(92)39/FINAL) provides a simplified and explicit means of managing movements of wastes. The Guidance Manual further provides an understanding on its functioning and assisting national governments in its implementation.[7] (OECD, 2009) In addition, environmental rules in industrial nations were tightened in the 1980s, resulting in considerable, if not enormous, costs of waste disposal, particularly hazardous materials disposal, that have risen. As a result, a new generation of traders emerged, offering less expensive waste disposal options.

These "toxic traffickers" transferred waste to poor countries and Eastern Europe, which lacked strict environmental standards. This carried on for a while before the entire extent of their acts became known as a result of increased media coverage that raised worldwide awareness.[8] (Unep, 2011) This sparked international uproar, prompting international organisations to establish and implement comprehensive legal tools to control and regulate the transport of hazardous waste. With the first attempt in the establishment a comprehensive mechanism and ratification of the Basel Convention on Control of Transboundary Movements of Hazardous Wastes and their Disposal, 1989, the world has become a safer place. There were several regional and multinational agreements negotiated in the aftermath of the Basel Convention.[9]

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[6]13 tons of Hazardous Waste Produced Every Single Second. Global Challenges, The World Counts.

[7]Guidance Manual for the Control of Transboundary Movement of Recoverable Wastes.

[8] Basel Convention

[9]Ibid

(Unep, 2011) For instance, the EU (formerly the EEC) has, issued various directives governing the trans-hazardous waste transportation across borders.[10] (European Union, 2008) These directives are more tailored to the interests of EU member states to provide for more comprehensive regulation of the market. region's specific concerns. The EU directives consider the Basel Convention's requirements as well as taking use of the commission's flexibility,[11] (Kummer, 1995) which allows regions are free to create and implement their respective guidelines and restrictions as long like they do not conflict with the convention's provisions essential elements. Some key steps were done prior to the activities of the 1980s that would eventually prepare the way for the events of the next two decades. The Waste Management Policy Group was established by the OECD Environment Committee in 1974 to evaluate, develop, and disseminate global policy instruments to encourage waste management that are environmentally friendly. In order to contribute to long-term development. As the organisation grew since 1980, there has been a greater focus on hazardous waste, it has placed a special emphasis on transboundary (also known as trans frontier) waste movement. The Waste Management Policy Group's efforts resulted in the OECD passing the Basel Convention on Transboundary Movement and Disposal of Hazardous Wastes regulates the movement and disposal of hazardous wastes across international borders was founded on eight decisions/recommendations. Several European Directives on waste categorization, definition, and management have been enacted were also adopted as a result of the group's efforts. This is a significant accomplishment since it is critical to be able to characterise and identify hazardous trash before limiting its movement. However, there are still a lot of variances in how "hazardous waste" is defined around the world, making it impossible to compare data from different nations.

It is usual to characterise wastes transit across borders as "bad" or "undesirable." It's a contentious problem that has to be addressed, and some have even urged for its outright prohibition. Before hazardous waste transportation may be condemned, the circumstances and reasons for it must be thoroughly investigated. It should be accepted that carrying such wastes over short and long distances should be safe provided it is transported under-regulated, technically sound conditions. Suppose the waste is properly managed with the appropriate level of technology and methods and the complete system

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[10] Directive 2008/98/EC.
[11] K. Kummer Peiry, International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules, Oxford University Press, Oxford, 1995/99.

are well-maintained and audited regularly, then wastes should be generally safe to transport. Furthermore, suppose the waste products are adequately labelled with clearly understandable descriptions, the importing state completely possesses knowledge of the waste components and the power to grant or refuse authorization. If the host government permits it, it ought to be legal to transfer, and ethically acceptable, it has the requisite technologies, personnel, and a waste management system (including infrastructure). If the only accessible wastes facilities are in another nation, moving the hazardous waste there and using their facility may be a far more ecologically beneficial alternative than picking a less safe alternative since it is within the same state, it is one of a waste disposal technique.

Hazardous substance transportation and disposal across borders, on the other hand, raises a danger of negative consequences in all areas (land, air, water). Landfills have the potential to pollute both land and water through groundwater contamination; combustion releases pollutants into the air that would settle or be dragged down into waterbodies or onto land by rain. Every sphere that is impacted is generally affected and impacts the other spheres as well. The possible hazards of hazardous waste are increased when it is transported across borders. Longer distances travelled, for example, increase the danger of accidents during transportation or processing. The destination country's environmental regulations and regulatory procedures may be weak and complicated, resulting in increased potential negative health and environmental consequences. Any time waste is handled improperly, it poses a threat to the environment.[12] (OECD, 1997)

6. The Basel Convention's Goals & Provisions

India is a signatory to the Basel Convention, which it has signed in 1992. The Basel Convention's overall function is to keep hazardous wastes negatively influencing health and the environment. Its field of applicability Article 1 and Annex I, III, VIII and IX categorise a wide range of wastes as "hazardous wastes" based on their source, content, there are two categories of wastes, and their features categorised as "other wastes".[13] (Kellow, 1999) The Convention's provisions are centred on the following main goals: (i) a regulatory

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[12]The Organization for Economic Cooperation and Development is a global organisation that promotes economic cooperation and development (1997). Hazardous Waste Movements Across Borders: 1992–93 Statistics, 21 pp.

[13]A. Kellow, International Toxic Risk Management: Ideals, Interests and Implementation, Cambridge University Press, Cambridge, 1999.

regime that applies when transboundary movements are permitted; and (ii) the limitation of dangerous materials waste transboundary movements but apart from where it is interpreted to be in consistent with environmental management standards; and (iii) the decrease of hazardous waste creation and promotion of ecologically sustainable hazardous waste treatment, regardless of disposal location; and (iv) the limitation of hazardous materials transboundary movements but apart from if it is deemed to be in accordance with environmental management standards.[14] (Krueger, 1999) The first purpose is met by broad regulations requiring states to follow the basic norms of environmentally sound solid waste management (Article 4). Hazardous wastes may have not been moved to Antarctica, a nation that is not a member to the Basel Convention, to meet the second purpose, or a country that has banned hazardous waste imports (Article 4). Parties, on the other hand, may reach bilateral or multilateral arrangements with the other parties or non-parties on hazardous waste management if they are "no less ecologically responsible" than the Basel Convention (Article 11).[15] (Kummer, International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules, 1995) Where later transferred is not prohibited in theory; nonetheless, it may still take place if it is an ecologically sound choice, if environmental protection and non-discrimination principles are followed, and when carried out in conformity with the Commission's regulatory provisions structure. As originally approved, the Basel Convention's regulatory framework is its cornerstone. It is founded on the concept of previous and explicit consent, which stipulates that, before to any export, the exporting state's authorities notify the officials of the possible future transfer and transiting states, provide them with any pertinent information on the planned movement The programme will be available in English be able to move forward and if and because all of the nations are on board involved have signed off on it in writing (Articles 6 & 7). The Basel Convention also allows for inter-party collaboration on a variety of issues, spanning from information sharing about the Convention's application to technical assistance for poor nations (Articles 10 and 13).[16] (Peiry, 1999)

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[14]J. Krueger, International Trade and the Basel Convention, Earthscan Publications, London, 1999.

[15]K. Kummer Peiry, International Management of Hazardous Wastes: The Basel Convention and Related Legal Rules, Oxford University Press, Oxford, 1995/99.

[16]K. Kummer Peiry, "The Basel Convention: Ten Years On, in: Review of European Community and International Law", Review of European Community and International Environmental Law,vol. 7, No. 3, 1999, pp. 227-36.

As a clearinghouse, the Secretariat is responsible for facilitating and supporting this cooperation (Article 16).[17] (Pallemaerts, 2003) The Convention delegates to one or more of the countries concerned, and enforces the requirement to secure appropriate disposal, whether by re-importation into the originating country or elsewhere, if later transferred of waste products is conducted out unlawfully, that is, in contravention of the law of Articles six and seven, or if it cannot be completed as planned (Articles 8 and 9).

The Basel Convention, like other current global environmental agreements, has its own institutional framework. UNEP establishes Secretariat, which prepares, organises, and services sessions under the Convention, enables information sharing, and advises and assists parties on technical and legal issues. In addition, the Secretariat has a limited authority to assist parties in implementing the Convention. The Open-ended Working Group, the Expanded Bureau, and the Implementing and Compliance Committee are the Conference of the Parties' subsidiary bodies. To fulfil the needs of diverse regions and sub regions, the Convention also calls for regional or sub-regional retrain centres to be established and transfer of knowledge centres for the control the reduction of toxic waste, as well as their creation (Article 14).

The Convention aims to create regional or sub-regional training and knowledge transfer centres for the management of hazardous wastes and other wastes, as well as for reduction of their generation, to meet the needs of various regions and subregions (Article 14). As a result, fourteen of these institutions were established in regions, which conduct training and capacity-building operations.[18] (Pallemaerts, Toxics and Transnational Law, 2003)

7. Rules for the Management and Transboundary Movement of Hazardous and Other Wastes: India's challenges

The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 is a framework which includes other wastes such as discarded tyres, paper garbage, metal scrap, old electronic products, and so on. The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016, are adequate to regulate industry because they just outline the procedures that must be followed. Apart from the guidelines mentioned earlier, only few initiates have been taken to guarantee that the processes are followed, and because the penalties are not well-defined, the regulations are frequently disregarded or poorly implemented.

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[17]M. Pallemaerts, *Toxics and Transnational Law*, Hart Publishing, Oxford, 2003.
[18]Ibid

7.1 The Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016 (Amended 2022), highlight key elements

- The Regulations now expand to include urban agglomerations, statistics towns, and industrial alerts neighbourhoods, Indian Railways-controlled regions, airlines, airfields, docks and harbours, military foundations, State and federal administrations, special economic zones, and airports, airbases, ports and harbours, government organisations, pilgrimage sites, religious and historic sites, and special economic zones.

- The separation of trash at the source has been enforced to channel waste into wealth through recovery, reuse, and recycling.

- Generators are now responsible for sorting trash is separated interior hazardous wastes under three categories: wet, dry, and hazardous (biodegradable), and giving them over to approved rag-pickers, garbage collectors, or local organisations.

- Garbage dealers/kabadiwalas, waste pickers/rag pickers should be integrated into the formal system by individual states, Self Help Groups, or any other organisation created.

- No one shall toss, burn, or bury his or her solid waste on roads, open spaces outside of their homes, or in drains or water bodies.

- Generators will be responsible for paying a 'User Fee' to the trash collector as well as an Illegal dumping and non-segregation will result in a 'spot fine'.

- Used menstrual waste, such as nappies and sanitary products, need to be properly wrapped in pouches provided by the makers of major brands, or in a suitable wrapping material, and disposed of in the dry waste / non-biodegradable trash container.

- In Swachh Bharat, the notion of collaboration is determined. A large quantity of Institutional providers, market groups, event planners, hotels, and restaurant have all been provided with funding direct responsibility for sorting and segregating waste, which they will handle in collaboration with local authorities.

- To ensure that biodegradable trash is used for composting/bio-methanation, all restaurants and hotels should segregate biowaste and set it up a collecting process or following the collection procedures of the local government system.

- All Resident Welfare and Market Associations, Gated Communities, and Institutions with an area must separate waste at the source, trying to separate valuable waste such as plastic, tin, glass, paper, and other materials from recyclable materials and going to hand recycled items to either authorised waste pickers or authorised recyclers, or to the urban local government.

- As much as possible, biodegradable trash decomposition or bio-methanation should be used to process, treat, and dispose of waste on-site. The residual waste must be given to the local authority's designated waste collectors or agency.

- As much as possible, biodegradable trash decomposition or bio-methanation should be used to process, treat, and dispose of waste on-site. The residual waste must be given to the local authority's designated waste collectors or agency.

- The development of biodegradable waste control and processing technologies in-house waste has been assigned to new township and Group Housing Societies.

In ***Research Foundation for Science Technology v. UOI***,[19] (Research Foundation for Science v. Union of India (2005) 13 SCC 186 (India), 2005) the Indian Supreme Court's involvement in recognising the safeguards as an important component of environmental sustainability and a component of customary law facilitated its implementation under The Indian Constitution's Articles 21, 48A, and 51A (g). Article 21 of the Indian Constitution states: "no individual shall be deprived of his life or personal liberty unless in accordance with the method established by law." Article 48A of the Indian Constitution requires the government to "protect and improve the environment and safeguard the country's forests and animals." 'It is the responsibility of every Indian citizen to conserve and improve the environment.' landscape, especially forest, rivers, waterways, and wildlife, and to have respect for those who live their beings,' according to Article 51A(g).

In ***Vellore Citizen Welfare Forum v. UOI,***[20] (Vellore Citizen's Welfare Forum v. Union of India (1996) 5 SCC 647 at 658 (India)., 1996), Kuldip Singh J held in 1996 that the precautionary principle entails three conditions:

(1) The state governments and the legislative authorities must anticipate, prevent and combat the causes of environmental degradation;

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[19] Research Foundation for Science v. Union of India (2005) 13 SCC 186.
[20] Vellore Citizen's Welfare Forum v. Union of India (1996) 5 SCC 647 at 658.

(2) In case of serious threat and irreparable damage, lack of scientific certainty should not be used to justify delaying action in environmental degradation;

(3) The actor, developer, or industrialist bears the 'onus of proof' in demonstrating that their acts are ecologically friendly.

In *The Commissioner of Customs* v. *M/s City Office Equipment (2019)*,[21] the respondent in this case involved in the importing and selling of 'Digital Multifunctioning and Copying Machine, and second-hand photocopier machines. The Court in this case stressed upon the application of Foreign Trade Policy 2009-2014, which prescribed the procedures for importable goods. The Court held that the respondent's goods fall under the category of goods that come under the Foreign Trade Policy and ordered the release of goods to the concern authorities. Furthermore, the National Green Tribunal (NGT) is a legislative body whose jurisdiction, powers, and procedures are governed by the National Green Tribunal Act of 2010 which establishes environmental justice. As required by Section 20, the National Green Tribunal (NGT) interprets and enforces the precautionary principle under Section 20 of the National Green Tribunal Act of 2010.[22] (The Commissioner Of Customs v. M/S.City Office Equipment, 2019) The National Geographic Society designated the precautionary principle should be included into national environmental legislation:

"The application of [the] protection of the environment is a statutory requirement for the Tribunal to follow when deciding or settling cases involving significant environmental issues. As a result, any infraction of this principle, even if suspected, would have been actionable in front of the Tribunal by anybody. Lack of action in the facts of this case of a given situation may constitute a violation of the law. protection of the environment, bringing the matter within the Tribunal's jurisdiction, as specified by the NGT Act 2010".[23] (Goa Foundation v. UOI, 2014)

Uncertainty is created by cautious, incomplete, or contested scientific information relating to obliviousness, defective designs, science-based

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[21]The Commissioner of Customs v. M/s City Office Equipment Writ Appeal No.1215/2019, High Court of Madras

[22]'The Tribunal shall use the sustainability principles, the carbon emitters, and the precautionary principle pays principle in making any judgement, judgement, or award,' as stated in Section 20.

[23]Goa Foundation v. Union of India (2014) 6 SCC 590.

inconsistencies, and agreeing on the amount of hazards with a low epistemological barrier of proof and an inclination for risk prevention with a low epistemological threshold of proof and a propensity toward risk prevention.[24] (Gill, 2017) The authority of the NGT to conduct merit reviews promotes legal principles. The NGT, as a merit court, assumes the position of principal decision-maker and is allowed to undertake in-depth investigations that encompass not only the legislation but also the advanced analytics that supports a decision.

In exercising the Tribunal must consider all components of such concerns, whether factual, technical, or legal, as part of its merit-review duty and as an expert body,' the NGT held in *M/S Sterlite Industries* v. *Tamil Nadu Pollution Control Board*[25] (M/s Sterlite Industries v. Tamil Nadu Pollution Control Board, 2013). Furthermore, the Tribunal's "merit evaluation" is not limited to the principle of Wednesbury. Other factors, such as a lack of proof, a lack of particular and scientific facts, or misuse of authority, may be examined by the Tribunal in deciding such a dispute. The precautionary principle has been invoked and is being observed as a normative commitment by judicial and expert personnel. Even in the lack of it, it advises the judges, particularly the technical expert judges, to offer scientifically based structural solutions and policies steps to improve and programs that, even in the absence of government intervention, creatively response to inefficient regulation.

The use of the precautionary principle is aided by the adoption of a variety of methods, such as investigative, stakeholder consultation, and the establishment of specialized committees. This enhances active participation by eliciting factual truths and expert knowledge to respond to environmental challenges through debate, argument, and conventions.[26] (Hanuman Laxman Aroskar v. Union of India, 2019) As a result, in India, the precautionary principle necessitates careful application in potential dangers should be monitored, prevented, and minimised. Risk factors have gotten increasingly complicated and far-reaching in recent years, with harmful health and environmental effects. The principle improves overall environmental and health decisions in India's environmental governance. Due to its irregularity (normative characteristics) and misapplication, the theory is contentious and difficult to

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[24]G.N. Gill, 'The National Green Tribunal of India: Decision-Making, Scientific Expertise and Uncertainty' (2017) 29 (2–3) Environmental law and Management 82–88

[25]M/s Sterlite Industries v. Tamil Nadu Pollution Control Board Appl No.57/2013. NGT

[26]Hanuman Laxman Aroskar v. Union of India 2019 SCC Online 441 at paras 138 and 149.

apply (legal standard of proof). There are many different definitions of the principle, making environmental issues more complicated in its governance. As indicated by case law, the responses also reflect various judicial interpretations. For example, the Supreme Court of India stated in *Research Foundation for Science Technology and Natural Resources Policy* v. *Union of India*,[27] "This principle is described as an approach to protecting the environment or human health...," it was described as a "principle underlying environmental law" in *M C Mehta* v. *Union of India*[28] (M.C.Mehta v. UOI, 2002), and as "precautionary measures" *Golden Gas Victims of Jaipur* v. *UOI*.[29] (Jaipur Golden Gas Victims v. Union of India, 2009) As a result of the changing declarative language, the substance of the concept is muddled.

8. Circular Economy and Hazardous Waste Management: Findings & Analysis

The global issue of hazardous wastes is increasing environmental concerns and are impacting the human health, the developed nations are nailing for global cooperation to address them. Circular economy, is one sustainable solution, where countries are practicing various methods in handling the hazardous wastes. China is the first country to adopt circular economy law promoting the recovery of resources from waste (2008) and later in 2015, the European Union adopted 'Circular Economy Package' which included many goals relating to food, water and reuse of plastic (Report on Circular Economy: United Nations Industrial Development Organization, 2017). Likewise, to promote cleaner and efficient use of resources, in Switzerland, among 26 cantons, Zurich was the first canton to include provisions relating to circular economy, in its Constitution (2022). Though circular economy has become a solution or alternate to handle wastes, it is difficult to recycle the hazardous wastes. Circular economy would be successful in a country with strong technological foundations and development. Hazardous waste are generally Health and Environmental Consequences resources. For instance, the UN reveals that by 2022, about 1.8 billion of the world population, will live in nations and locations where there is a severe lack of water.[30] (Jaipur Golden Gas Victims v. UOI, 2009) Analyzing one example to know the solutions provided by the companies involved in advising on circular economy, Triumvirate

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[27] Research Foundation for Science Technology and Natural Resources Policy v. Union of India 2007 AIR SCW 5851

[28] M C Mehta v. Union of India (2002) 4 SCC 356

[29] Jaipur Golden Gas Victims v. Union of India (2009) SCC W.P. (C) 6415/2006.

[30] Ibid

Environmental, a company which provides services to hazardous and non-hazardous management across North America is studied. This company explains the problems in hazardous waste management. The company has developed a recycling system called as 'closed loop system' to embrace the circular economy which involves:

- Waste-to-Energy: Converts high-BTU (British Thermal Unit)[31] organic solids to steam, which may then be utilized as energy on the site. Analytical Solutions and Products B.V. defines BTU "The British thermal unit (BTU or Btu) is a unit of heat; it is defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. It is also part of the United States customary units."

- Solvent Distillation: The recovery stills are powered by the steam generated by WTE (Waste-to-Energy). Spent solvents are re-manufactured and sold back to industry for their original solvent qualities by distillation.

- Water Treatment: Removes usable water from hazardous industrial wastes such as acids, bases, coolants, greasy water, and latex paint. On site, treated water is used for industrial purposes such as WTE and the cooling tower.

Further, companies may adopt circular economic concepts, keep materials in use indefinitely, and reduce the strain on natural resources by reusing these solvents. In the case of India, it is required for the government to encourage indigenous companies that is involved in the circular economy. There is lot of costs involved not only establishing the companies that handle hazardous wastes but the transport costs would be high because of special vehicles to carry the hazardous waste carefully. Therefore, it is essential for countries like India to concentrate on providing appropriate place to establish companies to handle the hazardous management. Proximity helps to reduce transport costs. Another advantage on such initiatives is that it helps companies to reduce carbon foot prints because using of excess fuel to transport hazardous waste to the companies that are far away or beyond a country's boundaries will increase the usage of fuel, time and high risk while transporting and

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[31]Analytical Solutions and Products B.V. defines BTU "The British thermal unit (BTU or Btu) is a unit of heat; it is defined as the amount of heat required to raise the temperature of one pound of water by one degree Fahrenheit. It is also part of the United States customary units.

would lead to other such consequences. India must encourage companies that practice cutting-edge technologies in handling hazardous wastes. Companies that create solvent waste might benefit from implementing circular economic strategies into the disposal of such wastes, which can reduce costs and carbon footprints while also lowering liability.[32] (Ellen Macarthur Foundation, 2023)

To analyse the working of circular economy and its success done through an example, Ellen MacArthur Foundation increased earnings from new circular activities and decreased manufacturing costs will be used to attain this goal. These would then have a ripple effect contribute to economic growth via all areas of the economy; economic activity develops and starts building overall system health. The concept recognises the need of an efficient economy at all scales - for large and small businesses, organisations, and individuals, globally and locally.

It is founded on three guiding ideas:

- Create a waste and pollution-free environment: The negative effects of economic activities that harm human health and environmental systems are revealed and designed out in a circular economy. This includes the emissions of greenhouse gasses and hazardous chemicals, as well as contamination of the air, land, and water, as well as structural waste such as traffic congestion.

- Maintain value in terms of energy, labour, and materials: Activities that keep value in terms of energy, labour, and materials in use are favoured in a circular economy. To keep goods, components, and materials flowing in the economy, Sustainability, recycling, remanufacturing, and recycling must all be considered by designers. Circular systems promote efficient promoting the use of lab resources through a range of applications go back and forth between economic and ecological systems.

- Regenerate natural systems: A circular economy reduces non-renewable resource usage while maintaining or increasing renewable resources, such as returning key nutrients to the soil to help regeneration or relying on renewable power rather than fossil fuels.

There are various models and procedures to minimize the devastating consequences of hazardous waste. A circular economy is one of the current trends in handling hazardous wastes. The diagram below is one of the recent models to understand how the circular economy works.

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[32]The Circular Economy in Detail.
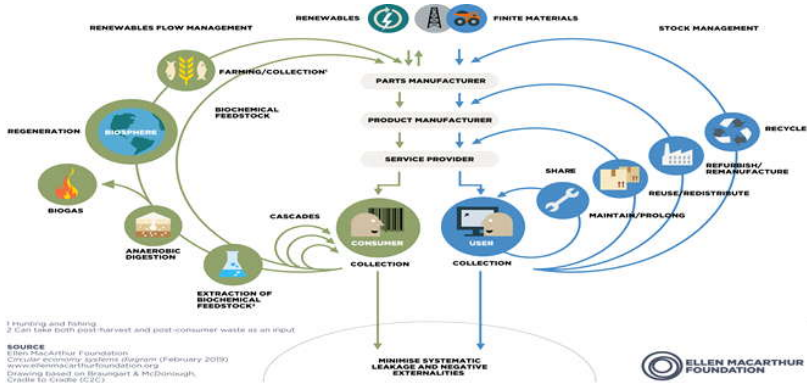
Figure – 1: Source: Ellen MacArthur Foundation (2019)

The 2023, Circularity Gap Report[33] (Fraser, 2023) provides "four key circular economy principles that we need to follow to achieve a 33% reduction in material extraction and consumption – use less, use longer, use again, and make clean. It calls for increased public-private collaboration to make this vision a reality, and points out the ultimate reason why things need to change: By upgrading to a model that maximizes the value that we extract from our precious materials, we can better ensure the well-being of present and future generations, while respecting the boundaries of our planet."[34] (World Economic Forum, 2022)

Another model by the European Parliament as follows:

Figure – 2: Source: European Parliament. Published by World Economic Forum[35] (World Economic Forum, 2022)

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[33] The Circularity Gap Report, 2023.

[34] Circular Economy.

[35] Ibid

Conclusion

Awareness on identification of hazardous waste is one of the challenges where people generally mishandle in disposing the hazardous wastes. Many companies responsible for producing hazardous materials have a wider challenge in handling cost-effective management when these materials turn into hazardous wastes.

Finally, Sustainable waste management allows for perfect collaborative partnerships (SDG 17) between the rich and the poor, the formally and informally sectors, communities, businesses, governments, and the international donor community. Collaboration and cooperation are perfect alternatives for sustainable trash management. Indeed, it is only through collaboration that the most rational and beneficial solutions may be discovered. As we have seen, waste generates implications across a wide range of different elements of society. Positive results are dependent on our ability to connect the links. Conclusively, the transition to recycling and reuse has the opportunity to boost the economy as well as the environment. By minimising waste, keeping commodities and commodities in use, and regenerating rather than degrading natural systems, the circular economy contributes significantly to attaining global climate goals. The idea of involving Artificial Intelligence in a product while manufacturing and utilizing raw materials will help to control the generation of harmful wastes. For instance, Artificial Intelligence- AI-assisted designers may create circular economic growth goods, components, and materials. AI can account for improved designs sooner due to how an AI system could analyse large amounts of data and offer initial thoughts or design improvements. A designer may then examine, alter, and approve changes based on the data. AI provides designers with a better understanding of the most effective designs to build and test, allowing them to maximise their time and skills. The already existing commercial strategies may not be helpful for the industries and producers to achieve the SDG unless they understand 'innovation is a key to progress' - need to be applied to circular economy models. Conclusively, the world nations have agreed many policies and SDGs are one such kind of obligation accepted by the nations which must be enforced and complied at every stage of growth and development. Achieving the Sustainable Development Goals is not merely an understanding among the nations, but are goals that are developing a governance that balances development and environmental protection.

RADICAL ENVIRONMENTALISM VS THE PRAGMATIC APPROACH: PERSPECTIVES FROM INDIA

Vishal Bera* *Assistant Professor of Law, Amity University Kolkata

Oishika Banerji** **The West Bengal National University of Juridical Sciences, Kolkata

Abstract

When deciding how to approach environmental legislation, there is frequently a standoff between those who support property rights and environmental activists, or those who support development and those who oppose it. This mostly leads to unproductive results and obscures the ideology behind environmentalism itself. Through the course of this paper, both sides of the debate i.e., the vision, objectives and means which radical environmentalism employs (especially in the legal realm) as well as the property rights proponents who are often seen as "anti-environment rights", have been discussed. The first part will also critique both these approaches to ascertain the weakness inherent in them. In the second part of the paper, pragmatism as a solution has been proposed to the concerned problem, both as a philosophy as well as its possible practical implications. It is imperative to research on these philosophies in order to find the best possible environmental solutions which not only change the way we view environment problems, but which can also be practically implemented. This paper will try and answer the following research questions; firstly, what are the basic features of the current philosophy governing environmental law that is critiqued by the radical school of thought? Further, what are the different branches of this theoretic critique- (especially deep ecology movement and eco-feminism)? Secondly, can legal pragmatism be used as a successful way to reconcile the noble motives of radical environmentalism with the pressing needs

of development? Moreover, how can 'pragmatic judging' can help to serve the purpose of environment protection, without being anthropocentric? The paper will conclude by analyzing Daniel Farber's principles for environment protection and ascertaining how they have been used by courts; both domestic and international to come to a solution that balances the often-conflicting interests of the economists and the environmentalist.

Keywords

Eco-feminism, Pragmatism, Radical environmentalism, Development, Environment

1. Introduction: A Radical Critique of the Current Environmental Law

1.1 What is the Radical Environment Movement?

The emergence of the greater environmental movement, which was sparked by eco-centrism and dissatisfaction with the mainstream environmentalism's co-optation, gave rise to radical environmentalism[1]. It can be described as "uncompromising, discontented, discontent with traditional conservation policy and at times illegal".[2] Rethinking western concepts of religion and philosophy, such as globalization, capitalism, and the like, is necessary for radical ecology. This is frequently accomplished by "re-sacralising" and re-establishing a connection with nature.[3] As may be apparent by now, this philosophy conflicts directly with the notion that human beings have any real ownership over natural resources and property. Further, this school of thought bases its argument in certain *arganthropocentric* values i.e. values which are based on a notion that human beings have the free will to use natural resources the way they want to[4]. They directly clash with this arguing that the earth doesn't exist for humans, and hence, we can claim no special privilege[5].

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[1]Leurs Jeff, "A Brief Description of Radical Environmentalism" Http://Www.enotes.com/Topic/Radical_environmentalism (2012).

[2]Manes Christopher, I Radical Environmentalism and the Unmaking of Civilization (Little Brown and Co., 1990).

[3]List Peter, I Radical Environmentalism: Philosophy and Tactics(Wadsworth Pub. Co., 1993).

[4]Karp, Aldo Leopold's Land Ethic, I Is an Ecological Conscience Evolving in Land Development Law? 737, 738-49 (Envtl. L, 1989).

[5]H. Jarrett Ed, Boulding, Economics of the Coming Spaceship Earth, in Environment Quality in a Growing Economy (Www.Google.Books.Com, 1966).

There are different kinds of radical approaches, all of which inform the legal movement as well. These are known as eco-centric values because what is common between them is that nature has a value independent of human labour or human interest. Thus, the focus of such values is nature centric as opposed to human centric. This paper will focus on two such philosophies, deep ecology and eco-feminism.

1.2 Deep Ecology

Regardless of how useful they are to humans as tools, all living things have intrinsic value, according to the deep ecology worldview[6]. Proponents of this school of thought argue that in the technology controlled industrialized societies such as the one we live in, humans are assumed to be isolated from nature and moreover, superior to nature. This underlying belief leads to the notion that humans retain full control and supervision over natural resources. The fundamental tenet of this ideology is that the living environment has the same right to life and prosperity as humans have[7]. The term 'ecology' has been described as 'deep' in this context because it raises questions at a deeper level in terms of 'why' and 'how' and therefore can be said to be concerned with fundamental philosophical reasoning about the impact that the human life has to undergo being a significant part of the ecosphere. It is significant to note that ecology has not been viewed through narrow lenses as merely a branch of biological science[8]. Deep ecology applies the knowledge that many components of the ecosystem, including humans, function as a whole rather than as distinct, fragmented units in order to achieve a more comprehensive understanding of the world in which humans live[9].

1.3 Eco- Feminism

Eco-feminism is the theory that regards that the oppression of women and nature is interconnected. According to this theory, the domination of people over nature is comparable to the dominance of the powerful over the weak, the masculine over the feminine, and even the dominance of the West over non-Western cultures[10]. In some way, the battered wife is made an analogy

[6]Devall, The Deep Ecology Movement (Nat. Resources J. 299, 1980).
[7]Zimmerman Michael, "An Introduction to Deep Ecology, Global Climate Change & Environmental Review" Http://Www.context.org/ICLIB/IC22/Zimmrman.htm(1989).
[8]Naess Arne, "A Defence of the Deep Ecology Movement, Environmental Review" (1984).
[9]Drengson Alan, "An Ecophilosophy Approach, the Deep Ecology Movement, and Diverse Ecosophies" The Trumpeter: Journal of Ecosophy14(3), AT P. 110 (1997).
[10]McIntyre, "The Maleness of Law" 1 Berkeley Womens L.J 39 (1985).

to nature, which is forever giving and being taken from, in silence. Most importantly, they believe that no nature should be changed in its form or purpose. Such modifications to the environment should be seen as depriving it of its 'inherent value'. A common radical critique to liberal feminism is criticizing the assumption that the value of women and their representation can't be secured merely by adding them as a subsection of the dominant system, and termed this the "add women and stir" problem[11]. Similar to race theorists and feminists, radical environmental critics attacks the very root of the anthropocentric philosophy underlying environmental law, and opine that you can't just "add environment and stir" without real systemic change[12].

2. Dominant Public Trust Doctrine

Closely connected with the property rights framework is the public trust way of looking at environmental protection. In 1970, Joseph Sax propounded the public trust doctrine, which argued that humans were the trustees of the environment which was precious property that we had to therefore, use judiciously[13]. He argued that all natural resources had to obviously be depleted, but in a manner that was sustainable for future generations.

This doctrine's roots are in the common property ideas of Roman law, which held that the air, rivers, sea, and shoreline were all public domains and could not be privately owned[14]. This doctrine was further developed in the US in the late 1800s, the Courts began to infer that the public possessed "rights" over natural resources and had the duty to use them for certain traditional purposes[15]. Although land/natural resources are viewed as requiring protection, the responsibility and trust of such protection is placed with the State. This is seen as a measure to protect nature from the whims and fancies of the private sector undertakings.

Under this theory pollution resulting in injury is actionable under law but the question of guilt hinges upon whether the property right holder was

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[11]Mellor Mary, I Eco feminism and Eco socialism: Dilemmas of Essentialism and Materialism 3(2), at p. 43 (1992).

[12]Stone C, I Should Trees Have Standing? - Towards Legal Rights for Natural Objects (45 S. Cal. L. Rev. 450; L, 1972).

[13]Sax Joseph, I The Public Trust Doctrine in Natural Resource Law: Effective Judicial Intervention (68 Mich. L. Rev. 471, 1970).

[14]"Public Trust Doctrine, California State Law Commission" Http://Www.slc.ca.gov/ Policy_statements/Public_trust/Public_trust_doctrine.pdf.

[15]Illinois Central Railroad v. Illinois, 146 U.S. 387 (1892)

permitted to injure the party without compensation. The state, under this model, has this privilege and this forms the basis of criticism against the model. The Public Trust Doctrine accomplishes two crucial goals namely, it gives citizens the authority to challenge inefficient use of natural resources and requires the state to take proactive measures for efficient resource management.

The Stockholm Declaration of United Nations on Human Environment, gives effect to such a doctrine. To quote, "*The natural resources of the earth, including the air, water, land, flora and fauna and especially representative samples of natural system, must be safeguarded for the benefit of present and future generations through careful planning or management, as appropriate...*".

2.1 Public Trust Doctrine in India

The view that humans being are trustees of the environment has translated into legislations, case law and basic thinking about the environment not only in the US, but also in India in the landmark judgment of *MC Mehta v. Kamal Nath* [16]. In this case, there was an attempt to alter the River Beas' path and intrude on forest area in order to make it easier to build a motel. The company, Span Motors Pvt. Ltd., involved in this project, alleged had close relationship with former Minister of Environment and Kamal Nath, which gave birth to this case. The Supreme Court echoed the public trust doctrine, quoting,

"*The Public Trust Doctrine primarily rests on the principle that certain resources like air, sea, waters and the forests have such a great importance to the people as a whole that it would be wholly unjustified to make them a subject of private ownership. The said resources being a gift of nature, they should be made freely available to everyone irrespective of the status in life. The State is the trustee of all natural resources which are by nature meant for public use and enjoyment. Public at large is beneficiary of the sea- shore, running waters, airs, forests and ecologically fragile lands The doctrine enjoins upon the Government to protect the resources for the enjoyment of the general public rather than to permit then- use for private ownership or commercial purposes.*"

It is evident from this judgment that State was made the trustee of the environment resting on the assumption that the State will necessarily confer benefits to the public. The Court identified the State as the guardian of natural

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[16]MC Mehta v. Kamal Nath, (1997) 1 SCC 388

resources. However, such a stance has been critiqued by radical critics, who point out there is an unquestionable belief that natural resources are "meant for" public use and enjoyment. The same view point was referred to in the case of *Intellectuals Forum* v. *State of Andhra Pradesh*[17]. This case came about in the context of sustainable development and the Stockholm Convention of which India is a signatory. Once again, the Apex Court held that it is only the State's responsibility to protect and preserve tanks. They contended that the government must guarantee the wise use of resources for future generations by reading the public trust doctrine with the concept of sustainable development. Numerous subsequent court rulings[18] have upheld this principle, which has led us to conclude that this doctrine is a fundamental component of Indian environmental law and provides the courts with a theoretical framework for resolving environmental cases in which a significant community resource has been allocated for uses other than those that promote common enjoyment and benefit[19].

2.2 Radical Critique to the Public Trust Doctrine

Critiques of the public trust theory argue that this paradigm has failed to achieve the basic objective of environment law, i.e. to prevent pollution and degradation. All it does is restrict the onus of protection to one sphere of individuals/corporations. *Richard Delgado*, one of the most important critiques of this theory has a two-fold argument. Firstly, he argues the law cannot bring about a change in the attitude towards the environment. This philosophy takes for granted the "natural" impulse of man is to hunt, mine, destruct instead of ushering a change in attitude to one of conservation. However, by merely appointing a trustee to take care of the environment, all that it results in is accepting the fact that human beings naturally destroy the environment and thus need to appoint someone who can act in a trustworthy manner. He argues that this view falls flat because the State is comprised of ordinary individuals as well, suffering from these same human impulses to obstruct, modify and damage the environment for profit. As he puts it, "*the public trust legal doctrine operates to expand the public benefit in natural resources, while contracting the private choice on how those*

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[17]Intellectuals Forum v. State of Andhra Pradesh, 2006 (3) SCC 549.
[18]T.N. Godavaram Thirumulpad v. Union of India, 2006 (1) SCC 87
[19]Kartik S.A, "The Doctrine of Public Trust and Environmental Protection in India, Centre for Environmental Law, Education, Research and Advocacy" Http://Www.nlsenlaw.org/Environmental-Protection/Articles/The-Doctrine-Of-Public-Trust-And-Environmental-Protection-In-India.

resources are best used". To put this argument in legal terms, this is nothing more than redistribution of property rights and at the end of the day this is entirely contingent on the will of the Parliament enacting the laws.

The second critique of this doctrine is that the law is not acknowledging any radical change in philosophy towards the environment, and is merely reproducing the anthro-centric approach that is the cause of the problem in the first place. It is imperative to note that Delgado doesn't reject the contribution of this view altogether, he only states that it is a compromise and there could be much more ambitious reform. However, he argues, that unless the law accepts a radical change in thinking then no such initiative will ever be seen as successful because it will never be seen as a realistic solution.

The author argues that although Delgado claimed that the human perspective is "inherently self defeating", his vision is flawed and unrealistic because it cannot be forgotten that human perspective is all that any individual can claim access to as argued by the pragmatic school of thought.

3. Environmental and Legal Pragmatism- Finding the Meeting Point

T.S Eliot had once said, "*The great weakness of pragmatism is that is ends by being of no use to anybody*". In light of this statement the author will analyze the pragmatic approach towards environmental law, ascertain in application by the judiciary and argue whether or not this approach should be followed by future environmental theorists.

The claim of environmental pragmatism is that human intervention is embedded in all aspects of the natural sphere[20]. Therefore, this must be kept in mind while restructuring social institutions so that the '*public can have a voice in deciding what kinds of environments*' we inhabit[21]. Instead of viewing human beings as the enemy, this school of thought tries to harmonize the two divergent and antagonistic schools in order to meet certain mutually desired goals. This doctrine believes that human beings must be seen as part of the environment and continuous with nature given that we are eventually biological beings.

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[20]Farber Daniel (ed.), Eco-Pragmatism (1999).
[21]Paul Veatch Moriarty, "Pluralism Without Pragmatism" Http://Www.cep.unt.edu/ ISEE2/2006/Moriarty2.pdf.

Legal pragmatism merely infuses this pragmatic way of thinking into a legal framework. Starting from a more general view, it is argued that law has always been informed more by experience rather than pure logic. Legal pragmatist say that the phrase "*you must see it in context*", is the basis of pragmatic principles. *Richard Posner* sees pragmatic jurisprudence as a counter to the concept of positivist logical law and instead using law as an instrument for social ends. In such a situation, interpretation of statutes becomes a tool to achieve a pre-decided outcome[22].

In the famous American case of *Reserve Mining Co. v. United States*[23] the courts have innovatively used this philosophy to arrive at their conclusion. This case concerned the massive discharge of asbestos in Lake Superior and the pollution caused as a result of this act. However, as asbestos is known to be carcinogenic only when airborne, it was still doubtful whether it created any risks to the water. Moreover, if any verdict ordered the closure the industry causing the discharge, it would lead to loss of thousands of jobs, and several millions of dollars. Thus the courts had to balance the delicate question of economic versus environmental rights. The court held,

"Without appealing to public values, environmental regulations couldn't long enjoy general support based purely on the calculus of private interests. But without recognizing private interests as legitimate, environmental regulations may provide unmanageable resistance from those paying the price and are likely to be seen by society as a whole as too draconian to be acceptable"

This case has been the reference pint for any future pragmatic thinkers. One among them is *Daniel Farber* who has formulated the following guidelines for environment protection:[24]

It is necessary to take all practical precautions to avoid a risk once it becomes likely significantly. The only times this wouldn't apply are if the costs were evidently greater than any prospective advantages. At the same time, he advocates "prudent precautions against potentially serious risks".

Preserve the obligation of the present generation to secure a sustainable future and consider environmental conservation as a long-term societal investment.

Acknowledge that environmental issues are dynamic and employ adaptable tactics. These consist of regulations that shift the burden of proof, delaying

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[22]Haac Susan, "Legal Pragmatism: Where Does the Path of Law Lead Us" Legal Pragmatism: Where Does the Path of Law Lead Us (2005).
[23]Reserve Mining v. United States, 514 F.2d. 481 (8th Cir. 1975)
[24]Daniel Farber and Joel Mintz, Some Thoughts on the Merits of Pragmatism as a Guide to Environmental Protection (B.C. Envtl. Aff. L. Rev 1, 2004).

making final decisions, and deregulation as necessary because of evolving conditions.

Finally, strive to keep balance even while retaining a commitment to environmentalism. This would imply that economists shouldn't be given discretion over the regulatory process, however, their views can't be disregarded completely. This economic perspective must be scrutinized as a reality check on over-regulation of natural resources.

These four principles have been extensively used as an environmental baseline for reconciling the precautionary principle within a cost benefit analysis, in the economic sense. Further, this is used by scholars like *Keith Hirokawa* to critique the radical approach. They argue that this approach excludes the possibility of persuasion by ignoring the importance of debate. The challenge needs to be directed so that we can "find a way the law can be understood to include conceptions of the oppressed as they are coming to be, even if the weight of legal institutional clearly excludes them [25]". Every environmentalist must choose between two strategies. One is to persist in the hope that the legal system, and society in general will see that environmental policy is inherently faulty and hope for a total revolution. The other would be recognizing that the barriers to integration of environmental ethics and law are perceived, and not rigid. Therefore, persuasion and rhetoric would be important tools to integrating the two. This can be described in terms of dogmatic versus pragmatic thinking.

3.1. Applying Pragmatic Judging to Environmental Law

Pragmatic judges are those who always do the best they can do for the present and the future, unchecked by any felt duty to secure consistency in principle with precedent". They diverge from the strict principle of applying legal precedents and justify the same on the ground that it serves a bigger purpose. This has been termed as the 'green' interpretation of the law.

Conclusion

To conclude, the author argues that the very fact that environmental law has developed in almost all countries evidences the success of the pragmatic school of thought. The Supreme Court, in the case of *A.P. Pollution Control Board v. Prof. M.V. Nayudu (Retd.)*[26] had said that often judges would have to decide between permanent harm to the environment if it is permitted or between severe adverse impact on economic interest of the country. In fact, certain scholars advocate the constitution of separate tribunals with a simple procedure which follows the pragmatic approach to each case.

[25]Margarat Radin, The Pragmatist and the Feminist (63 3 Cal. L. Rev. 1699, 1721, 1990).
[26]A.P. Pollution Control Board v. Prof. M.V. Nayudu (Retd.),, 1999(2) SCC 718.

PROMOTING GENDER EQUALITY TOWARDS SOCIAL SUSTAINABILITY IN INDIA: EXAMINING THE PROGRESS AND CHALLENGES IN INDIA

Dr. Ashwani Pant* *Assistant Professor, School of Law, MIT World Peace University, Pune, Maharashtra, India

Dr. Vishwanath Karad** **MIT World Peace University, Pune, Maharashtra, India

Abstract

Sustainable Development Goals 2015 were adopted by United Nations calls for universal action to end poverty, protection of planet Earth, ensures people peace and prosperity by the end of 2030. An inclusive and equitable society is fostered with gender equality and women empowerment as fundamental principle of social sustainability. Sustainable Development Goal 5 aims at ending all forms of discrimination against women and girls through gender equality and empowerment. India's rich cultural and social diversity poses a challenge as well as opportunities in promotion of gender equality. The present study aims to study the concept of social sustainability and broadly about Sustainable Development Goals. The research aims to explore and examine India's progress in the attainment of SDG 5 specific to Gender Equality for Social Sustainability.

The present study also focuses on gender-responsive strategies and initiatives taken by Indian Policy makers to uplift the status of women and percolation of equality amongst them. It delves into the specific challenges faced by poor women like access to education, economic opportunities, healthcare and violence against them. The paper also looks into various barriers and societal norms that obstruct the path of full realization of gender equality. The present study highlights the progression and challenges in implementation of social sustainability and SDG in India. The outcome of the study leads to policy recommendations

and advocating efforts towards attainment of SDG 5 and social sustainability in India.

Keywords: *Social Sustainability, Sustainable Development Goals (SDGs), Gender Equality, Women's Empowerment, India, SDG 5.*

1. INTRODUCTION

The '2030 Agenda' was proposed by the world's leaders at a United Nations (UN) summit in September 2015, and it is a comprehensive plan for human and environmental prosperity that is broken down into 17 Sustainable Development Goals (SDGs) and 169 targets. It showcases both the scope and the ambition of the global action that is to be pursued. The 2030 Agenda recognizes that the achievements of the 17 SDGs are linked to human and planetary prosperity, strengthening universal peace, greater freedom and promoting the eradication of poverty, discrimination and inequalities in all forms[1]. In the collective journey of meeting the SDGs and the UN 2030 Agenda targets, countries and stakeholders will act in partnership[2] to take a transformative and inclusive path towards a resilient and sustainable future in economic, social and environmental terms.

Action in crucial sectors for human and planetary well-being is triggered by the 2030 Agenda's goals for the SDGs and related targets. These include[3]:

(i) Human existence in prosperity, equality and a healthy environment,

(ii) Planet conservation through timely climate action, sustainable production, consumption and management of natural resources,

(iii) Economic, social and technological prosperity in a harmonious symbiosis with nature,

(iv) Peaceful, just and inclusive societies and

(v) Revived global partnership of countries, stakeholders and people.

SDG 5 – 'Achieve gender equality and empower all women and girls', reflects the ever-increasing efforts of the UN towards gender equality, earmarked with the establishment of the Commission on the Status of Women

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[1]United Nations, Transforming our world: The 2030 agenda for sustainable development, (United Nations, Department of Economic and Social Affairs, New York, 2015).

[2]W.Leal Filho, T.Wall et.al. "Relevance of International Partnerships in the Implementation of the UN Sustainable Development Goals", 13(1) *Nature Communications* 613 (2022a). https://doi.org/10.1038/s41467-022-28230-x.

[3]United Nations, Transforming our world: The 2030 agenda for sustainable development, (United Nations, Department of Economic and Social Affairs, New York, 2015).

in 1946[4] and the adoption of landmark agreements such as the Convention on the Elimination of All Forms of Discrimination against Women in 1979[5], the Beijing Declaration and Platform for Action in 1995[6], and the establishment of UN Women in 2010[7]. The important role of gender equality for socio-economic development is well highlighted in the UN publication "We the Peoples"[8], emphasizing the untapped development potential due to social, economic and political inequalities arising from gender discrimination, deeply rooted and persistent in many developing and developed economies, related to access to decent work and equal pay, education, healthcare, resources, decision-making, among others[9]

Women are still more vulnerable to violence, discrimination, and underrepresentation in the political, economic, and business spheres[10]. The recognition of the important role of women in global, social, economic and environmental prosperity is clearly stated in paragraphs 236–243 of the **'Future We Want'[11]** and in the Open Working Group Proposal for Sustainable Development Goals (2014). SDG5 brings forward issues of gender-based discrimination such as unpaid work, sexual and reproductive rights, and gender-

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[4]United Nation, Women Commission on the Status of Women (2020a), *available at*: https://www.unwomen.org/en/csw.

[5]OHCHR, Convention on the Elimination of All Forms of Discrimination against Women New York, 18 December 1979 (2020), *available at*: https://www.ohchr.org/en/professionalinterest/pages/cedaw.aspx.

[6]United Nations, Beijing Declaration and Platform for Action, (1995) *available at*: https://www.un.org/en/events/pastevents/pdfs/Beijing_Declaration_and_Platform_for_Action.pdf; United Nations, UN Creates New Structure for Empowerment of Women. United Nations press release. New York, 2 July 2010 (2010).

[7] United Nations, Resolution adopted by the General Assembly on 27 July 2013, A/RES/66/288 (2012), *available at*: https://www.un. org/ga/search/view_ doc.asp?symbol=A/RES/66/288&Lang=E.

[8]K.Annan, *We the peoples,* United Nations (2000).

[9]Z. Brixiová, T. Kangoye, & F. Tregenna, "Enterprising women in Southern Africa: When does land ownership matter?" 41 *Journal of Family and Economic Issues* 37–51(2020); J. Connor, S. Madhavan, M. Mokashi, H. Amanuel, N.R. Johnson, L.E. Pace, & D. Bartz, "Health risks and outcomes that disproportionately affect women during the Covid-19 pandemic: A review" 266 *Social Science & Medicine* 113364 (2020), *available at*: https://doi.org/10.1016/j.socscimed.2020.113364.

[10]A. Milazzo, & M. Goldstein, "Governance and women's economic and political participation: Power inequalities formal constraints and norms" 34(1) *The World Bank Research Observer* 34–64 (2019), *available at*: https://doi.org/10.1093/wbro/lky006.

[11]United Nations, Resolution adopted by the General Assembly on 27 July 2013, A/RES/66/288 (2012), *available at*: https://www.un. org/ga/search/view_doc.asp?symbol=A/RES/66/288&Lang=E.

based violence[12]. The improvement of global well-being depends on the success of SDG5. Table 1 outlines the nine goals of SDG5 that strive to eliminate discrimination in all its forms. The goals for sustainable development (SD) are set by these benchmarks. Depending on whether the goals are global, regional, or national in scope, a different set of indicators will be used to track progress toward those goals.

The promotion of gender equality and empowerment of women constitutes a fundamental component in the pursuit of social sustainability and inclusive development in a societal frame. It is a basic human right of individuals and a driving force for advancement across diversified domains. In Indian scenario, a nation characterized by a profound cultural legacy and a diverse population, the endeavor to achieve gender parity and foster the advancement of women has garnered considerable prominence in recent times. The present study advances the arguments related to obstacles in the path of achievement of gender equality and women empowerment and their significance in building sustainability in the society.[13]

The cultural, ethnic, and social differences in India, the world's second most populous country, are vast. All citizens of India, regardless of their gender, are guaranteed equal protection under the law by the Indian Constitution. However, the fight for gender equality is a never-ending struggle that is entangled with cultural norms, customary behaviors, and institutional barriers. The status of women in Indian society has improved greatly over the course of history. Despite these advancements, gender discrepancies continue to exist in many areas, including but not limited to formal education, paid job, political engagement, and access to healthcare. In India, women's liberties and their participation in the workforce have advanced significantly over the past several decades. In historically male-dominated fields, women have demonstrated that they are capable of extraordinary accomplishments, shattering stereotypes and forging new trails. Nevertheless, despite these significant advancements, women continue to confront a variety of complex obstacles, including gender-based violence, discriminatory behaviors, limited economic

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[12]L. Hirsu, L. Hashemi, & Z. Quezada-Rayes, "SDG 5: Achieve Gender Equality and Empower all Women and Girls", *Jean Monnet Sustainable Development Goals Network Policy Brief Series*, RMIT University (2019), *available at*: https://www.rmit.edu.au/content/dam/rmit/rmit-images/college-of-dsc-images/eu-centre/sdg-5-policy-brief.pdf.
[13]United Nations Development Programme (UNDP),
Social Sustainability (2021), *available at*: https://www.undp.org/sustainable-development-goals/social-sustainability.

opportunities, and limited authority in decision-making processes. For the sake of women's health and prosperity, as well as the long-term stability and growth of society as a whole, it is crucial that these issues be resolved and significant progress made toward the promotion of gender equality and the empowerment of women[14].

This research aims to shed light on the successes and setbacks experienced by India's efforts to achieve gender equality and female empowerment. The exploration encompasses a range of dimensions, encompassing legislative measures, social initiatives, grassroots movements, and policy frameworks that have been enacted with the aim of advancing gender equality. Furthermore, it elucidates the enduring barriers and entrenched cultural norms that impede the achievement of genuine parity. Through an analysis of the experiences, accomplishments, and challenges faced by women in India, this investigation aims to cultivate a holistic comprehension of the intricate dynamics pertaining to gender parity and the empowerment of women within the Indian milieu.

The promotion of gender equality and women's empowerment in India is not only an issue of social justice but also a crucial need for sustainable development. By implementing policies that guarantee equal opportunities and rights for women, the nation may effectively leverage the complete range of capabilities possessed by its diverse population, thereby cultivating an atmosphere characterized by inclusivity, creativity, and advancement.[15] This analysis of the advancements and obstacles in India provides a foundation for fostering well-informed dialogues and motivating collaborative endeavors aimed at establishing a society that is fair and environmentally viable for every individual.

2. A NOTION OF SOCIAL SUSTAINABILITY

Social sustainability is defined as the capacity of a society to effectively address the current and future requirements of its constituents, thereby guaranteeing social welfare, fairness, and impartiality. The statement acknowledges that sustainable development covers not just environmental aspects but also social factors that play a crucial role in ensuring the enduring

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[14]United Nations Development Programme (UNDP), Goal 5: Gender Equality (2021), *available at*: https://www.undp.org/sustainable-development-goals/goal-5-gender-equality.

[15]United Nations Development Programme (UNDP), Social Sustainability (2021), *available at*: https://www.undp.org/sustainable-development-goals/social-sustainability.

stability and prosperity of communities. The notion of social sustainability places emphasis on the significance of cultivating inclusive societies whereby every individual is afforded equitable access to resources, opportunities, and fundamental services. The concept incorporates various dimensions, including but not limited to human rights, social cohesiveness, social fairness, quality of life, and community resilience. The concept of social sustainability aims to tackle the structural obstacles and inequalities present in society, with the goal of creating a more fair and impartial global community[16].

Social sustainability, in its essence, acknowledges the insufficiency of economic growth and environmental conservation in isolation for the attainment of genuine sustainable development. The statement recognizes the importance of social progress and well-being as integral elements of a sustainable society. It emphasizes that disregarding the social dimension can result in enduring ramifications, including but not limited to inequality, social unrest, and environmental damage.

2.1. Key Principles of Social Sustainability:

- Equity and social justice: These are central to the concept of social sustainability, which prioritizes the equitable allocation of resources, opportunities, and benefits throughout society. This approach aims to prevent the marginalization or exclusion of any individual or group. The objective of this initiative is to foster inclusive societies that facilitate the well-being of all individuals, while advocating for social justice, equal rights, and the elimination of discriminatory practices[17].

- Participatory Decision-Making: Social sustainability encompasses the imperative of involving all stakeholders, particularly disadvantaged and vulnerable groups, in decision-making processes through active involvement and engagement. The statement acknowledges the significance of inclusive governance, community engagement, and collective efforts in tackling social issues and attaining sustainable results[18].

- Community Resilience: The concept of community resilience pertains to the ability of communities to effectively respond, adapt, and recover

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[16] International Institute for Sustainable Development (IISD), Social Sustainability (2021), *available at*: https://sdg.iisd.org/topics/social-sustainability/
[17] United Nations, Transforming our world: The 2030 agenda for sustainable development, (United Nations, Department of Economic and Social Affairs, New York, 2015).
[18] Ibid.

from various shocks and pressures of a social, economic, and environmental nature. The primary objective of this initiative is to cultivate social capital, facilitate the development of robust social networks, and encourage the enhancement of community cohesiveness and solidarity[19].

• Uplifting the standard of living and welfare of every individual and society as overall is one of the key elements of Social Sustainability. It encompasses access to education, healthcare, housing, cultural resources, and social services, recognizing that these factors are crucial for a sustainable and thriving society[20].

• Inter-generational Equity: Social sustainability considers the needs and rights of future generations, ensuring that present actions do not compromise the well-being and opportunities of future populations. It promotes responsible resource management, long-term planning, and sustainable practices to safeguard the social fabric for generations to come[21].

3. Gender Equality And Sustainable Development Goals

Gender equality is not alone a basic human right of individuals, but also an essential element of long-term and viable progress. The United Nations has acknowledged the inherent significance of gender equality by designating it as an independent objective, namely Goal 5, inside the framework of the Sustainable Development Goals[22]. The advancement of gender equality is crucial not only to society as a whole, but also to the success of the other SDGs. This is due to its success in addressing the underlying causes of underdevelopment and removing the structural barriers that hamper progress in a variety of sustainable development areas[23]. The United Nations officially

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[19]Ibid.

[20]United Nations, Transforming our world: The 2030 agenda for sustainable development, (United Nations, Department of Economic and Social Affairs, New York, 2015).

[21]World Commission on Environment and Development, "Our Common Future (The Brundtland Report)" (1987), *available at*: https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf.

[22]United Nations, Transforming our world: The 2030 agenda for sustainable development, (United Nations, Department of Economic and Social Affairs, New York, 2015).

[23]United Nations Development Programme (UNDP), Social Sustainability (2021), *available at*: https://www.undp.org/sustainable-development-goals/social-sustainability.

endorsed the Sustainable Development Goals (SDGs) in 2015, providing a comprehensive framework for addressing global challenges and promoting sustainable development in a unified and coordinated fashion. Goal 5 of the Sustainable Development Goals (SDGs) is to "Achieve gender equality and empower all women and girls," and it is a potent tool for advancing gender equality and women's empowerment as crucial parts of sustainable development.[24]

3.1. Interconnection of SDGs and Gender Equality

- Actual elimination of poverty includes efforts to ensure women's equality. Gendered poverty is because of discrimination based on gender and unequal access to resources and opportunity given. According to **U.N. Women Gender Equality and the Sustainable Development Goals (2021)** "the promotion of gender equality and the economic empowerment of women have the potential to mitigate poverty and foster inclusive economic growth."[25]

- The need of providing equal access to a quality education for girls and women is emphasized heavily in Goal 5 of the United Nations' Sustainable Development Goals. Individuals have a right to an education, but education is also a powerful tool for fostering empowerment, promoting economic participation, and improving health outcomes. By advocating for gender equality in the realm of education, countries have the potential to cultivate a cohort of empowered women who actively contribute to the pursuit of sustainable development[26].

- The promotion of gender equality is intricately connected to the enhancement of the health and well-being of women and girls. The objective of Goal 5 is to provide widespread availability of sexual and reproductive health services, encompassing family planning as well. The imperative components of sustainable development encompass the mitigation of gender-based violence, the reduction of maternal

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[24]United Nations Development Programme (UNDP), Goal 5: Gender Equality (2021), *available at*: https://www.undp.org/sustainable-development-goals/goal-5-gender-equality.

[25]United Nations Women, Gender Equality and the Sustainable Development Goals (2021), *available at*: https://www.unwomen.org/en/news/in-focus/women-and-the-sdgs.

[26]International Institute for Sustainable Development (IISD), Gender Equality and the SDGs (2021), *available at*: https://sdg.iisd.org/topics/gender-equality.

[27]Ibid.

mortality rates, and the enhancement of healthcare accessibility[27].

• The attainment of inclusive and sustainable economic growth necessitates the presence of gender equality, as it plays a crucial role in fostering economic empowerment. Sustainable Development Goal 5 emphasizes the imperative of advancing gender equality by advocating for the equitable distribution of economic resources, facilitating women's access to financial services, and ensuring their rights to possess and govern land and other assets. The economic empowerment of women has the potential to yield various positive outcomes, including enhanced production, diminished poverty rates, and the promotion of greater societal equity[28].

• The correlation between gender equality and peace, justice, and robust institutions is significant. The need of building peaceful and just societies necessitate the prioritization of addressing gender-based violence, facilitating women's involvement in decision-making processes, and guaranteeing equitable access to justice[29].

4. RESULTS/FINDINGS: SUSTAINABLE DEVELOPMENT GOAL – 5 AND ITS KEY INDICATORS

Sustainable Development Goal 5 (SDG 5) focuses specifically on achieving gender equality and empowering all women and girls[30]. It recognizes that gender equality is not only a fundamental human right but also a critical driver for sustainable development. SDG 5 sets forth a range of targets and indicators to monitor progress and ensure the realization of gender equality across various dimensions[31].

United Nations, Department of Economic and Social Affairs Sustainable Development**[32]**

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[28]Ibid.

[29]Ibid.

[30]United Nations Statistics Division, Sustainable Development Goal 5 (2020), *available at*: https://unstats.un.org/sdgs/report/2020/goal-05/.

[31]United Nations Women, Goal 5: Achieve gender equality and empower all women and girls (2021), *available at*: https://www.unwomen.org/en/news/in-focus/women-and-the-sdgs.

[32] United Nations, Department of Economic and Social Affairs Sustainable Development, 5 Achieve gender equality and empower all women and girls (2021), *available at*: https://sdgs.un.org/goals/goal5.

Table 1 SDG5 Targets and Indicators from UN (2021)

Target	Indicators
5.1 End discrimination against women and girls	5.1.1 Legal frameworks for gender equality and non-discrimination
5.2 End all violence against and exploitation of women and girls	5.2.1 Violence against women from an intimate partner
5.3 Eliminate forced marriages and genital mutilation	5.3.1 Women married before age 15 or 18 5.3.2 Female genital mutilation/cutting
5.4 Value unpaid care and promote shared domestic responsibilities	5.4.1 Time spent on unpaid domestic and care work
5.5 Ensure full participation in leadership and decision-making	5.5.1 Women in political positions 5.5.2 Women in managerial positions
5.6 Universal access to reproductive rights and health	5.6.1 Women's decision-making on contraceptive use and healthcare 5.6.2 Guarantee of equal access to sexual and reproductive health care
5.A Equal rights to economic resources, property ownership, and financial services	5.A.1 Female land rights or ownership 5.A.2 Equal rights to land ownership
5.B Promote empowerment of women through technology	5.B.1 Mobile telephone ownership
5.C Adopt and strengthen policies and enforceable legislation for gender equality	5.C.1 Systems to track gender equality

Key Indicators of Sustainable Development Goal 5:

· The indicator of gender parity in education assesses the extent to which equal opportunities for girls and women to access and receive excellent education have been achieved. The metric monitors the proportion of females to males enrolled in primary, secondary, and postsecondary educational institutions, alongside the literacy rate among women between the ages of 15 and 24[33].

• The indicator of women's engagement in decision-making centers on the objective of enhancing women's involvement and prominence in political, economic, and public spheres. The metric assesses the ratio of female-held seats in national parliaments, along with the level of female representation in managerial roles throughout public and private sectors[34].

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[33]United Nations Development Programme (UNDP), Goal 5: Gender Equality (2021) *available at*: https://www.undp.org/sustainable-development-goals/goal-5-gender-equality.

[34]United Nations Development Programme (UNDP), Social Sustainability (2021), *available at*: https://www.undp.org/sustainable-development-goals/social-sustainability.

- The objective of this indicator is to assess the advancement made in the efforts to confront and eradicate various manifestations of violence and detrimental customs targeting women and girls. The indicators encompassed in this framework consist of several factors, such as the incidence of intimate partner violence, the presence of harmful practices like child marriage and female genital mutilation, and the existence of legal and policy measures aimed at safeguarding women from acts of violence[35].

- The indicator at hand pertains to the guarantee of widespread availability to sexual and reproductive health services, encompassing family planning, maternal healthcare, and the provision of contraception. The tracking of indicators such as the maternal mortality ratio, adolescent birth rate, and the accessibility of reproductive healthcare services is conducted[36].

- The indicator of Unpaid Care and Domestic Work acknowledges the significance of acknowledging and assigning value to the unpaid care and domestic work, which is primarily carried out by women. The metric assesses the ratio of females and males involved in unpaid household labor, together with the policies and endeavors aimed at offering assistance and acknowledgment for this type of employment[37].

- The objective of this indicator is to assess the advancement towards attaining equitable compensation for work of comparable worth and fostering the economic empowerment of women. The indicators encompassed in this analysis consist of the gender wage gap, the rate of women's labor force participation, and the proportion of women engaged in non-agricultural jobs, as reported by the World Bank[38].

5. DISCUSSION: SDGS PROGRESSION AND CHALLENGES IN INDIA

The primary objective of Sustainable Development Goal 5 (SDG 5) is to attain gender equality and enhance the empowerment of women and girls.

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[35]United Nations Development Programme (UNDP), Goal 5: Gender Equality (2021), *available at*: https://www.undp.org/sustainable-development-goals/goal-5-gender-equality.

[36]Ibid.

[37]Ibid.

[38]United Nations Statistics Division, Sustainable Development Goal 5 (2020), *available at*: https://unstats.un.org/sdgs/report/2020/goal-05/.

In the Indian context, notable advancements have been achieved in the pursuit of this objective; nonetheless, numerous obstacles continue to endure. In order to address these issues and expedite advancements, it is imperative to undertake a collective endeavor that encompasses policy reforms, social efforts, and attitudinal changes[39].

5.1. SDGs Progression in India

- The Republic of India has made significant strides in reducing the disparity between genders in the realm of education and literacy. The enrollment of female students in basic and secondary educational institutions has witnessed a notable rise. Moreover, endeavors have been undertaken to tackle the obstacles hindering girls' access to education, exemplified by projects like the Sarva Shiksha Abhiyan, which aims to ensure education for everyone. Nevertheless, there are still obstacles that need to be overcome in order to guarantee a good standard of education and decrease the number of students who discontinue their studies, especially in the context of higher education[40].

- India has witnessed notable advancements in the realm of women's political representation. The 73rd and 74th Amendments of the Constitution of India have been implemented to allocate reserved seats for women in local government bodies, namely in panchayats. As a consequence, there has been a notable rise in the involvement of women in grassroots activities and their influence in decision-making processes. However, women's presence in national and state-level legislatures remains relatively low[41].

- Efforts to combat violence against women in India have witnessed a surge in enthusiasm. Legislative initiatives, such as the enactment of the Criminal Law (Amendment) Act in 2013, have been implemented with the aim of bolstering legal provisions pertaining to sexual offenses. Furthermore, endeavors such as the Beti Bachao, Beti Padhao

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[39]NITI Aayog, SDG India Index & Dashboard 2019-20 (2020) *available at*: https://www.niti.gov.in/sites/default/files/SDG-India-Index-2.0_27-Dec.pdf.

[40]Ministry of Women and Child Development, Beti Bachao, Beti Padhao (2020) *available at*: https://wcd.nic.in/sites/default/files/Good%20Practice%20Document-2-3-20_2.pdf.

[41]PRS Legislative Research, Reservation for Women in Panchayats and Urban Local Bodies (1993), *available at*: https://www.prsindia.org/parliamenttrack/acts/amendment-acts-women-reservation-panchayats-and-urban-local-bodies.

campaign are designed to tackle issues pertaining to gender-based violence and discrimination. Nevertheless, there are ongoing obstacles in the successful implementation and enforcement of legislation, the transformation of societal perspectives, and the guarantee of survivors' access to justice[42].

- India has had notable advancements in the realm of women's economic empowerment, characterized by a rise in female labor force engagement and enhanced accessibility to financial services. Efforts such as the Pradhan Mantri Jan Dhan Yojana (Financial Inclusion Program) and the Stand-Up India Scheme have been implemented with the objective of fostering women's entrepreneurship and facilitating financial inclusion. Nevertheless, the persistence of gender disparities in remuneration, occupational segregation, and restricted entry to formal job possibilities continues to pose substantial obstacles[43].

5.2. Indian Challenges in Attainment of SDGs:

- The persistence of entrenched gender norms: Conventional gender norms and stereotypes exert an enduring impact on social perceptions, constraining the options available to women and promoting the persistence of gender inequity. In order to attain permanent development, it is imperative to confront these deeply ingrained conventions and advocate for gender-sensitive indoctrination.

- The domain of women's health and well-being exhibits progress, however certain metrics, such as maternal mortality rates and accessibility to sexual and reproductive health services, necessitate more focus and intervention. Improving healthcare infrastructure, guaranteeing the provision of high-quality healthcare services, and effectively tackling cultural barriers are pivotal factors in promoting the well-being of women.

- The bridging of the digital divide holds significant importance in the context of women's empowerment, particularly with regards to technology. The issues that must be confronted include ensuring

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[42]Ministry of Women and Child Development, Beti Bachao, Beti Padhao (2020) *available at*: https://wcd.nic.in/sites/default/files/Good%20Practice%20Document-2-3-20_2.pdf.
[43]UN Women India, Women's Economic Empowerment, *available at*: https://asiapacific.unwomen.org/en/countries/india/economic-empowerment. (Last visited on Sep 15, 2023)

access to technology, promoting digital literacy, and establishing a conducive climate that facilitates women's engagement in the digital realm.

- The concept of intersectionality, which encompasses the interconnectedness of various identities and lived experiences, holds significant relevance in the pursuit of gender equality. It is imperative to prioritize the unique requirements and obstacles encountered by marginalized populations, including Dalit women, tribal women, and LGBTQ+ individuals, in order to foster comprehensive advancement.

6. CONCLUSION AND SUGGESTIONS

The promotion of gender equality and the empowerment of women play a key role in the attainment of social sustainability in India. Although substantial advancements have been achieved in diverse domains, including education, political participation, and the mitigation of violence targeting women, a number of obstacles persist. Gender equality is hindered by long-standing societal expectations, gaps in healthcare access, unequal economic opportunities, and inequities in technological access. In order to effectively tackle these difficulties and advance the cause of gender equality and women's empowerment, it is imperative to use a comprehensive and multifaceted approach. Several recommendations have been proposed to enhance the existing state of affairs.

i. Efforts should be consistently directed towards enhancing legislative measures and implementing policy reforms in order to effectively combat gender-based discrimination, violence, and economic inequities. This entails both the reinforcement of current laws and the introduction of new legislation. The establishment of an environment that fosters gender equality necessitates the critical task of guaranteeing the efficient implementation and enforcement of these laws. We need to focus on evaluation and monitoring part as well for having an effective system that supports social sustainability.

ii. The enhancement of women's access to economic resources, financial services, and entrepreneurship opportunities should be the central emphasis of policies and programs aimed at empowering women economically. The promotion of labor policies that are responsive to gender, the reduction of wage discrepancies, and the addressing of occupational segregation have the potential to enhance women's economic empowerment.

iii. Education and skill development: It is imperative to allocate resources towards enhancing the standard of education and mitigating gender inequalities in educational opportunities. The promotion of girls' enrollment and retention in educational institutions, along with the provision of skills training and the implementation of gender-sensitive education, can effectively empower women and enhance their range of opportunities.

iv. Addressing health disparities is of utmost importance in ensuring equitable access to quality healthcare for women, encompassing essential services related to sexual and reproductive health. Enhancing the healthcare infrastructure, mitigating cultural obstacles, and fostering knowledge regarding women's health concerns are critical measures.

v. The promotion of technology and digital inclusion plays a crucial role in addressing the digital gap, hence facilitating the active involvement of women in the digital sphere. There is a need to prioritize initiatives aimed at enhancing technological accessibility, implementing digital literacy programs, and establishing a secure and inclusive online space for women.

vi. Engaging men and boys as allies and champions for gender equality is of utmost importance. The promotion of gender sensitization programs, the questioning of harmful gender stereotypes, and the cultivation of positive masculinity can play a significant role in developing a society that is more inclusive and equal.

vii. Enhancing Data Collection and Monitoring: The reinforcement of data collection, analysis, and monitoring processes is crucial in order to effectively monitor advancements, identify areas of improvement, and provide a foundation for policymaking based on empirical facts. Enhancing the practice of data disaggregation via the lens of gender and intersectionality can yield a more comprehensive comprehension of the obstacles encountered by diverse cohorts of women.

By following the aforementioned recommendations and cultivating cooperative endeavors among governmental entities, civil society organizations, and private enterprises, India has the potential to achieve substantial advancements in the promotion of gender equality and the empowerment of women. This progress would therefore contribute to the establishment of a socially sustainable and inclusive society.

"TRANS" EQUALITY OF OPPORTUNITY: TAPPING THE AFFIRMING FABRIC OF THE CONSTITUTION

Himangshu Rathee*

*School of Law, The NorthCap University, Gurugram & Ph.D. Scholar, National Law University, Delhi

Abstract

UN Sustainable Goal number five emphasize on gender equality as a goal which nations must be destined to achieve. It envelopes the entirety of gender complexations while placing special stress on women and girls. The national Constitutions in democracies make equality as a strong pillar of society. Equality for all is an ideal that the Indian Constitution strives to deliver. The equality true to the color of India transforms into several mutations to ensure equality in form and substance. Affirmative actions in the nature of reservation is a powerful tool to ensure participation and representation of vulnerable groups. The aim of the paper is to establish an argument favouring reservation for transgender community. It is constructed with the assistance SDG, social position of transgender, and the logic of reservation. The paper is trailed on the similar lines. On an overall analysis conclusion is drawn in the nature of suggestions for pushing the equality to newer meaning.

Keywords

Transgender, Equality, SDG, Reservation, Constitution

1. Preface: Equality, SDG, and The Indian Constitution

The democratic world order has imbibed equality as an evolving hydra which mutates in different settings varyingly. There is common cutting force of progression in the before stated variation (linear or exponential) on a macro assessment of society's survival from then to now. Piketty (2022) makes a loose yet pertinent and well noticed observation, the word order of 2020s is

more egalitarian than that of 1950s or 1900s[1]. Any static definition or theorem of equality would not allow changes in the society. Being acutely aware of it, United Nations General Assembly adopted 17 Sustainable Development Goals ("SDG") which points to the direction on which nations should move[2]. The goals are a way to ensure humanitarian existence via protection of human rights. One such goal is to "Achieve gender equality and empower all women and girls[3]. The goal not only takes cognizance of the social position of women across the globe as indicated in its latter part, but remains conscious of the other vulnerable groups also which can be gleaned from the general umbrella of "gender equality". The sub-text of the SDGs is to leave no one behind[4].

The Indian Constitution captures a vision of transformative and substantive vision of equality. It does not simply treat everyone uniformly, rather it factors into social standing and circumstances of persons to achieve equality meaningfully. There are several tools in India's constitutional arsenal such as rational classification, special protection of women and children, reservation to backward classes and so on. Can a Constitution like ours promise a vicious cycle of exclusion and non-representation of a particular vulnerable group, given the fact and law reservation for the backward classes is an option? If it's a promise to keep, is the legal apparatus accommodating it? When one soberly considers these questions *qua* transgender community, one finds almost absolute absence of transgender community in various walks of life. Should the Constitution respond? Answering the question involves a prior searching of preliminary questions. What is the social standing of transgender? Can reservational equality be extended to them? The aim of the paper is to answer these questions and attempt to curate a constitutional response to the issue of transgender equality. For the response to be coherent, the paper is divided in the following three parts. The second part lays down the social reality of the transgender community ("TC"). Building on that the third part would see the flexibility in the concept of reservation to accommodate the nature of reservation as mooted in the paper. The last would be a wrap with certain reflections and suggestions in the light of the SDG 5 to the extent it touches on gender equality.

Before entering the core arguments of the paper a brief background to the broad concept of equality under the Indian Constitution is mandated to better

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[1]Piketty, T, "A Brief History of Equality" Harvard University Press eBooks(2022).
[2]"The 17 Goals" Sustainable Development. (N.D.). Https://Sdgs.un.org/Goals..
[3]Goal 5, Department of Economic and Social Affairs." Https://Sdgs.un.org/Goals/Goal5.
[4]"Leave No One Behind" Https://Unsdg.un.org/2030-Agenda/Universal-Values/Leave-No-One-Behind

appreciate what is to follow. The Constitution has engrafted the equality code in Articles 14 to 18, the normative wiring of which permeates the entire Constitution[5]. Article 14 generally guarantees equality before law and equal protection of laws to all persons within the Indian territory. Article 15 is still general and serves as a framework for prohibition of discriminatory treatment by state against its citizens and has provisions for positive discrimination. Article 16 is dedicated to equality in public employment factoring in special representation for backward class of citizens. Articles 17 and 18 prohibit untouchability including its practice in any form, and abolishes conferment of titles barring military and academic respectively.

The Constitution espouses substantively equality provisions. In Nitisha *(2021)*, the Supreme Court adopted Sandra Fredman's four dimensional conception of substantive equality[6]. First, redistributive dimension to break the cycle of disadvantage. Second, recognition to redress the stigma, stereotyping, and humiliation. Third, transformative dimension to accommodate changes for structural change. Last, participation dimension that entails full participation of the disadvantaged group in the society. The approach suggests to take stock of the realities before administering equality. The focus of substantive equality is on the impact of the law. The substantive approach is followed after a long employment of formal approach to equality which emphasizes sameness in treatment[7]. By that understanding, equality is 'trans'-transformative and transcendental.

In Navtej Singh *(2019)*, the Supreme Court detested the practice of stereotyping of any kind and made explained that it fails the test of equality.[8] It denies full participation of certain marginalized sections of the society. Considering the brief of equality provisions one needs to consider the position of the TC in India. It is to be noted that the Indian Constitution is in sync with the SDGs in so far it attempts that no one should be left behind.

2. Social Position of the Transgender in India

The SDGs promise to achieve gender equality. One of the many genders is transgender and the scope and range of TC rights are hotly debated issue especially with regard to reservation. To litigate and lobby a claim for reservation

[5]Maneka Gandhi v. Union of India, AIR 1978 SC 597
[6]Lieutenant Colonel Nitisha v. Union of India, (2021) 15 SCC 125
[7]Kapur, R., and Gossman, B, "On Women, Equality and the Constitution: Through the Looking Glass of Feminism" National Law School Journal, 16(1). (2022).
[8]Navtej Singh Johar v. Union of India, AIR 2018 SC 4321

backwardness is a non-negotiable criterion. More detailing on the reservation criteria is dealt with in the subsequent part. Currently, one needs to assess the social position of transgender through data and policy to check if they are actually backward. Facing facts on status of TC requires a common understanding of transgender which is influenced by discipline oriented discourse. Crucial issue of who is a 'transgender' is responded differently by law, sociology, and anthropology. In NALSA *(2014)*, there were two visible approaches to define the term transgender.[9]Justice Radhakrishnan favoured a self-determinism approach to define transgender where an individual does not relate to the sex assigned at birth. Justice Sikri adopts a biological approach to confine transgender to mean *'hijra'[10]*. It may not be appropriate since *'Hijra'* community's self-identification is different. Contrary to popular belief an intersex may not be a *'Hijra'* for it requires adoption by a guru. The *'Hijra'* guru is affiliated to a *gharana* for which a membership fee is charged from its members[11]. Ina Goel who was a female by birth identified herself as a member of *'Hijra'* community since she was adopted by a guru and essayed the roles and responsibilities[11]. The viewpoint of Justice Sikri may not have a sociological purchase. What good is a law which has low social value?

However, The Transgender Persons (Protection of Rights) Act, 2019 (hereinafter referred to as the "2019 Act"). has adopted an inclusive definition of transgender which envelopes cultural and/or biological characteristics. Genderqueer, kinar, hijra, transman, transwoman with or without Sex Reassignment Surgery are included. The definitional foreground is illuminating for at least two purposes. First, the statistics which will be shortly be used to assess the standing of transgender may not share the same definition since the NALSA judgment and the 2019 Act were later in point of time (post 2011 census). Second, whenever the claims of TC to reservation are considered in the paper, it means transgender as defined in the 2019 Act.

There are approximately 4.88 lakhs transgender in India[12]. As per a survey by Mckinsey, the TC is twice as likely to be unemployed[13]. International Labour

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[9]Nalsa v. Union of India, (2014) SCC 438

[10]Dutta, A, "Contradictory Tendencies: The Supreme Court's NALSA Judgment on Transgender Recognition and Rights" Journal of Indian Law and Society 5(2), 225-236. (2014).

[11]Goel, I, "Beyond the Gender Binary" Economic and Political Weekly 49 (15), 77-78 (2014).

[12]"TransGender/OthersCensus 2011 India. (N.D.)." (2011).

[13]"Transgender People Twice as Likely to Be Unemployed" McKinsey & Company.com(2021).

Organization has recognized the workplace and job market discrimination against the sexual minorities.[14]The promise of representation of TC in India is yet to be materialized. Total literacy rate amongst the TC is well below the national average of 56.1% as against the national average of 74.04%[12]. The quantitative data represents a circular loop of dejection and despondence. Being a transgender is not a single disadvantage faced at education and jobs. It is a life cycle maladjusted to the 'mainstream' society. Goel (2014) correctly flags the birth of a child entails 'is it a boy or girl'[11]. To break the cycle of discrimination, representation is mandatory. For that to happen, reservation along with other affirmative actions play a crucial role. For instance, Persons with Disability which were absent in public employment gained some representation of differently enabled persons increased[15].

Bring cognizant of the social position of the TC, the Supreme Court made a recommendation to grant reservation to TC under Article 15(4) as Socially and Educationally Backward class of citizens and as per Article 16(4) in the matters of public employment[10]. There are issues with the recommendation qua Article 15(4) which is dealt with in the next part. For now, the reasons supplied by the Supreme Court for such the recommendation are worth noting. Transgender hitherto are *systematically* denied the rights under Article 15(2) which is essentially a non-discrimination guarantee to access certain public goods and places such as wells, parks, places of entertainment etc. Kerala was the state government to introduce additional two seats for TC in educational institutions[16]. Other states are following the trend[17]. Post the 2019 Act the situation is expected to change with uniformity in grant of reservation to TC. Transwoman are claiming reservation under the 'women' category also. The claims have been contested but adjudicated favorably for TC. In *Anjali Guru Sanjana Jaan* (2021), petitioner who was a transwoman submitted her nomination form to contest election in a seat reserved for woman-general category. The form was rejected by the returning officer on the ground that

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[14]"Inclusion of Lesbian, Gay, Bisexual, Transgender, Intersex and Queer (LGBTIQ+) Persons in the World of Work: A Learning Guide" (2022).

[15]Dey, D, "Current State of Inclusion of People with Disabilities at Workplaces in India" Journal of Critical Reviews, 7(11), 2827-35 (2020).

[16]Pti, "Transgenders to Get Reservation in Colleges in Kerala" Deccan Herald. Https://Www.deccanherald.com/India/Transgenders-To-Get-Reservation-In-Colleges-In-Kerala-678883.Html (2018).

[17]Haider, A, "Explained: Transgender Community's Fight for Reservations" IndiaTimes. Https://Www.indiatimes.com/Explainers/News/Explained-Transgender-Communitys-Fight-For-Reservations- (2023).

there was no reservation for transgender. Hence, the petition was presented to the Bombay High Court. The High Court allowed the petitioner to contest on the seat with an assurance to the effect that she would not change her gender during her lifetime[18]. In *K. Prithika Yashini* (2015), the petitioner had to go to the court for successive reliefs at most of the stages of sub-inspector recruitment. The noted the discrimination faced by TC in the society. It is a form of discrimination which other two genders cannot realize observed the court[19]. Appropriate reliefs were granted. Such is the travesty that despite NALSA

(2014), transgender had to go to the court to make their gender counted in the recruitment process. For say, in *Atri Kar* (2017), petitioner had to knock the doors of the Calcutta High Court to direct State Bank of India to include third gender in the form.

There are cases where the High Court have simply rejected the claims of TC on the ground that the state governments are yet to formulate a policy on the matter[20]. In *M. Suman* (2020), petition was presented before the Kerala High Court to direct the state to provide reservation to TC for the recruitment under First and Second Division Assistants in Bengalore City Civil Court. The claims were rejected on the ground that the state is yet to formulate a policy on the matter[21]. The sorry social standing of transgender is adequately clear from the limit set of case law mentioned. They merit reservation to enhance their visibility in the society and representation in the job market.

3. Reservation: Horizontal or Vertical

Social standing of the TC is far cry from satisfactory as noted in the previous part. It demands empowerment through reservation. The model of implementation raises a question. There are two ways of implementing reservation- Horizontal and Vertical. Each of the method is suited for administering a reservation for varying social categories. In this part, implications of each of the model would be considered for TC.

Vertical Reservations are available for SEBC (or OBC)/ Scheduled Caste/ Scheduled Tribe, and Economically Weaker Section. There is mobility from one reserved to in reserved category based on merit. In case of migration from

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[18]Anjali Guru Sanjana Jaan v. State of Maharashtra, (2021) 3 Mah LJ 674

[19] K. Prithika Yashini v. Chairman, Tamil Nadu Uniformed Services Recruitment Board, (2015) 8 MLJ 734

[20]Atri v. Union of India, 2017 SCC OnLine Cal 2717

[21]M. Suman v. Karnataka State Services Commission, Represented By, 2020 Indlaw Kar 5902

reserved to unreserved category, the vacancy so created in the reserved category owing to such migration shall be filled by another reserved category candidate. Where no suitable candidates are found for such a vacancy, it shall be carried forward or dealt with according to the rules in force .

If TC are treated as a vertical category, it is bound to increase the representation for 'meritorious' transgender can get placed in open category seats and the ones in need can co-opt reservation under the vertical quota. It may work against the purpose and promise of substantive equality under the Constitution. Granting vertical reservation has its attendant disadvantages where the economically better off can siphon away the seats and marginalized are bound to remain astray to the Constitutional vision.

Horizontal model of reservation better serves the cause. It does not create water-tight compartments and permit 'interlocking' reservations. They are computed alongside the vertical categories. The primary rule for working the horizontal quota are adjustments. First merit in open category is examined and if the number of candidates sought to be represented through Horizontal quota are represented and then through the specific social categories[22]. Added as a benefit for all, there is no carry forward of vacancies in horizontal reservation. Horizontal reservation is a tool to allow intersectionality of identities of a person.

One of the approaches suggested was to merge TC into OBC category.[10]It is submitted that the approach is faulty. It denudes the multiple identities that constitute wholesome of an individual. Intersectionality can be described as "mutualy constitutive relations among social Identities"[23]. It recognises multiple axels of discrimination. Semmalar (2014) underlines the transgender's situation in India by noting the compound discrimination of social identities. For context, a dalit transgender may not solely be oppressed due to gender but due to caste also[24]. Further there are more to lose than to gain if transgender identity is subsumed in OBCs. First, the TC have to compete with other candidates who face single factor discrimination. Most of them are cisgender. Second, transgender may belong to different walks of life are collapsed under one roof. A "lower" and "upper" caste transgender would constitute single identity. Third, much like men or women, transgender exist in all social groups. A ST transgender would have to choose one of their identities as ST or OBC. Fourth, upper caste

[22]Saurav Yadav v. State of U.P, (2021) 4 SCC 542

[23]Shield, SA, Gender: An Intersectionality Perspective;Sex Roles 59(5), 301, 301-311 (2008).

[24]Semmalar, G., "Unpacking Solidarities of the Oppressed: Notes on Trans Struggles in India" Women's Studies Quarterly, 42(3–4), 286–29 (2014).

transgender may take away all the OBC benefits which is running contrary to the spirit of reservation[25]. Fifth, the nature of barriers is not homogenous. SC/ST face additional barriers. The suggestion of inclusion of TC in OBCs is bad for the mentioned reasons.

Horizontal reservation would be better suited to further the cause of justice. Such a course would be in consonance with the demands of the TC. Some transgender activists demanded that transgender should not be forced to compete with cisgender men or women in the OBC category, rather a separate category should be created for transgender within the OBC as OBC-T (OBC-Transgender) during the state-level consultation organized by West Bengal Government's Department of Health and Family Welfare on issues concerin transgender and *hijra*. Likewise, the Telangana Transgender Hijra Intersex Samiti proposed a reservation only on the grounds of gender which is different from SC/ST/OBC reservations[11]. Delving deeper, the demands could conceivably be met by horizontal reservation in the matters of education and employment. It would allow the intersectional discriminated transgender, let's say Tribal Transgender, to avail benefit of ST-Transgender horizontal seat. If a person is discriminated only for being transgender, such a reserved seat can be taken in open category. The spectrum of combining identities and availing reservation is true to the gender identity and constitutional ideals.

Further, NALSA (2014) recognized 'sex' under Articles 15(4) and 16(4) as a protected characteristic and read 'gender' into it. All protections available to sex under Article 15(1) are equally applicable to gender identity of an individual. When reservations are made for 'sex'(woman) category horizontally then for 'gender' (transgender) reservation ought to be horizontal. Going for the vertical reservation model would fail to address the concerns of discrimination amongst the TC. It would further ignore socio-politics of transgender qua cultural, and institutional barriers. The only benefit that a separate vertical category of TC would offer is to ensure carry forward of vacancies till the rules allow, the rules may allow conversion of backlog vacancies within a year as well. However, on a value weighing in terms of social dissection of the society and complexity of social identities, the disadvantages of vertical reservation outweigh its only benefit.

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[25]Raghuvanshi, P. and Swaminathan, S, "Horizontal Reservation for Transgender Persons: Resolving the NALSA Conundrum" Comparative Constitutional Law and Administrative Law Journal,. 6(2), v-xxiii. (2022).

An incidental yet important matter appertains to reservations in promotions. Vertical reservations allow reservation in promotion as is evinced from Article 16(4A) which permits reservations for SC and ST in the matters of promotion subject to demonstration of quantifiable data showing inadequacy in representation, backwardness, and the overall efficiency of the administration should not be compromised as mandated by Article 335[26]. The matter for horizontal reservation in promotions is still pending before the Supreme Court with respect to Persons with Disability. If it extends to them by any logic, the same logic can be applied to TC[27].

Conclusion and Suggestions

NALSA (2014) judgment was expected to be a watershed in the march to realization of equality. The ground reality has left a lot to desire. New dimensions can be added to the concept of equality for it is transcendental. To fulfil the SDGs no one should be left behind. Currently, the TC in India are as distanced from equal opportunities as non-grant of reservations in education and employment allow them to be. As a measure to translate SDG 5 of gender equality (part of it) necessary legislative interventions are required to be moved into action. The equalizing measures should not be cabined only in the form of reservation. The focus should begin from the awareness and normalization of third gender for being a transgender is a life cycle as much as is for men and women. To better convey the point, illustration of women is illuminating. Women have an improved status and gradually improving owing to multi-dimensional legal and social interventions. Right from prohibiting screening of the sex of the baby under Pre-Conception and Pre-Natal Diagnostic Techniques Act, 1994 to school education under various schemes of state and central government, prohibition of dowry under The Dowry Prohibition Act, 1961, protecting her in the matrimonial home under Protection of Women from Domestic Violence Act, 2005, and so on. There is an effort to afford all round protection to women. In the same vein there is a need for life-cycle protection of the transgender.

In the interim, reservation is required to assure immediate representation and empowerment. The 2019 Act should be amended on four counts. First, the representation of transgender should be more than the bureaucratic representation under the National Council for Transgender Persons established

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[26]Nagaraj v. Union of India, (2006) 8 SCC 212
[27]"Reservation for Transgender Persons in India" [28] Centre for Law and Policy Research (2018).

under section 16 of the 2019 Act. Further there should be state level statutory bodies to redress the grievances against the mandate of the 2019 Act. Second, Mental Health Boards should be entrusted with special responsibilities established under the Mental Healthcare Act, 2017 to account for mental health assistance as may be required by trans-persons, pre or post the transition of gender. Third, a fixed quota of seats should be reserved for transgender in education and employment. The fixation of seats via horizontal reservation should be according to the transgender population in the state or union territory. A separate schedule specifying the number of seats should be attached with the 2019 Act. Fourth, the horizontal reservation should be in compartments and not on overall induction of transgender so that TC from amongst each social class (SC/ST/OBC) get represented.

The paper has attempted to highlight the need for transgender reservation as one of the measures to mainstream and consequently expedite the equalization process of TC. Devoid of it SDGs cannot be achieved in the spirit.

ALTERNATIVE DISPUTE RESOLUTION - AN ANCIENT INDIAN PRACTICE AS AN ALTERNATE TO REALIZE SUSTAINABLE DEVELOPMENT GOAL- 16

Kumar Ashutosh* *Assistant Professor in Political Science, Law College Dehradun, Uttaranchal University

Amit Kumar** **Assistant Professor in Sociology, LCD,UU Law College Dehradun, Uttaranchal University

Abstract

The objective of this study is to examine dispute settlement procedures from both a socio-historical perspective and in the light of United Nations Agenda 2030 especially Sustainable Goal 16. Alternative Dispute Resolution is widely assumed to have arisen and originated in the west over the last few decades. However, this method of dispute resolution is centuries old and was widely used in ancient Indian society. In this paper, we examine ancient socio-historic practices such as ADR which were later on refined, and became a popular legal practice. In this paper we discuss how old customs and practices became the base of the modern legal system and widely accepted as a legal practice. The primary focus of this paper is to analyze the viability of dispute resolution mechanisms in ancient Indian society and to present a layout of its utility and significance in the present era and also to show how much it is more helpful in achieving Sustainable Development Goal then the conventional judicial system.

Keywords:

Alternative Dispute Resolution, Sustainable Development Goal, legal practice, socio-political aspect, Conventional Judicial System

1. Introduction

If we talk about evolution of law then we can simply say that it is a regulation

of human conduct imposed and enforced by the state[1]. It is concerned with norms governing subject's external behavior. Law is a tool that allows people to coexist peacefully and in a predictable manner. Other than legislation and judicial precedents, customs of society are a source of law. In the ancient society social control is maintained by social norms and practices. The prime goal of society was to maintain the integrity and harmony among members. For that purpose society invented methods for amicably solve the issues of its members[2] (2). These methods after long usage became custom of society. Contemporary Alternate Dispute Resolution is nothing but a continuation of social practice of ancient society.

2. Conceptual and Functional dimensions of ADR in Ancient Society

Sociologically speaking every society wants minimum friction and disputes among its members. This can be considered as foremost important target of any society. For this purpose society uses various methods and mediation is one of them.

2.1. Conceptual aspects of ADR in Ancient Indian Scriptures

Another mechanism of dispute resolution was mentioned in the *Yajnavalkya Samriti* which was written somewhere around 4th to 5th-century AD[3]. The *Yajnavalkya Smriti* presents legal doctrines in three books: *achara-kanda* (customs), *vyavahara-kanda* (judicial process), and *prayascitta-kanda* (crime and punishment, penance). He talked about three types of courts: *Puga, Sreni,* and *Kula*, which were non-official adjudication agencies. The *Puga* courts were made up of people who lived in the same area, regardless of caste or occupation, and they had jurisdiction over disputes involving the general population. The *Srenis* (guilds) were groups of people who shared pursuits, the most significant of which were the commercial guilds. They had the authority to make decisions concerning their specific calling as traders. At the *Kulas* level, social issues affecting residents of a local community might be explored and decided. Normally, an appeal was made to *Sreni* Court from a *Kula* court ruling, and the same might be made to *Puga* Court from a *Sreni* court decision. *Kulas*, or joint families, were common in ancient India, and if there was a

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[1]Dr. Madabhushi Sridhar, *Alternative Dispute Resolution Negotiation and Mediation* 09 (Lexisnexis, Gurgaon, 1ˢᵗ edn., 2015).

[2]Vijay Srivastva, "Legal Issues in International Commercial Arbitration: A Comparative Study" Ph.D. thesis, Uttaranchal University, 2017.

[3]S.C. Raychoudhary, *Social, Cultural and Economic History of India* 20 (Surjeet Publication, Delhi, 10ᵗʰ edn., 2011).

dispute between two members, the elders would try to mediate it. This informal body of family elders was known as the Kula court. When family arbitration failed, the case was brought before the *Sreni* court. The term *Sreni* was used to refer to guild courts, which were an important component of ancient community life[4].

Thus, ancient Hindu jurisprudence acknowledged two means for resolving civilian disputes: one was through a judicial process created by the king, and the other was through various types of arbitration institutions.

Various types of Courts in Ancient India

2.2. Functional aspects of ADR:

i. In Ancient Indian Society:

The *Sabha* most likely served as a popular court throughout the Vedic period. When it was feasible, the S*abha*, or common village assembly, rather than the king, attempted to resolve disputes[5]. The words *'Prasnin'* and *'Abhiprasnin'* referred to the plaintiff and defendant who brought their problems to the village *sabha* for resolution. *'Madhamasi'* was more of an arbitrator than a judge, attempting to resolve conflicts rather than imposing punishments. Because their verdicts were frequently maintained by the kings, these popular tribunals flourished until the commencement of British authority. It should be remembered that these popular courts only tried civil cases and had no jurisdiction over criminal cases.

ii. In Ancient Villages:

Prior to the arrival of the British, an indigenous form of dispute settlement known as *Panchayats* existed in India's villages. *Panchayats*, or local self-

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[4]Patrick Olivelle, *Between the Empires: Society in India 300 BCE to 400 CE* 188 (Oxford University Press, U.S.A., 1st edn., 2006).

[5]Shriram Yerankar, "Village Administration In Ancient India" 65 *The Indian Journal of Political Science*, 87-100 (Jan.-March, 2004).

government, were common in ancient societies. This institution was created to peacefully address issues at the village level. The village headman *(Gram)* and a council of village elders *(Ghosh)* are mentioned, and the leader *(Gramini)* was in charge of collecting state dues, keeping village records, and mediating conflicts[6]. Disputes were referred to the *Panchayats*, a body made up of five village elders whose verdict was respected by the parties for fear of excommunication, ostracism, or exclusion from religious and social functions.

S. No. Ancient Period	Name of Village Council
1. Ramayana	*Gram Vridhas*
2. Mauryan Period	*Sabha*
3. Chola Period	*Ur/ Mahasabha*
4. Gupta Period	*Janapadas*

iii. In Ancient Family Systems:

Family, which was considered as basic unit of society uses mediation to resolve disputes among its members. The joint family was the most common arrangement in ancient times, and the concept of Gerontocracy was widely accepted. Gerontocracy simply means that the family's eldest member is the family's head and has complete authority over all the family operations[7]. When there is a disagreement among family members, the leader of the joint family works as a mediator to reach an amicable solution. but what would happen if a dispute arises among different families. The same can be resolved by another available mechanism called *Sabha* in early Vedic period.

3. Modern Mechanism of Alternative Dispute Resolution

Because of the friendly and fruitful process involved, mediation is becoming the most favored technique of dispute resolution in comparison to other approaches[8]. United Nations adopted New York Convention also known as the Convention on the Recognition and enforcement of Foreign Arbitral Awards on 10th June 1958. It was the most important international treaty and described as a foundation stone in the field of international arbitration. At present 156 state

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[6]Dr. Pandurung Vaman Kane, "History of Dharmashastra", 3 *Bhandarkar Oriental Research Institute*, 230 (1946).

[7]Vidyabhusan Sachdeva & D.R. Sachdeva, *An Introduction To sociology* 178-198 (Kitab Mahal, Delhi, 48th edn., 2017).

[8]Madhusudan Saharay, *Textbook on Arbitration & Conciliation with Alternative dispute resolution* 6-7 (Universal Law publishing, Delhi, 4th edn., 2017).

parties are signatories of this convention. The number of instances that choose mediation to resolve their conflict has steadily increased in recent years. However, claiming that this process is the brainchild of the current population may be incorrect. This method of problem solving, in which a neutral third party is present to help find an amicable solution, can be found as social practice and historical writings all throughout the world. Alternative Dispute Resolution hereon will be called as ADR has many wings in contemporary world. ADR processes can be divided into two types: adjudicatory and non-adjudicatory. Arbitration and binding expert determination are adjudicatory procedures that result in a binding ruling that resolves the dispute. Mediation and negotiation are non- adjudicatory techniques that help parties resolve problems by agreement rather than adjudication.

1. Arbitration: According to the Arbitration and Conciliation Act it is settled by a legally appointed authority. By its very nature, the decision is final.

2. Mediation: A third party facilitates the process based on an informal agreement. By its very nature, the ruling is non-binding.

3. Negotiation: It is initiated by the parties themselves and is non-binding.

4. Advantages of ADR over Conventional Judicial System: Gone are the days when people wait for the justice for decades. In the contemporary world instant resolution of the grievance is most important aspect of governance. The biggest challenge that nations are facing today is faster and cheaper delivery of justice to their citizens. So it becomes very important for the state to find and incorporate new mechanisms of justice[9]. This problem can

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[9]Thomas E. Carbonneau & William W. Park, *Arbitration: Law, Policy, and Practice*, 20-50 (West Academic Publishing, 5th edn., 2014).

be resolved through Alternative dispute resolution. However ADR is not a panacea for all the issues related to the delayed justice but there are many benefits that make it viable option over the conventional judicial system.

1. **Access to Justice:** It increases the opportunities of justice for people as it offer various methods to resolve their disputes. It is beneficial for those who cannot afford formalities and the cost associated with formal litigation system.

2. **Cost -effective system:** In comparison with the conventional system ADR is much cheaper because procedure and documentation is much less. Expenses of both the parties reduced if they opt for ADR mechanism

3. **Speedy resolution of disputes:** As this system is out of the preview of court procedures and scheduling due to that decision is much faster than conventional courts.

4. **Flexible and Informal:** ADR methods are less rigid and formal when compared to the courtroom procedures. So representation of the case and other functionalities of the trail are simple and user friendly.

5. **Preservation of Relationship:** The focus of conflict resolution in ADR is based on compromise between parties which creates a win-win situation for both parties. These methods try to maintain brotherhood and interpersonal relations.

6. **Confidential system:** ADR process is much more confidential when compared with courtroom proceedings. This favors the parties as it spare them from public gaze and deterioration of their image. Because such kind of news can negatively affects their business or personal brand.

7. **Expert Decision Makers:** As it allows parties to choose their arbitrators for dispute resolution. This lets decision makers have some related technical or industry specific expertise to understand the consequences they are about to face.

8. **High Compliance Rate:** ADR outcomes are voluntary rather than imposed so willingness to compliance to such decisions is very high when compared with conventional judicial system. This may make the implementation of resolutions faster and decrease the occurrences of enforcement actions.

So we can say, ADR systems present numerous advantages that have made them popular as an option for speedy, efficient and more satisfactory solutions to the conventional judicial system.

5. SDG – 16 realization and the function of ADR

ADR mechanisms have been found to be very useful in the implementation of the objectives of SDG 16 by enhancing access to justice, reducing on conflicts, improving the capacity of institutions, the promotion of the rule of law, and empowering communities[10]. They are viable and efficient substitutes to the conventional legal proceedings and therefore assist in the advancement of the general goal of realizing the is conducive, fair and sustainable

5.1. SDG-16, Peace Justice and Strong Institutions

There are the 17 goals adopted by the United Nations in 2015 in the framework of the 2030 Agenda for Sustainable Development. They are cascade nutrition and health of the world's poor, end poverty in all its forms, reduce inequality, prevent climate change and protect the planet, promote peace and justice, strengthen partnerships at global, regional and national levels. They all have defined objectives that need to be attained in this year, 2030.

SDG 16 addresses Peace Justice and Strong Institutions In this SDG it is postulated that there is need for maintaining the international peace and justice for sustainable development as well as advocating for inclusive societies that support delivery of justice to everyone and attaining proper governance for enhanced performance and accountability of all institutions–national, regional and international ones. The key components of SDG 16:

1. **Promotion of Peaceful and Inclusive Societies:** The major focus of SDG 16 is reduction in all forms of violence like child abuse, human trafficking, torture, cruelty etc. It advocates a creation of more inclusive society by creating absolute equity among justice delivery system.

2. **Effective and Accessible justice for all:** Today effective governance system not only demands speedy justice delivery but justice delivery system should also be more effective and is in the reach of grass root population. Justice should be free, fast and unrestricted to ensure fundamental freedom.

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[10]Report on Transforming Our World: The 2030 Agenda for Sustainable Development, 28 submitted by United Nations in 2015, available at: www.unfpa.org/ resources/ transforming-our-world- 2030-agenda-sustainable- development#:~:text=%22 We%20 resolve%2 C%20 between%20 now%20 and,protection%20 of%20 the%20 planet%20 and, visited on September 10, 2023.

3. **Effective governance:** The United Nations – Agenda 2030 stresses on the necessity of promoting and providing a culture of lawfulness and a corruption free public institutions. This helps government to gain confidence of their people hence develop a good relationship with them which is very vital for the development of any Nation.

4. **Corruption free governance:** Inclusive growth and peaceful environment in society is only possible when the governance system will be corruption free. This can only be possible by creating transparent, efficient, and accessible and corruption free governance system.

5. **Safeguarding Human Rights:** According to agenda 16, no one can be discriminating on the bases of race, ethnicity, religion, gender or any other disability. Nations should create equal opportunities for each and every person and should focus on equity rather than equality while protecting their human rights

5.2. Interrelation of ADR with SDG 16: ADR can therefore be associated with sustainable development goal 16 of the United Nations or UN SDG 16. SDG 16 focuses on the peace, justice, and institutional space that is required for development while offering affordable and fair justice to everyone.

1. **Access to Justice**: Among disputes, there are mechanisms like mediation or arbitration – choices that are equal to legal procedures, but do not take place in court. They can improve access to justice by providing solutions that are equally efficient, fast and affordable especially to persons and groups who may be locked out of judicial system.

2. **Reducing Violence and Conflict**: Of special interest, since ADR primarily involves settling disputes without resorting to legal battles it stands to alleviate rivalry and enmity within the community as well as human relations. This is as per the objectives of SDG 16 of ending conflict and violence for sustainability of societies.

3. **Building Effective Institutions**: ADR mechanisms assist to build up the capability of legal and judicial systems around the world since they diminish the cases pile and enhance the effectiveness of the dispute resolution systems. This is because it would help in the attainment of the institutions that are accountable as envisaged in the SDG 16.

4. **Promoting Rule of Law**: ADR is useful in upholding the principle of the rule of law as it entails practices that are organised towards the finding of solutions to disputes assured of principles of fairness, equity as well as impartiality. It assists in fostering peoples' confidence in legal systems and encourages compliance with the laws and legal frameworks.

5. **Empowering Communities**: ADR also assists people and groups using the adoption of participatory procedures whereby they determine the fates of their conflicts. Participatory states ensure that people take full responsibility when implementing the development process, hence the sustainability.

6. **Discussion:** The rate of population growth and the rate of conflict are nearly identical. In an era, where need for dispute resolution and justice delivery is very prompt. Agenda 2030 of Sustainable development goal is also demanding a just and a peaceful society and one way to realize this goal is to systematize ADR[11]. Any civilization cannot afford to have such a high rate of conflict. Despite the fact that modern governments have a well-established judicial framework for administering justice and resolving disputes, however, by its very nature, this system is not harmonious. The majority of conflicts may be resolved without going to court. As previously stated, ancient society has a well-established method for resolving disputes. The primary motivation for developing such a process was to resolve disputes not only promptly but also amicably. This strategy was usually a win-win situation for both sides, as well as maintaining societal unity. Our discussion point is that we should learn from ancient culture and adapt this ancient approach of conflict resolution in order to build a more harmonious society.

7. **Conclusion:** In today's world, the rule of law frequently takes precedence over societal practices and norms. Law is viewed as a product of modern scientific society according to most of the people in contemporary time. In every civilization, the process of administering justice reflects the people's social understanding and consciousness. Even in the most ancient societies, concepts of equitable justice and diverse ADR approaches were always available at the parties'

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[11]Christopher W. Moore, *The Mediation Process: Practical Strategies for Resolving Conflict*, 13-21 (Jossey Bass, 3rd edn., 2003).

discretion. The primary objective of ancient society was to maintain social harmony, tranquility, and integrity. Our predecessors were more concerned about peacefully resolution of issues in order to meet these objectives. They knew that while avoiding conflict is tough, resolving it through mediation is simple. Same ideology of peace and justice is reflected in the Agenda 2030 of the Sustainable Development Goal. ADR, undoubtedly become a game changer in realization of SDG – 16. Though, due to political and sectarian connotations, the system has lost its integrity over time. In essence, out-of-court dispute settlement is not new, and non-judicial, indigenous dispute resolution procedures have long been employed in every civilization.

THE ROLE OF A.I AND CYBER FORENSICS IN ACHIEVING SDG 5 AND 16 DEALING IN SPECIFIC REFERENCE TO CYBER OFFENCES AGAINST WOMEN

Ujjwal Kumar Singh[*]   *Assistant Professor, Law College Dehradun, Uttaranchal University, Dehradun

Prof (Dr). Rajesh Bahuguna[**]   **Dean, Law College Dehradun, Uttaranchal University, Dehradun.

1. Introduction

The internet has global face today, India being a formidable part of this system is not exception to it. India also took seismic shift in this new era of Information and Technology. India got its first cyber law legislation namely Information and Technology Act -2000 (I.T Act -2000) . With an objective to grant legal recognition to all transactions done via electronic exchange of information and as well as digital signatures.

In this information era, Cybercrimes are growing impetuously and changing global scenario. Modern era is more challenging and alarming. By the growth of Artificial intelligence, IOT, Deep Learning, Machine learning .These challenges are behaving like *hydra headed*. Internet is being strong in the era of Internet of Things (IOT), deep learning machine learning, big data etc. Presently we are facing new challenges in dealing with cyber offences against women due to rise of Meta-Verse and robo-relationship. Privacy in virtual world is really shrinking. Women is worst affected in Cyber world. It is not affecting only netizens but also affecting students, working women, writers, celebrities, transgender, women, and even tribes who never come across this virtual world.

1.1. Artificial intelligence- There is no generally accepted definition of Artificial Intelligence till date. In 2016 Report issued by *Barack Obama* administration in America "Some define Artificial Intelligence loosely as a computerized system that exhibit behavior that commonly thought of as intelligence. Other defines it as a system capable to solve complex problems

relating to cyber world. In 2018 Microsoft attempted to define it as "a set of technologies which helps us in enabling computers to perceive, learn, reason and assist in decision making to solve problems in ways that are similar to what people do.

1.2. Cyber forensics- This term was first time coined in 1991 by International Association of Computer Specialists in *Oregon*. It developed as a branch of forensic science where we can apply techniques of investigation in dealing with cyber offences.

Basically cyber forensics dealt with scientific examination and data analysis of data held in computer for the purpose of presentation before the court.

Internet related forensics may be classified in three heads.

A. Computer Forensics - It generally deals with extracting hidden or deleted data from computers

B. Cyber Forensics- It may also be called as *Network forensics* and is capable to deal basically with analysis of digital or electronic evidence that is across the large network. The main object of Cyber forensics is to identify potential perpetrator and to assess the impact of crime.

C. Software Forensics- It is generally used in analyzing software source code or binary code (O-1) to determine intellectual property infringement. It helps in suits relating to IPR related disputes in cyber world.

1.3. Cyber offences-Due to changing and dynamic nature of subject the term cyber offences may not be defined particularly. The misuse of computer or in the era of IOT , AI, or Cyborg the nature of these offences is changing very fast so it is not possible to define or cribbed , cabined and confined this word in some established set of rules.

Cyber Offences may be defined as" Crimes directed to a computer or whole computer system" But the complex nature of cyber offences may not be defined in such simple term.[3]

Some other organizations also defined this concept.[4]

Some kinds of cyber offences are discussed below:[5]

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[3]Talat Fatima, Cyber Crime 89 (Eastern Book Company) (2011)
[4]The Organization for Economic Co-Operation and Development (OECD) , *Computer related crime means any illegal, unethical,or unauthorized behavior relating to the automatic processing and the transmission of Dat*a
[5]Rita Esen, *Cyber Crime: A Growing Problem*, 66 J. CRIM. L. 269 (2002).

a. **Hacking**- Hacking is generally an act of unauthorized use of digital devices and electronic networks. Generally, it is not always malicious act, it may be with alter motives. In hacking hacker misuse the devices like computer, smart phones, tablets or other similar devices and networks, and by it he may gather data of user or he may disrupt data in device.

Hackers are especially skilled coders and they may classified in three broad heads. This classification is basically based on function and motive of the hacker. They may classify in Black, White and Yellow Hackers. In which Black hat hackers are serious threat to data and they work generally in profitable syndicate.

b. **Child Pornography**- Pornography is depiction of a content it may be printed or visual. It contains narration, display or demonstration of sexual activities or any other obscene material with an inherent intention to trigger sexual excitement to the particular viewer.

The term Child pornography has been defined under Sec 2 (da) POCSO ACT 2012. It may explain as *"Child pornography is any kind of visual display of overt sexual activity that engages a child. It includes all those image which shows involvement of child in any sexual act".*

c. **Password Sniffers**- Password sniffer scans all data by installing a host device/ machine. It may apply to various network protocols like HTTP, FTP, Telnet, etc.

Password sniffers purpose is generally bona-fide and it may use as a security tool, but Hackers use it for illegal purposes.

d. **Denial of service attacks-** Denial of service i.e. DoS is an attack on device and as a resultant it becomes impossible to gain access by its legitimate intended user. It may done by flooding the target with traffic and also by sending a message that is capable to trigger crash.

The most common dos attack may be illustrated as Buffer overflow attack, ICMP flood, SYN flood etc.

e. **Computer Fraud**- We know that a deceit who does not deceive is not a deceit. Fraud may be committed also in virtual world. It may done by using computer data with malafide ulterior motives or by unlawful gaining by that data.

It may be classified in various heads like accessing computers without authority by engagement in data.

f. **Cyber Pornography**- In simple words we may say Cyber Pornography is use of cyberspace with an objective to create, display, distribute, publish obscene materials. Traditional pornographic content has been widely replaced by virtual contents.

g. **Sale of illegal articles**- In contemporary world we see that internet is being widely used in selling and purchasing illegal goods like Weapons, Wild life , Drugs, etc. Generally by exchange of e mail I.Ds customer and seller may contact with each other and after verification and chance of secrecy they may complete this sale transaction.

h. **On-line gambling**- Gambling in India is illegal and generally it governs by the Public Gaming Act 1867. When this act was passed at that time we are not having any idea relating to virtual world. This act does not provide any effective remedy relating to virtual gambling. It may include virtual poker, Sports betting, virtual Casinos etc.

On line gambling is not restricted globally. There are some nations like Gibraltar, Malta etc. allowed gambling with certain regulations and licensing.

i. **Copy right Infringement**- Copy right is a protection to the author of any book, owner of any published. Literary, artistic, dramatic or scientific work. It excludes other from getting any unlawful gain by this work. When anyone breaches the condition and takes unlawful gains of it without the permission of owner it amounts to infringement of such copyright.

j. **E-mail Spoofing**-It is also a form of Cyber attack. In cyber spoofing hacker sends a manipulated mail, which appears as originated from original and trusted source. By taking advantage of known credentials hacker may take sensitive data of user.

k. **Forgery**- In forgery the person creates a data which he knows that it is not genuine but still he uses and projects it as genuine. It may done by various modes like affixing others signature on a document. Digital forgery implies forgery in virtual world.

l. **Cyber defamation**- Offensive Speech targeting women on internet-Such speech has a tendency to create hatred based on sex against women. There are some particular groups of women like young

women, women in media, women having political participation and also individually every women on internet and social platforms have potential threat to be victim of it. It is a global challenge no matter that Malala Yusufjai in Pakistan or a women in eight high income nations.

Cyber offences against women-

1. **Offensive Speech targeting women on internet**-Cyberbullying is an aggressive and intentional, act that was committed by an individual person or by a group with the aid of electronic tools and internet. It is repeatedly attack on victim.

   Cyberbullying is very much alike to traditional bullying but having very wide negative impact on the victim

2. **On-line grooming**- Online grooming is a tactics which may be used by attacker on child victim with an intention to sexually exploit her. The essence and object of this crime is exploit the children and his trust by leveraging shame oif reputation and dignity or by fear of any consequential evil.

   In cyber world or in meta verse it is biggest challenge which society will face

3. **Cyber Stalking-** It is an activity in which attacker, abuser or stalker stalks or harass another person by misusing of internet.

   In cyber-stalking stalker may use e-mail, social media platforms or any such platform with   an   intent to contact the victim.

   According to Sec. 2(n) of the Sexual Harassment of Women at Work Place (Prevention, Prohibition and Redressal) Act 2013 it includes-

   • Unwelcome physical contact and advances,

   • Demand sexual favors

   • Making sexually colored remarks

   • Showing Pornography

   • Any other verbal /non-verbal conduct of sexual nature[6]

4. **Privacy infringement/ Voyeurism**- As per sec. 66 E of Information and Technology act 2000, Whoever, intentionally or knowingly captures,

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[6]Sexual Harassment of Women at Work Place (Prevention, Prohibition, and Redressal) Act 2013, §.2(n)

publishes or transmits the image of a private area of any person without his or her consent, under circumstances violating the privacy of that person, shall be punished with imprisonment which may extend to three years or with fine not exceeding Rupees two lakh or with both.[7]

The different terminologies associated with the section are explained by the explanation clause following the section 66E of the said Act which are discussed below:

Explanation: For the purposes of this section—

1. "transmit" means to electronically send a visual image with the intent that it be viewed by a person or persons:

2. "capture" with respect to an image, means to videotape, photograph, film or record by any means

3. "private area" means the naked or undergarment clad genitals, pubic area, buttocks or female breast

4. publishes" means reproduction in the printed or electronic form and making it available to public

5. "under circumstances violating privacy" means circumstances in which a person can have a reasonable expectation that-

    • He or she could disrobe in privacy, without being concerned that an image of his private area was being captured; or

    • Any part of his or her private area would not be visible to the public, regardless of whether that person is in a public or private place.[8]

5. **Revenge Pornography**-Revenge pornography means non-consensual distribution of sexually explicit graphics contents like images, videos and like materials in cyberspace. It is an illegal act to share or publish images and videos of anyone with an ill motive. It may called by other names like non-consensual pornography or sextortion.

6. **Sexting-** the term sexting can be understood by the combination of two words sex+textingwhich can be explained as an act to send sexual text messages. The ambit of sexting may also include sending of nudes or seminude photos and explicit videos of oneself. It may happen through any electronic device.

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[7]Information and Technology Act, 2000, § 66 E
[8]*ibid*

Sexting risks for teens; Cyber Bullying- some time leak contents becomes the cause of cyber bullying. A cyberbully may use this leaked media to bullying by Impersonation, Text message harassment, uploading on porn websites.

7. **Defamation** - Some time cyberspace may be used for defamation of any person or community by wrongly portray him. Similar event we have witnessed by Bullibai app. By making this app they were wrongly portraying women. It resulted in causing defamation by hurting the feelings of women.

8. **Meta verse and safety challenges**- Meta verse is also having potential threat to women in cyber world. Recently we have already witnessed many events in which women has been subjected to brutal cruelty in meta verse. Meta verse is generallya new concept having less or no regulation.

Role of cyber forensics in dealing with cyber offences against women-

Forensic evidence is needed for finding out precisely and exactly what data was stored in a computer at the time of occurrence of a particular event. There are many important documents within the computer, the main among them includes files whether normal or deleted, hidden files, passwords, free space, file slack etc.

The digital forensics examination method basically ensures that data should not be tampered.

In U.S, it was held in a case that deleted files on a computer hard disk drive are discoverable. The other party must allowed to retrieve recoverable files. On the same path in other case[9] it was held that onsite inspection of computer hardware to discover relevant records.

On the same path Indian courts also recognized the importance and followed it as a normal procedure in deciding cyber offences.[10]

Cyber forensics may help in dealing with cyber forensics in these heads-

• In maintaining integrity and continuity of data

• Secure collection of computer data

• Examination of data

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[9]Eugene J.Strasser v. Bose Yalumachi, 669 So. 2d 1142
[10]Shafhi Mohammad v. State of Himachal Pradesh-2012 SLP(Crl)9631-9634

- Collection and presentation of relevant information.
- Protection of relevant data

2.1 Challenges before Cyber Forensics in dealing with Cyber Offences against Women –The aim of digital forensics investigation is to extract evidences from data and detailed facts and use these evidences in the court of law. It plays an important role in any investigation where data is evolved after a security breach. This data contents may be related to business or strictly confidential. Digital forensics investigation may use to investigate cyber and computer related crime. This investigation may be classified-

a. Collection of evidences without altering the crime scene;

b. Examination of evidences

c. Analysis of these evidences

d. Reporting his analysis before the court/jury

Challenges before digital forensics may be explained in these heads-

- Scientific developments growing popularity of heterogeneous hardware and software.
- Increasing variety of file formats and operating software
- Modern smartphones and utilization of end to end encryption.

Other challenges—

a. **High speed and Volume of data**—It is not confined to a single host, it is scattered among different physical and virtual locations. Due to this reason more expertise tools and time are needed.

b. **Privacy preserving investigations**—At this time cyberspace is being used by persons to bring many aspects of life which is personal in nature. It may cause serious privacy infringement where cloud computing is involved.

c. **Development of standards**—Due to technological development we need cutting edge technology in investigation in dealing with cutting edge cybercrimes. We need processing of these information in a collaborative way. So digital forensics community needs Proper development in dealing with these challenges.

d. **Legitimacy**—Legitimacy is a big challenge before modern forensic

community in the age of fog computing. It's really a challenge to investigate in this border less scenario.

e. Rise of anti-forensic Techniques—Now modern defensive measures encompass encryption, cloaking techniques, obfuscation including information hiding. New tools for cyber forensics should competent to deal with different investigations and privacy protection.

Eric holder, *Deputy Attorney General, the United States Subcommittee on Criminal Oversight for the Senate* has classified these challenges in three categories-

a. Technical challenges—Technical challenges includes- Encryption, Anti Forensics, Different media formats and there dynamic nature, Steganography, Live acquisition and analysis.

b. Legal challenges—Legal Challenges includes- Relevancy of Scientific evidence[11], Lack of standard legislation capable to deal with this matter, not clear calculation about potential rate of error of used methods in examination and analysis of these documents, General acceptance of theory/method by scientific community.

c. Resource challenges—Resource challenge includes – Heterogeneous hardware and software platforms, Volume of data, to satisfy prosecutorial needs of government at all levels.

Other possible challenges—

• Scalability

• Pervasive Encryption

• Automation and intelligence

• Internet of things (IOT)

• Cloud Computing

• Visualization and collaborations

Limitations of Cyber Forensic Tools- These are the limitations of cyber forensic tools—

• Poor and Limited in their functionality

• Incapable to hold terabytes of data into a succinct report.

• Incapable to re-create a unified time line of past events before the court of law

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[11]Selvi v. State of Karnatka-2010,(7) SCC 263

- Slow in speed during data analysis
- Digital forensic may be conducted till data is present in the computer
- Needs much integrity and faith before the court

Challenge against fundamental rights like Right to privacy

3.1. Role of AI in helping Cyber Forensics-By using AI technology increases the chances of investigating and identifying cybercrimes. It help us investigating agencies solving the problems effectively and it saves a lot of time and money of the agency. Artificial Intelligence helps in solving these problems and may also play precautionary role in Cybercrimes. Ai can detect suspects by sifting through unstructured data. It can also help investigators to easily look through criminal records and identify potential suspects. The most important role of ai is capability to swiftly analyzing the data. The major contemporary issue before digital forensics is exponential data storage. This issue has only one solution and that is Artificial intelligence.

The prime role of digital forensics is to focus on solving some real time challenges which may arise like reducing the work load of inputs and provide maximum valid output. Artificial Intelligence deals with the proper handling of data and managing the resources.

Advantages of AI In dealing with cybercrimes—

- Detecting new threats
- Thorough understanding of good bots and bad bots, during website traffics.
- Helps in asset inventory and threat exposure
- Strengthening cyber security

Specific AI methods that impact digital forensics—

1. Knowledge re-presentation- One of the pivotal function of Artificial Intelligence is the representation of knowledge. Semantic web can be attributed as the major growth in this area. It is the future of WWW(World Wide Web). It, i.e. the sematic web, generally allows user computer to draw the required connections between web pages and information store. Artificial intelligence can ease the understanding and interpretion of natural language texts witch are required computational task. The two known methods to standardized data is XML (Extensive markup language) RDf (Resource Data Framework). However RDF is generally concerned about semantics which is not very useful in a computer system without syntax[12].

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[12]Fadi Al-Kalani, Mamoun G.Awad, Nabeel Bani Hani Semantic Web: Improving Web Search Using RDF Instead of XML, 10 ORIENT. J. COMP. SCI. AND TECHNOL, December 2010.

2. Pattern recognition- Identification of data cluster is done by pattern recognition. Pattern recognition is process to recognize pattern by using a machine learning algorithm. It can be defined as a classification of data based on already gained knowledge. Examples Speaker identification, speech recognition etc.

3. Expert systems- It explain s the4e reason behind particular process and conclusion obtained during the process of this digital forensics. It allows a person to analyze and critique the process. It can expose flaws in getting conclusions.

AI techniques which may help in data forensics—

- **Live forensics-** Live forensics is a growing branch of digital forensics that helps in performing forensic activities in live system. Active system normally means running system. It helps in providing accurate and consistent data for investigation.

- **Data recovery-** Ai also plays major role in data recovery and data protection. It is already providing some real good solutions to complex data recovery problems. Although Ai is at very infant stage but when it will be able to restore data within a few minutes.

- **Password recovery-** The basic thinking behind the password recovery is it that average user often choose similar words, passing phrases, or pattern. With that fixed rules hacker hacks the password. This system works in these stage.

    1. Initiating Private Information look up.

    2. Data Collection and indexation module.

    3. Semantic analysis module of database of found password or potential passwords.

    4. Mutation of data and attempt to guess probable password.

- **Known file filtering**—It is a common forensic technique used to relocate relevant files out heap of irrelevant ones. The major demerit of it that it can work only when hash match perfectly. It can't apply on a damaged file.

- Timeline analysis- In performing investigation of an event it becomes crucial for us to know the existing relationship and communication between parties. Timeline analysis gives us clear data through specific day, month, year, views. It helps examiner in taking decision on particular time line basis.

4.1. Conclusion- In this modern era of cyborg it's really a mammoth challenge before justice system to deal with cyber offences against women. This new branch of science and law cyber forensics though it is in its developing stage is playing a vital role in dealing with these offences. In this fast developing cyber world its really great challenge before the law to maintaining the pace with criminals. They are adopting technology very early. Artificial Intelligence is playing vital role in solving recent challenges before the cyber forensics. Now after adopting new technologies like artificial intelligence, IOT, big data, machine learning application of law is being more effective. But these new challenges like anti-forensics, new hardware and software applications are imposing new limitations before the law and adjudicating agencies.

'THE ONES WHO ARE LEFT BEHIND': TRACING SPACE FOR NON-BINARY INDIVIDUALS IN SUSTAINABLE DEVELOPMENT GOALS 2030 AGENDA

Shreya Rawat[*]   *Research Scholar, Law College Dehradun, Uttaranchal University

Prof. (Dr.) Poonam Rawat[**]   **Head Of Department, Law College Dehradun, Uttaranchal University

Abstract

In the shared principles of 2030 Agenda for sustainable development, the United Nations declares "The achievement of full human potential and of sustainable development is not possible if one half of humanity continues to be denied its full human rights and opportunities…." There are 17 sustainable development goals with 169 specific targets focused on creating socially, economically and environmentally sustainable world. The goals aim for inclusive society for all stating "No one must be left behind." However, we fail to find any mention of word 'third gender' or 'sexual orientation'. We still live in a society discriminating against sexual and gender minorities. Nonetheless, the terms and principles of SDGs can be interpreted to advocate in favor of gender non-conforming persons. In this paper the author attempts to highlight the challenges faced by the queer community in various walks of life. The writing also deals with Sustainable development goals 1, 3, 4, 5, 8 and 10 while trying to trace where Transgender community stands in relation to them.

Keywords:

Sustainable, SDG, Third gender, Queer, Inclusive

Introduction

Transgender community or gender non-conforming refers to people who do not consider themselves in either of the two binary sexes (male/female) or recognize themselves in the sex other than that they are assigned at birth. This is not very common. This does not fit the common society. And with

the 'uncommon' trait, comes the biased gaze of society. The 'general' society looks down on them for being different than the rest. This stigma is faced by them in every walk of their lives right from school to workplaces. For the intersex people it starts from the birth. Ostracized by the society, harassed by bullies, ill-treated by their loved ones leave them traumatized. The trauma stays for the whole life. The repercussions of patriarchy, sexism, heteronormativity, racism and biasness are that a mark is left for whole of the lives. All the discrimination makes them feel lonely, isolated and depressed. These are some of the problems that queer community faces on almost daily basis. This list is not exhaustive. There are a lot of other problems which the community encounters. Not only smaller countries, but big nations have failed to include this community in the mainstream society. Even the international document Universal Declaration of Human Rights led sustainable development goals have failed to include gender non-conforming people as such. Sustainable development goals made on the foundation of UDHR have 17 goals with the aim for creating an inclusive society. However, it does not specifically provide for inclusion of queer community.

Concept

SDG 3 and prejudices in healthcare

SDG 3 calls for promoting and ensuring well-being and good health of people of all ages. It sets out 13 targets, out of which Target 3.7 provides for 'sexual and reproductive healthcare services'. Target 3.8 calls out for 'universal health coverage and access to quality, safe and effective health care services'. The reality however, is different from what we are trying to achieve. Health and healthcare situation for gender non-conforming individuals is substandard.

Trans persons face different mental and physical health issues. The mental health issues for transgender individuals begin from the early stage of body dysphoria. This is the internal battle faced by them when even the external struggle has not yet started. The research shows that all these experiences are deepened in the years of puberty.[1] The most distressing part is that the person has to fight with himself before fighting with the world. The trans phobic Indian society has so much filled each mind with the hetero normative ideas that the individual sometimes fears his own identity. These

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[1] Huttunen, A., Hirvonen, N., & Kähkönen, L. (2020). Uncomfortable in my own skin–emerging, early-stage identity-related information needs of transgender people. *Journal of Documentation*, *76*(3), 709-729, https://doi.org/10.1108/JD-09-2019-0193

internalized negative beliefs and attitudes affect the self-esteem and identity development of a queer individual. Queer may devalue themselves by considering their behaviour as 'wrong', 'unnatural', 'immoral' or 'sin' and involve themselves in self-destructive behaviour like substance abuse, leaving their studies and professional concerns incomplete.[2]

WHO declares that LGBT+ persons are at a higher risk of suicide these are the vulnerable groups to experience discrimination. As per now no concrete statistical data nationwide is there on suicide transgender individuals. But over the years the cases of harassment and bullying, abuse, torture have been witnessed. A qualitative study on LGBT women showed that isolation, anxiety, drug use, and suicidal tendency were common experiences. It is found that they don't take help of psychologists because of stigma, fear of negative mental interventions and sometimes previous unfavourable experience.[3]They face violence, abuse, family rejection, pressure and discrimination. Young people with gender dysphoria often wish to go through social and medical gender transition.[4] This creates a mental pressure over them to establish their identity in the society as a particular gender.[5] This sense of inability to achieve the identification increases their mental and psychological pressure which results in suicidal or non-suicidal self-harming thoughts and behaviour like NSSI.[6]

The physical healthcare situation is no different. The place where common people show their wounds freely and open up about their physical difficulties is not the same for trans community. They feel cut off from these places also. They feel even the attitude of healthcare workers is not empathetic towards them, which often leads them to hide their identity if they can. In

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[2]Joseph, S. (2005), *Social work, Practice and Men Who Have Sex with Men*. Sage Publications

[3] Wandrekar, J. R., & Nigudkar, A. S. (2020). What do we know about LGBTQIA+ mental health in India? A review of research from 2009 to 2019. *Journal of Psychosexual health*, *2*(1), 26-36, https://doi.org/10.1177/2631831820918129

[4]Becker, I., Ravens-Sieberer, U., Ottová-Jordan, V., & Schulte-Markwort, M. (2017). Prevalence of adolescent gender experiences and gender expression in Germany. *Journal of Adolescent Health*, *61*(1), 83-90, https://doi.org/10.1016/j.jadohealth.2017.02.001

[5] Coleman, E., Bockting, W., Botzer, M., Cohen-Kettenis, P., DeCuypere, G., Feldman, J., ... & Zucker, K. (2012). Standards of care for the health of transsexual, transgender, and gender-nonconforming people, version 7, *International journal of transgenderism*, *13*(4), 165-232, https://doi.org/10.1080/15532739.2011.700873

[6]Claes, L., & Vandereycken, W. (2007). Self-injurious behavior: differential diagnosis and functional differentiation. *Comprehensive psychiatry*, *48*(2), 137-144, https://doi.org/10.1016/j.comppsych.2006.10. 009

a study, the authors point out the discriminatory bill of health and human services in the U.S. that rescinded health protections for gender diverse Americans.[7] In the time of epidemics especially, such rule and withdrawal of such protection many prove to be fatal to their health. Many studies show that medical healthcare providers often misbehave with them and treat them as unequal and inferior.[8] There are inequalities in healthcare with regard to sexual and gender stigma.[9]

SDG 4 and School Bullying

SDG 4 calls for ensuring quality education to all 'girls' and 'boys'; again neglecting the third category of people. Target 4.5 calls to end gender disparities in education and ensure equal access to education for 'vulnerable'. It is very probable that vulnerable class includes non-binary people too. Target 4.A. declares that education facilities must be gender sensitive. The picture of education system is totally unlike.

Many such people face bullying and abusing in schools and to avoid humiliation often skip classes or even drop out of school. Exposure to violence shows negative effects on the health and education.[10] Absenteeism has been found to be responsible for low graduation rates that can have consequences for the whole life.

School bullying is a major cause of anxiety and future traumas in trans individuals.[11] As far as India is concerned this holds true only for gender

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[7]Malina, S., Warbelow, S., & Radix, A. E. (2020). Two steps back—rescinding transgender health protections in risky times. *New England Journal of Medicine*, *383*(21), e116, https://doi.org/10.1056/nejmp2024745

[8]James, S., Herman, J., Rankin, S., Keisling, M., Mottet, L., & Anafi, M. A. (2016). The report of the 2015 US transgender survey, https://www.semanticscholar.org/paper/The-Report-of-the-2015-U.S.-Transgender-Survey-James_Herman/e7be734f_9129854a 0288493a739b2df1bdfdf06d

[9] Moallef, S., Salway, T., Phanuphak, N., Kivioja, K., Pongruengphant, S., & Hayashi, K. (2022). The relationship between sexual and gender stigma and difficulty accessing primary and mental healthcare services among LGBTQI+ populations in Thailand: Findings from a national survey. *International Journal of Mental Health and Addiction*, *20*(6), 3244-3261, https://doi.org/10.1007/s11469-021-00740-7

[10]Woodford, M. R., Kulick, A., Sinco, B. R., & Hong, J. S. (2014). Contemporary heterosexism on campus and psychological distress among LGBQ students: The mediating role of self-acceptance. American Journal of Orthopsychiatry, 84(5), 519, http://dx.doi.org/10.1037/ort0000015

[11]Lian, Q., Li, R., Liu, Z., Li, X., Su, Q., & Zheng, D. (2022). Associations of nonconforming gender expression and gender identity with bullying victimization: an analysis of the 2017 youth risk behavior survey. *BMC public health*, *22*(1), 1-7, https://doi.org/10.1186/s12889-022-13071-6

non- conforming people as most intersex in India don't even get the facility of going to a school. There is high rate of victimization and bullying towards gender non-conforming students.[12] The isolation faced by them in schools make them drop out and leave studies, which in turn brings economic dissatisfaction. The discrimination faced in the stage of puberty leaves an effect on their mental health forever.[13] Queer people are often mocked about their mannerisms. Sometimes even teachers also tend to participate in abusing, harassing and sometimes even forcing the transgender pupils to sit aloof from their classmates.[14]

This discrimination also affects academic grades[15] of such individuals.[16] Even social support from friends is associated with higher self-esteem in cisgender LGB students but not their transgender counterparts.[17]

A quality education system is inclusive, that accepts and nurtures all students regardless of their colour, creed, sexuality or anything unrelated to academics. Unreasonable classification in schools is dangerous as it sets an example before the younger generation. They form the society in future and their learning leads their mentality all their lives. The discrimination they see in schools is repeated by them in their lives out of and after the school.

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[12]Henderson, E. R., Sang, J. M., Louth-Marquez, W., Egan, J. E., Espelage, D., Friedman, M., & Coulter, R. W. (2022). "Words Aren't Supposed to Hurt, But They Do": Sexual and Gender Minority Youth's Bullying Experiences. *Journal of interpersonal violence*, *37*(11-12), NP8747-NP8766, https://doi.org/10.1177%2F0886260520978199

[13]Beusekom, G., Baams, L., Bos, H. M., Overbeek, G., & Sandfort, T. G. (2016). Gender nonconformity, homophobic peer victimization, and mental health: How same-sex attraction and biological sex matter. *The Journal of Sex Research*, *53*(1), 98-108. https://doi.org/10.1080/00224499.2014.993462

[14]Knight,K. (2019) *Section 377 is History but Young LGBT Indians Need Concrete Policies to Protect them from Bullying,* Human Right Watch, www.hrw.org

[15]Hartig, A., Voss, C., Herrmann, L., Fahrenkrug, S., Bindt, C., & Becker-Hebly, I. (2022). Suicidal and nonsuicidal self-harming thoughts and behaviors in clinically referred children and adolescents with gender dysphoria. Clinical child psychology and psychiatry, 27(3), 716-729, https://doi.org/10.1177/13591045211073941

[16]Mathies, N., Coleman, T., McKie, R. M., Woodford, M. R., Courtice, E. L., Travers, R., & Renn, K. A. (2019). Hearing "that's so gay" and "no homo" on academic outcomes for LGBQ+ college students. *Journal of LGBT Youth*, *16*(3), 255-277, https://doi.org/10.1080/19361653.2019.1571981

[17]Taylor, K., Coulombe, S., Coleman, T. A., Cameron, R., Davis, C., Wilson, C. L., ... & Travers, R. (2022). Social support, discrimination, and self-esteem in LGBTQ+ high school and post-secondary students. *Journal of LGBT Youth*, *19*(3), 350-374, https://doi.org/10.1080/19361653.2020.1812465

Our schools are definitely setting wrong examples which are dangerous for the future.

SDG 5 and Social Discrimination

SDG 5 enshrines the principle of Gender equality. The draft calls for empowering women and girls by giving them equal opportunities as well as ending discrimination against them. If we widely interpret the term 'gender' we can keep all other non-binary genders in the category. But in all targets of SDG 5, provisions for specifically females have been made.

The transgender persons are ostracized by the society, discriminated and humiliated at every pace by every other person. One can assume that when the whole world side-lines a person, family can come to rescue and they are the people who would be there. But the trans community is deprived of this support too. They face family exclusion, poor relationships with their kins, domestic abuse and homelessness.[18]

This results in social anxiety, cynic sense, depression and alcohol and substance abuse. To escape from horrifying reality, they often get succumbed to drugs. Their state of being different and 'unnatural' is frowned upon by the society and that instigates the family to act this way. A surprising fact is that some of them have even been discriminated by LGB groups.[19] When a person is questioned and made unsure of what he/she feels, the confidence shatters. Discrimination breaks the soul; especially, when one cannot do anything about it. Distressed and diminished mental health of transgender individuals hinders their growth. Blunt comments, mocking and mean behaviour do not let them come out of their own shell. They live in their own small, congested world so as to feel safe.

SDG 8 and Workplace Discrimination

SDG 8 appeals for promoting inclusive and sustainable economic growth, decent and productive employment for all. But the LGBT community suffers workplace harassment too. They get through various forms of abuses such

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[18]Glick, J. L., Lopez, A., Pollock, M., & Theall, K. P. (2019). "Housing insecurity seems to almost go hand in hand with being trans": Housing stress among transgender and gender non-conforming individuals in New Orleans. *Journal of Urban Health*, *96*, 751-759. https://doi.org/10.1007/s11524-019-00384-y

[19]McCann, E., & Brown, M. J. (2021). Homeless experiences and support needs of transgender people: A systematic review of the international evidence. *Journal of nursing management*, *29*(1), 85-94, https://doi.org/10.1111/jonm.13163

as mean jokes, insensitive casual homophobic jokes, insulting references as to their sexual orientation and side lining at the workplace. Existing laws against workplace harassment like Equal Remuneration Act, 1976 and POSH Act, 2013 do not specifically account for the rights of LGBT people. Thus, there is no obligation to make inclusive workplace. Even anti-discrimination laws like Transgender persons (Protection of Rights) Act, 2019 are too weak to provide proper protection for private employees. These laws use gender specific language, require proof and certification of transgender status, and do not provide any kind of remedy in case of violations. Constitutional guarantee provided under Art. 16(2) is restricted to the public sector. Thus, Indian LGBT employees are left with no remedy when their rights are violated by private employers.[20] Workplace discrimination laws and maternity benefits do not include the LGBTQ persons.

LGBT workers often tend to hide their identities at workplace under the fear of being isolated. They also face micro aggressions at work, like hearing demeaning remarks about them or people similar to them. They are also a prey of sexual harassment at greater rate and more frequently than their heterosexual counterparts. Sexual orientation negatively affects their career advancement at work.[21] Such treatment affects economic contributions of LGBT community and results in lower productivity, unemployment and underemployment. It is because of this reason that they face poverty and marginalization. Social exclusion pushes them into dirty businesses like prostitution and sex work.

If they are discriminated at workplace, it leads to lower utilization of human capital as in this community there are skilled workers but then they are passed over in employment. Sometimes homosexuals are replaced with heterosexuals even if they are less skilled than the former as they seem 'normal' to the employers. In addition, even if there is no effect in wages or employment opportunities, harassment in workplace reduces their productivity as they are not able to contribute their hundred per cent to work disturbed by the discriminatory behaviour.

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[20] Devaprasad, A. (2020). Creating LGBT inclusive workplaces in India: The push for an anti- discrimination law. *Georgetown public policy Review*, https://gppreview.com/2020/10/05/creating-lgbt-inclusive-workplaces-india/

[21] Ellsworth, D., Mendy. A. (2020) *How the LGBTQ+ community fares at workplace,* McKinsey & Company, https://www.mckinsey.com/featured-insights/diversity-and-inclusion/how-the-lgbtq-plus-community-fares-in-the-workplace

One more issue for queer at work is wage gap. They are not safe at the workplaces as well. Key biases faced by the gender diverse workforce in their offices which varies from overt to covert from subtle ambiguous statements to blatant aggressive acts. This makes them anxious and depressed, which in turn can affect their productivity at work and harm their efficiency thus preventing their real abilities to come forward. Target 8.5 calls for decent work generation and full productive employment, with equal pay for equal work. But discrimination at workplace creates another reality on the face of truth.

FINDINGS: Let alone the question of implementation, Agenda 2030 of the Sustainable development goals fails to expressly provide space to the 'third gender' in its targets. This is certainly a big pitfall as an important community of the world which is continuously struggling for its rights through years, is not being addressed anywhere. SDG 4 regards education but includes only two sexes i.e., male and female. SDG 5 which specifically refers to 'Gender Equality' points out only 'women' to be put in equal footing as men, as if there is no other existing gender. SDG 5 has failed bitterly to even aim for a gender unbiased society. In SDG 10, Target 10.2 declares that there must be political social inclusion of all. It calls for ending any kind of discrimination on the basis of age, race, origin, sex, disability or other status. The term 'other status' may be construed to include the third gender. However, there is no clear indication. Talking about implementation, while SDG 3.8 states that medical facilities should be affordable to all, there are many AFAB (Assigned Female at birth) and AMAB (Assigned Male at birth) who are not able to afford a sex transition surgery to become what they wish. While SDG 8 calls out for an inclusive work environment and equal work pay, the picture is really bleak for the LGBT community.

DISCUSSION ON THE BASIS OF FINDINGS: First and Foremost, Transgender people should be given proper and clear space in the SDGs so as to set off the journey of recognizance of their rights at International level. School curriculum and school environment can be made more inclusive by including unbiased literature and writings. For the implementation part, Aids by nurses and other medic workers with should be given proper training to foster inclusive care and promote better family connections of gender diverse people. There must be inclusive workplace environment to boost the financial condition of third gender while promoting income equality.[22] Society must be made vigilant through campaigns and programmes around the world to eradicate the prejudices of common masses towards the said community.

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[22]Fontana, E., & Siriwichai, P. (2022). Understanding transgender persons' careers to advance sustainable development: The case of Trans for Career Thailand. *Sustainable Development*, *30*(6), 1573-1590, https://doi.org/10.1002/sd.2329

The welfare policies and foster care systems can build trust; create affordable and accessible healthcare services thus improving their mental health. More social connectedness and support lowered the rate of anxiety and depression. Friends are a significant source for this community. Mental health professionals should take help of families of gender non-conforming youth to provide gender affirming care.[23] There is relation between gender identity documents and mental health of gender non- conforming persons. Those who have changed their official documents in conformation with their identity had lower suicide risk than their counterparts who were unable to do so.[24] This shows that along with better health services the convenience of updating one's gender identity can help such individuals in improving their mental health.

Conclusion

We can gather that experiences of transgender community happen in many stages. First the inside struggle that they deal with, second the time they are isolated by their families, third when they are harassed at schools and workplaces and so on. This is certainly a class that suffers right from birth to last breath. Most of the countries are not doing very well on the healthcare services front. This has pushed many such persons to the abysm of isolation, depression and anxiety. Enough of men and women, this section of society has been left untouched till now. Even after declaration of UDHR, which is the touchstone of Human Rights for the whole world, the international statutes fail to make a gender inclusive society by only creating gender specific statutes. Still in the year 2023, we are lagging behind in achieving the set goals of 2030 Agenda. A problem discussed on national level may be termed as 'regional' but when it is discussed at the world platform and when we take into consideration the environment, the flora and fauna, when we talk about the whole world addressing the problems and discussing challenges coming in way of development, neglecting a major chunk of the population struggling for gender identification which if included would contribute to achieve the sustainable goals to the fullest, would be a major drawback from achieving a worldwide successful sustainability.

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[23]Tüzün, Z., Baºar, K., & Akgül, S. (2022). Social connectedness matters: Depression and anxiety in transgender youth during the COVID-19 pandemic. *The journal of sexual medicine*, *19*(4), 650-660, https://doi.org/10.1016/j.jsxm.2022.01.522
[24]DeChants, J. P., Price, M. N., Green, A. E., Davis, C. K., & Pick, C. J. (2022). Association of updating identification documents with suicidal ideation and attempts among transgender and nonbinary youth. *International journal of environmental research and public health*, *19*(9), 5016, https://doi.org/10.3390/ijerph19095016

ADVANCING SUSTAINABLE DEVELOPMENT THROUGH LEGAL INNOVATIONS IN DIGITAL IDENTITY AND SOCIAL MEDIA PRIVACY

Garima Chuphal* *Research Scholar, SSJ Campus, Kumaun University, Uttarakhand, India

Dr. D.K. Bhatt* **Dean (Law) SSJ Campus, Kumaun University, Uttarakhand, India

Abstract

In the fast-paced computerised age, India stands at the intersection of technological advancement and economic progress. As the country strives to achieve the United Nations' Sustainable Development Goals (SDGs) by 2030, it concurrently grapples with emerging challenges, including advanced identity and social media security. This article explores the intricate situation by examining the role of legal advancements in promoting both SDGs and digital securities in India. Utilising a multidisciplinary approach to planning Indian law, around-the-world viability benchmarks, and cyber ethics, this examines synergies that can be opened through well-crafted genuine frameworks. Real-life scenarios and court cases are analysed for the reasonable proposals of laws relating to computerised assurance and how they can be balanced with temperate progression. The country's burgeoning computerised system offers unparalleled openings and raises concerns over computerised identity and assurance. The paper emphasises that India has the one-of-a-kind potential to pioneer authentic changes because of secure computerised spaces and progress toward doable change. By highlighting the commonly valuable relationship between these two essential circles, the consideration offers critical information and propositions for policymakers, true blue experts, and accomplices committed to building a more secure and prudent future in India.

Keywords

Sustainable Development Goals (SDGs), Digital Privacy, Identity Theft, Legal Frameworks, Cybersecurity

1. Introduction

In a quickly globalising world, India stands out as a compelling consideration of contrasts and conceivable outcomes. Domestic to one of the world's most energetic populaces and a detonating computerised framework, the nation is balanced for transformative changes[1]. As the country seeks to attain a more impartial and economic future in arrangement with the SDGs, it concurrently navigates the complex landscapes of advanced character, information assurance, and social media security. Despite these significant challenges, they offer India an uncommon opportunity to lead in harmonising advanced administration and feasible improvement through innovative legal approaches.[2]

With the majority of its populace under the age of 25, the nation is overflowing with energetic vigour, undiscovered ability, and an unquenchable starvation for alteration. This energy is complemented by an ever-expanding computerised framework, counting broad portable phone utilisation and developing web infiltration. Whether it is agriculturists utilising apps to check climate figures and trim costs or youthful experts utilising advanced stages for further work, India's populace is progressively becoming more careful and adroit.[3] The complexity and scale of these challenges make India a perfect testing ground for inventive arrangements, especially within law and administration. The nation can set points of reference in computerised administration that may serve as models for other nations hooking with comparable issues. From creating enactments that secure personal protection while advancing innovative development to building systems that guarantee economic advancement, India has an opportunity to lead by case.

2. Literature Review

A substantial body of literature explores and advocates for the development of data protection laws in India, underscoring the need for comprehensive

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[1]Kumar, S., "Digital Identity and Sustainable Development Goals in India: An Analysis." Journal of Indian Law and Society 11(2), 67-89 (2020).

[2]Sharma, R. and Patel, A., "Legal Aspects of Aadhaar and Financial Inclusion." Indian Journal of Public Policy, 19(3), 245-263. (2021).

[3]Joshi, M., "Data Protection in the Age of Social Media: A Study on Indian Laws." International Journal of Law and Information Technology, 27(4), 346-362. (2019).

legal frameworks in the digital age.The Information Technology Act 2000 regularly serves as the beginning point for these dialogues. Researchers have critiqued the Act's viability in handling cutting-edge challenges like identity theft, information breaches, and online badgering[4]. The Personal Data Protection law, which is still under consideration as of the final upgrade, has also been considered for its potential to reinforce India's advanced security scene.[55]

Kumar, A. and Gupta, S., The Personal Data Protection Bill: A Step Forward or Backward. (2019).

Recently, a landmark verdict by the Supreme Court of India in the case of K.S. Puttaswamy v. Union of India affirmed the right to privacy as a fundamental right, thereby introducing a constitutional dimension to the discourse[6]. India's commitment to accomplishing the SDGs by 2030 has been talked about at length in both legislative reports and scholarly writing. Gupta and Vegelin (2016)[7] examine the administrative challenges that India faces in accomplishing the SDGs, whereas Joshi and Azam (2020)[8] give a comprehensive audit of India's performance across different SDGs. The centre frequently focuses on the foremost squeezing issues like destitution destruction, quality instruction, and sex correspondence. While each area— digital character, security laws, and maintainable development—is well-covered in personal capacities, there is a discernible hole in writing that investigates the crossing point of these spaces. Some crucial exceptions include the impact of digital identity in financial inclusion[9] and the possibility for IT laws to contribute to environmental sustainability. Discussions about how legal advancements can serve as a connection between digital security and sustainable development are relatively scarce . A paper authored by Singh and Dey (2021)[10] approaches this topic by examining how Aadhaar, India's unique identity initiative, could be employed for social welfare programs aligned with Sustainable Development Goals (SDGs).

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[4]Bhasin, T., Digital Privacy in India: A Long Road Ahead. (2018).

[5]Kumar, A. and Gupta, S., The Personal Data Protection Bill: A Step Forward or Backward. (2019).

[6]Mehta, A., Right to Privacy: Constitutional Perspectives in India. (2017).

[7]Gupta, R. and Vegelin, C., Sustainable Development Goals in India: Challenges and Opportunities. (2016).

[8]Joshi, R. and Azam, M., India's Progress in SDGs: A Comprehensive Review. (2020).

[9]Verma, R. and Tiwari, A., Digital Identity and Financial Inclusion in India.(2019).

[10]Singh, H. and Dey, S., Aadhaar and Social Welfare: Aligning with SDGs.(2021).

3. Legal Landscape in India: An Overview

India's complex legitimate design administers advanced personality and social media protection. In this quickly advancing field, the crossing point of law and innovation has required consistent upgrades and legal elucidations.[11] In this section, we explore the fundamental legal frameworks, directives, and notable precedents that define the terrain of digital identity and privacy in the realm of social media within the context of India

- The Information Technology Act, 2000 (IT Act),[12] serves as the primary legislation overseeing electronic data and digital identity This Act criminalises unauthorised access to computer information, identity theft, and the infringement of individual security. In the 2015 case of Shreya Singhal v. Union of India[13], a significant legal precedent was set, safeguarding freedom of speech in the digital realm. This pivotal decision resulted in the striking down of Section 66A of the IT Act, a provision that had faced widespread criticism for its perceived role in stifling freedom of expression on various social media platforms. The Court announced this arrangement as illegal, sending a solid message about the significance of safeguarding free discourse within the advanced age. This judgment is vital in setting the boundaries for legal state intercession within the computerised space and has become a rampart against a subjective decrease in online expression.

- Personal Information Protection Bill[14]: Despite not being sanctioned into law as of the most recent overhaul, it oversees the preparation of individual information by government and private substances. Motivated by the GDPR in Europe, this bill may be a game-changer for computerised protection in India. In the 2017 case of K.S. Puttaswamy v. Union of India[15], despite the absence of the Individual Data ProtectionAct, the Supreme Court's recognition of privacy as a fundamental right lays the foundation for the proposed legislation. This landmark case stands as a crucial legal reference point for shaping future laws concerning the protection of individual data.

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[11]Reddy, v., The Aadhaar Act: A Critique. Legal Studies Review of India,22(1), 12-33. (2020).
[12]Information Technology Act, 2000
[13]Shreya Singhal v. Union of India, (Writ Petition (Criminal) No. 167)
[14]Personal Data Protection Bill
[15]K.S. Puttaswamy v. Union of India, (Writ Petition (Civil) No. 494)

- The Aadhaar Act[16] provides a legal framework for the unique identification system known as Aadhaar, establishing a legitimate foundation for this distinct identification system. Even though initially conceived to streamline government advantage dissemination, Aadhaar has developed into an omnipresent shape of computerised character. In the case of Justice K.S. Puttaswamy (Retd.) v. Union of India (Aadhaar Case)[17], the legitimacy of the Aadhaar identification system was closely examined, with a fundamental connection to the Aadhaar Act, 2016. The Court maintained the framework for welfare dissemination but struck down a few segments that abused protection rights.

- The Consumer Protection Act, 2019[18]: while not exclusively focused on digital matters, it provides some safeguards related to data protection. This act holds companies accountable for deceptive advertisements, including those on social media platforms. In the case of Swami Ramdev v. Facebook Inc. (2019)[19], while the Consumer Protection Act of 2019 is not explicitly a digital law, it provides protections for consumers, potentially extending to users of digital platforms and services. The Swami Ramdev case, dealing with content removal from social media, can be interpreted in the context of consumers' rights to information and fair treatment, creating a potential connection to the Consumer Protection Act.

India's legal landscape regarding digital identity and social media protection is a dynamic paradigm in evolution. It is characterized by efforts to harmonize diverse constitutional rights and government interactions. The aforementioned laws and cases demonstrate that India has begun to implement substantial legal measures to safeguard digital spaces. However, the intersection of these laws with broader objectives such as sustainable development remains a relatively unexplored area, underscoring the need for further inquiry. By outlining the existing legal framework and landmark cases, this section establishes the groundwork for exploring the untapped potential of legal advancements in advancing digital security and sustainable development goals in India.

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[16]Aadhaar Act, 2016
[17]Justice K.S. Puttaswamy (Retd.) v. Union of India, (Writ Petition (Civil) No. 494)
[18]Consumer Protection Act, 2019
[19]Swami Ramdev v. Facebook Inc., (CS(OS) 27/2019)

4. Sustainable Development Goals: India's Commitment and Progress

As a signatory to the United Nations' Sustainable Development Goals (SDGs), India has committed to a comprehensive framework addressing a diverse array of challenges, including poverty, hunger, gender equality, and climate action, with the aim of achieving these objectives by 2030. This commitment reflects India's dedication to participating in a global effort towards building a more sustainable and equitable world. The nation has embraced an arrangement of authoritative and arrangement measures to realise these objectives[20]. This segment investigates India's commitment and advance towards SDGs, highlighting important laws and cases that serve as breakthroughs.

4.1 National Policy Frameworks

India embraces diverse strategies that underscore its dedication to sustainable progress and global aspirations

- National Action Plan on Climate Change (NAPCC)[21]and SDG 13 (Climate Action): The National Action Plan on Climate Change (NAPCC) serves as India's comprehensive framework for overseeing climate change issues and progressing naturally attainable improvement. The strategy is geared towards fundamentally addressing and alleviating the adverse effects of climate change, with a focus on eight key "national missions" encompassing solar energy, energy efficiency, and sustainable agriculture. This aligns closely with Sustainable Development Goal 13, which calls for urgent action to combat climate change and its impacts.

- Swachh Bharat Abhiyan (Clean India Mission)[22] and SDG 6 (Clean Water and Sanitation): Propelled in 2014, Swachh Bharat Abhiyan points to guaranteeing cleanliness and appropriate sanitation in India. The program aims to kill open defecation and oversee squandering viably, centring on behavioural alter as a pivotal component for accomplishing sanitation objectives. This activity adjusts precisely with

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[20]Verma, S. and Gupta, N., "Aligning Digital Identity with SDGs: A Case Study of Aadhaar." Journal of Sustainable Development Law, 10(2), 70-91. (2018).

[21]"Ministry of Environment, Forest and Climate Change, National Action Plan on Climate Change (NAPCC)".

[22]"Ministry of Drinking Water and Sanitation. Swachh Bharat Abhiyan: Clean India Mission. Government of India".

SDG 6, which guarantees the accessibility and maintainable administration of water and sanitation for all.

- National Health Policy, 2017[23] and SDG 3 (Good Health and Well-being): The 2017 National Health Policy aims to achieve comprehensive health coverage and provide high-quality healthcare services to everyone at affordable rates. It points to diminishing mortality rates, making strides in preventive wellbeing care, and prioritising wellbeing and wellness. This approach aligns with SDG 3, centring on guaranteeing great wellbeing and advancing wellbeing at all ages.

- Pradhan Mantri Jan Dhan Yojana[24] and SDG 1 (No Poverty) and SDG 10 (Reduced Inequality):

The Pradhan Mantri Jan Dhan Yojana is a financial inclusion program aimed at providing accessible and affordable access to financial services, including bank accounts, credit, securities, and benefits. By empowering more individuals, particularly those in marginalised communities, to get to money-related administrations, the program aims to lift individuals out of destitution and decrease budgetary disparity. This adjusts with SDG 1, which points to reducing destitution in all its shapes, and SDG 10, centered on diminishing disparities within nations.

These arrangements and activities outline how India works on numerous fronts to realise feasible advancement, regularly mirroring the points and goals of the joined nations' feasible advancement objectives. By tending to issues extending from climate change and sanitation to healthcare and monetary incorporation, India endeavours to create a more impartial and maintainable future for its citizens.

4.2 Relevant Laws

- The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013[25]: This act aligns with SDG 11 (Sustainable Cities and Communities) and SDG 15 (Life on Land) by advocating for a more equitable approach to land acquisition and compensation.

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[23]"Ministry of Health and Family Welfare. (2017). National Health Policy, 2017. Government of India.".
[24]"Ministry of Finance. Pradhan Mantri Jan Dhan Yojana. Government of India".
[25]The Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013

- The Forest Rights Act, 2006[26]: This law engages nearby communities to oversee and preserve woodlands, contributing towards accomplishing SDG 15 (Life on Arrival).

- The Companies Act, 2013[27]: Section 135 of the Companies Act orders Corporate Social Responsibility (CSR) investing in a roundabout way, advancing SDG 8 (Good jobs and economic growth).

India has appeared to have a committed approach towards accomplishing the SDGs through plenty of laws, arrangements, and legal intercessions. Whereas advances have been made in particular segments like well-being, sanitation, and money-related inclusion, there is a need to look at how these systems can be advanced and optimised to serve the double purposes of feasible improvement and digital protection. As India progresses towards a more digitally connected governance model, the convergence of sustainable development and digital identity and privacy holds untapped potential for comprehensive advancement.

5. Positive Relations and Synergies

Recognizing the anticipated advantages and positive correlations between sustainable development and digital identity and privacy can unveil innovative solutions and advancements within legal frameworks. Both zones, regularly seen as discrete and now and then indeed clashing, have undiscovered synergies that quicken India's advance in different segments.[28]

- The synergy between the Pradhan Mantri Jan Dhan Yojana and the Aadhaar Act can collectively enhance legal frameworks. While Aadhaar provides a distinctive identification, Jan Dhan aims to extend banking services to every citizen. This collaboration aligns with SDG 1 (No Poverty) by enabling improved delivery of public services and welfare benefits directly to recipients, thereby reducing fraud and systemic inefficiencies. Additionally, it underscores the importance of aligning such initiatives with privacy laws to ensure the protection of individual data and rights.

- The synergy between various legislations on protection of women rights and the proposed Personal Information Protection laws can

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[26] The Forest Rights Act, 2006
[27] The Companies Act, 2013
[28] Chatterjee, A., "Social Media, Privacy, and Legal Systems in India." Indian Journal of Cyber Law Studies, 3(1), 15-40. (2021).

establish a cohesive framework, ensuring confidential reporting and safeguarding the personal information of victims.This positive connection underpins SDG 5 (Gender Equality) and secures the protection and respect of ladies, making work environments more secure and comprehensive.

- The National Action Plan on Climate Change (NAPCC) could incorporate advanced secure and data-protected measures under the Information Technology Act and the proposed Data Protection Act. Digital solutions may expedite climate monitoring, disaster response, and public engagement, thereby contributing to SDG 13 (Climate Action).

- The National Health Policy aims for widespread healthcare coverage and can be enhanced by robust digital protection laws to safeguard electronic health records. This partnership contributes to achieving SDG 3 (Good Health) by promoting more efficient and confidential patient care

- Digital identity systems, such as Aadhaar, could be integrated into online dispute resolution mechanisms. These systems need to be designed in accordance with data protection laws. This directly aligns with SDG 16 (Peace, Justice, and Strong Institutions) by enhancing the efficiency and accessibility of justice delivery.

By investigating the synergies between feasible improvement objectives and lawful frameworks around computerised personality and social media security, India has the opportunity to pioneer a demonstration of administration that's both dynamic and all-encompassing.[29] These synergies might open unused pathways for arrangement development, showing a win-win situation that addresses both quick social needs and long-term supportability. The positive relations and synergies demonstrated considerable room for adjusting legitimate advancements in advanced security and character with the overarching points of economic improvement. Recognising these connections is the primary step in making coordinate arrangements that serve different purposes.

6. Case Study

To gain a more practical understanding of the synergies between Sustainable

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[29]Menon, R. and Ahuja, V., "The Role of Digital Identity in Sustainable Urban Development: A Focus on Smart Cities" Journal of Urban Sustainability, 7(2), 120-135. (2019).

Development Goals (SDGs) and legal frameworks in digital identity and social media protection, this section introduces a series of case studies. These real-world examples provide insights into the potential advantages, obstacles, and optimal practices for aligning these two domains. India's identification system, Aadhaar, has played a pivotal role in enhancing financial inclusion through the Pradhan Mantri Jan Dhan Yojana. The landmark judgment in Equity K.S. Puttaswamy (Retd.) vs Union Of India[30] by the Supreme Court had significant implications for the validity of Aadhaar, particularly in the context of financial inclusion.

- Legal Framework: The Aadhaar Act of 2016 ensures the secure collection and storage of biometric and demographic data, while the Jan Dhan program utilizes this identity verification for opening bank accounts

- Alignment with SDGs: Primarily aligned with SDG 1 (No Poverty) and SDG 10 (Reduced Inequalities).

- Outcomes: The integration has streamlined benefit transfers, reduced fraud, and increased financial literacy among marginalized populations.

- Challenges: Challenges include concerns about information security and the potential misuse of Aadhaar data for surveillance or profiling

CONCLUSION

The intricate interplay between Sustainable Development Goals (SDGs) and legal frameworks governing digital identity and social media protection presents a compelling avenue for exploration and innovation. As India strives towards an economic future, these distinct domains emerge, mutually reinforcing when viewed through a more integrated lens. The convergence of these areas holds the potential to expedite the attainment of various SDGs, ranging from poverty alleviation to gender equality and climate action. Financial inclusion, for example, significantly benefits from a secure and ubiquitous digital identity system, as demonstrated by the synergy between the Aadhaar framework and the Pradhan Mantri Jan Dhan Yojana. Moreover, information security laws can act as enablers, securing helpless bunches from abuse while also contributing to SDGs like Gender Equality and Good Health and Well-Being. Strategies such as National Health Policies, various laws safeguarding women's rights, and the anticipated Personal Data Protection Act, among others, serve as promising

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[30]Justice K.S. Puttaswamy (Retd.) v. Union of India, Writ Petition (Civil) No. 494

examples of how legislation can propel both sustainable development and digital security.

However, it's crucial to emphasize that the dynamic nature of both sustainable development and digital technologies necessitates continual vigilance and adaptability. As technology progresses, the challenges associated with privacy and identity will also evolve, demanding a continuously adjusting set of legal instruments and frameworks. The dual focus on sustainable development, digital identity, and privacy is both a commendable academic pursuit and a crucial practical necessity. Legal advancements in these areas could establish a precedent not only for India but also for other nations striving to align human progress with digital transformation. Therefore, policymakers, legal scholars, and all stakeholders involved have a distinct opportunity to shape a future that is both sustainable and digitally secure.

INVESTIGATING THE CONTRIBUTIONS OF GEOGRAPHICAL INDICATIONS (GI) TOWARDS SUSTAINABLE DEVELOPMENT OF A REGION: OVERVIEW AND INSIGHTS FROM MUGA SILK GI OF ASSAM

Ipsita Kaushik* *Research Scholar, Department of Law, Gauhati University

Prof. Subhram Rajkhowa** **Professor, The University of Science and Technology, Meghalaya

Abstract

The Muga Silk Geographical Indication (GI) of Assam can play an important role in the long-term growth of Assam if properly institutionalized. The GI-tagged Muga Silk of Assam has the full potential to become an effective marketing tool as it facilitates local producers to stand out and differentiate their products in the market. Moreover, GI provides a competitive advantage to the authorized users because of the trust of the customers they acquire regarding quality, origin, and other related attributes which give them a better price. Moreover, the GI protection of Muga also contributes to the protection of the 'traditional knowledge' of the local indigenous people of Assam which they have adopted while producing Muga Silk to get a better result. Traditional knowledge is an intangible asset for the producer community which requires protection and Geographical Indication can be a useful instrument to protect the same. The GI-registered Muga Silk of Assam also helps in the protection of the environment and the socio-cultural identity of the Assamese people.

However, the recognition and registration of Muga Silk as a Geographical Indication of Assam is only a means to achieve the benefits of Geographical Indication, not an end. Post-GI mechanisms are equally important to unfold the benefits of Geographical Indication.

Keywords

Muga Silk, Geographical Indication, sustainable development, TRIPS

1. Introduction

Silk "The Queen of Textile" has always been an indispensable part of the life and culture of India. The Silk Industry of India occupies a predominant position in the world being the second-largest producer of silk after China. India produces four varieties of silk: Mulberry, Eri, Muga, and Tasar silks and India has a monopoly in the Muga Silk production which is produced only in the Bramhaputra Valley of Assam[1].

Sericulture activities have been practiced in Assam since time immemorial. Assam contributes 95% and 65% of the country's total Muga and Eri production respectively. Muga Silk is one of the many nature gifts to Assam which is endemic to Assam. Muga silk has various distinguishing characteristics such as colour stability, durability, UV Ray resistance, acid resistance (resistant to concentrated Sulfuric acid), eco-friendly, etc. Muga Silk produced by *Antheraea Assama* silkworm is produced only in Assam. The people of Assam have been carrying out the production of Muga Silk since time immemorial which finds mention in the *Arthashastra* by Kautilya dating back to 321 B.C. The scientific name of Muga silk (*Antheraea assama*) also shows its origin. The Muga Silk of Assam received Geographical Indication in the year 2007 and the "Muga Silk of Assam" Logo was registered in 2013.

The Geographical Indication (GI) is a form of intellectual property right that indicates the product's geographical origin and designates the quality, reputation, and other characteristics of the product derived from its geographical environment. To obtain Geographical Indication, there must be a close triple association among the product, place of origin and quality, reputation, and other characteristics-related attributes.

A product originating from a particular geographical region acquires quality, reputation, and other characteristics essentially attributable to its geographical origin, and because of the close association with its geographical place of origin, the product eventually becomes "Exotic". A particular product acquires exoticness primarily because of its non-replicable quality, reputation, or other characteristic attributes derived from its place of origin. Products may also acquire exoticness from the history and tradition associated with the production processes prevalent in the specific geographical areas from which the products originate. Over time, these geographical indications become valuable assets

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[1]Chowdhury, N. R., "Socio-Economic Problems of Muga Silk Weavers of Sualkuchi Silk Industry" International Journal of Scientific & Technology Research 8(9), 595–601 (2019).

for the local producer community because they enable the producers to obtain a better market price for the products. Moreover, Geographical Indication enables the local communities to turn their long-standing, collective, and patrimonial knowledge into viable means of livelihood and income generation. Geographical indications can thus be key in developing strong collective brands for origin-linked quality products. Geographical Indication can also bring competitive advantage, added value to the product, niche market for local producers, and increased export opportunities. Thus, Geographical Indication becomes an intangible asset for the producer community[2].

2. Role of Muga Silk GI in Sustainable Growth and Development of Assam: An Analysis

Geographical Indication plays a vital role in the sustainable growth and development of designated regions. The concept of 'sustainable development' was described by the 1987 Bruntland Commission Report as the development that serves the requirements of the present without jeopardizing future generations' ability to meet their own needs. There are four dimensions to sustainable development: "Society," "Environment," "Culture" and "Economy" which are intertwined and not separate. Sustainability is a paradigm for thinking about the future in which environmental, societal, and economic considerations are balanced in the pursuit of improved quality of life.

Since time immemorial, the Silk Muga has played a pivotal role in the socio-economic progress of Assam. The GI-tagged Muga of Assam has the potential to become an effective marketing tool as it enables local producers to stand out and differentiate their products in the market. Since Muga Silk is endemic to Assam and its ecological requirements are found only in its natural abode and hence it is non-replicable. The role of Muga Silk in the sustainable growth of Assam can be discussed hereunder-

2.1 Contribution to Rural Economy:

Both producers and consumers can profit significantly from geographic indication once it is protected. Firstly, it protects the interests of genuine producers and dealers, particularly those who are a part of traditional local communities that are economically underprivileged, by eliminating unfair competition, commercial abuse, and unauthorised use[3]. Furthermore, Geographical Indication boosts

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[2]Buch, N and Trivedi, H, I Geographical Indication of Indian Handlooms(Routledge, 2022)

[3]Dewalt, B. R, "Using Indigenous Knowledge to Improve Agriculture and Natural Resource Management" Human Organization 53(2), 123–131 (1994)

local producers' trust by assuring buyers of the product's quality, origin, and other important characteristics. This enables them to command better prices. Additionally, it assists in addressing potential market failures caused by information asymmetry between buyers and sellers, resulting in a more open and knowledgeable market.[4] When consumers purchase a product with a GI label, they can trust that it genuinely comes from the designated region. This assurance helps to prevent consumers from falling victim to counterfeit or misleading marketing practices that might otherwise deceive them. Consumers can be assured that products with a GI label meet these standards and are of high quality. This helps the producers to build trust among the customers.

Muga industry is a high-income generating sector that is valued as a key tool for Assam's economic growth. Muga sericulture generates livelihood for different stakeholders such as silkworm seed producers, farmers cum rearers, reelers, twisters, weavers, spinners of silk waste, traders, etc., who are associated with the Muga silk production through different interdependent and specialised operations. With Muga Sericulture, more than 30,000 households from all around Assam are involved. Most of them work as small-scale farmers and run household businesses in rural areas. Muga sericulture is ideal for small-scale producers since it offers numerous chances for revenue generation, little initial investment, high returns, and a short gestation period.

2.2 Protection of 'Traditional Knowledge':

Traditional knowledge refers to the knowledge and customary practices of the indigenous or local community that have evolved over time, been handed down through generations, and are still used by the community today. Since geographical indication protects knowledge and practices in existence in close association with its place of origin and grants the entire community rights over the knowledge, it has become a potential tool for preserving traditional knowledge.[3] Moreover, the protection given under Geographical Indication allows the traditional knowledge to remain in the public domain and the same can be protected in perpetuity.

Muga Silk production is an age-old traditional practice associated with the indigenous people of Assam. The Local indigenous Muga producers adopt different traditional practices and methods which play an important role in Muga sericulture. For example- Muga farmers gracefully apply their traditional wisdom to determine the most suitable host plants for rearing the exquisite

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[4]Rout, T. K and Majhi, B., I WTO, TRIPS and Geographical Indication (GIs) (New Century Publications., 2014).

Muga silkworms. With a keen eye, local Muga farmers have classified Som plants into four enchanting categories known as *Naharpatia, Ampatia, Jamupatia,* and *Kathalpatia*, wherein *Naharpatia* holds the supreme position. Seasoned Muga farmers can identify the preferred variety of Som plants simply by tasting the leaves, as they believe that the suitable leaves possess a delightful sweetness[5]. Alongside, there are a myriad of traditional beliefs and practices embraced by Muga silk rearers during the seed selection process. A popular Assamese proverb, "*Namonir sonch ujanir goch,*" imparts the wisdom that seed cocoons nurtured in the lower Brahmaputra valley and reared in the upper Brahmaputra valley ensure a bountiful harvest. Traditional rearers often select seeds based on observations of larval colour, size of larvae and cocoons, movements, and the gentle touch of the larvae's tubercles. Larger larvae and cocoons are believed to possess a remarkable adaptiveness, surpassing their smaller counterparts. Male larvae form cocoons that are smaller and smoother compared to those created by female larvae. Notably, when these superior seed cocoons are placed in *Chokori Pera*, a bamboo cage, after collection, they emit a loud sound, distinguishing them from their inferior counterparts[6]. Countless instances of traditional knowledge and practices adorn every stage of Muga Silk production, reflecting the profound expertise of its producers.

2.3 Protection of Environment:

Geographical Indication (GI) serves as a powerful tool in identifying products that originate from unique geographical regions from where their exceptional quality, reputation, and distinct attributes are inherently acquired. The profound connection between GI-branded goods and their terroir, encompassing both natural and human elements, bestows upon producers and other stakeholders the responsibility to safeguard the integrity of the natural resources that contribute to their production[7].

The Muga culture has a very close relationship with the environment. The Muga culture encompasses a comprehensive range of interconnected

[5]Sharma, M., Rahman, S., et.al., "Traditional Practices and Terminologies in Muga and Eri Culture." Indian Journal of Traditional Knowledge, 9(3), 448–452. (2010).

[6]Chakravorty, J., Gogoi, M., et.al., "Cultural Attributes and Traditional Knowledge in Connection with the Rearing of Muga (Antheraea Assama = Assamensis) in the Dhemaji District of Assam, North-East India." Journal of Insect Biotechnology and Sericology, 84, 17–28. 84, 17–28. (2015).

[7]Blakeney, M. L., "Geographical Indications and Environmental Protection. Frontiers of Law in China, 12(2)" Http://Dx.doi.org/10.3868/S050-006-017-0011-9. (2017).

practices, including the cultivation of food plants, the rearing of silkworms, the process of unraveling the silk filament from the cocoons through reeling, the creation of yarn, and the intricate weaving and fabric processing techniques. These various elements collectively contribute to the rich tapestry of the Muga culture. In Assam, the 'Som' and 'Soalu' trees play a vital role as the primary food source for Muga silkworms, which yield lustrous golden silk. Additionally, there are several other food plants available for Muga silkworms, such as Digloti, Mejankari, Bogori or ber, Champa, Bhomloti, Patihonda, Gamar, Panchapa, Katholua, Gansarai, Bojramoni, and more. These plant species are categorized as primary, secondary, and tertiary food plants based on the silkworms' feeding preferences. The favourable conditions for the growth of Muga silkworm food plants in Assam include high rainfall, humidity, and warm climatic conditions[8].

The production of Muga Silk is directly influenced by the environment, fostering a sense of environmental stewardship among policymakers, local producers, and the government to conserve the natural habitat of Muga silkworms and their host plants. The responsible utilization of natural resources and genetic resources, as well as the preservation of the terroir's biophysical attributes linked to the distinctive qualities of the products, becomes the shared responsibility of local producers and other stakeholders which contributes to preserve the biodiversity of the region. This collective effort aims to ensure sustainability and conservation practices are upheld for the benefit of present and future generations.

2.4 Protection of 'Cultural Integrity':

The tangible manifestations of "traditional cultural expressions," also known as "expressions of folklore" and "traditional know-how," encompass a wide array of artistic forms, including art, portrayals, designs, portraits, statues, figures, pottery, mosaic, woodwork, jewelry, handloom-handicrafts and more. If these expressions bear a connection to the cultural practices of a community, influencing their creation, they may be eligible for protection under geographical indication. Geographical indication safeguards the enduring traditions and culture of a community, preserving its identity that could otherwise diminish with the passage of time.

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[8]Das, N., "Impact of Muga Silk (Antheraea Assamensis) on Community Livelihood in the Brahmaputra Valley of Assam-India." American Journal of Environmental Protection, 10(3), 59–65. (2021).

Assam serves as a vibrant union point for a multitude of cultures and traditions. Muga silk of Assam is a cultural heritage of Assam. The women of Assam wear "*Mekela-Chador*" a two-piece traditional attire made from Muga silk at their wedding, Bihu festival, or on other special occasions. Even the male member of the society wears dresses made from Muga silk during the Bihu festival or on other special occasions. Even during Ahom kind Muga attires were worn by the king and other government officials and used it as their status symbol. Thus, the recognition of Silk Muga as the geographical indication of Assam shall also protect the cultural pride of the people of Assam. Thus, GI-registered Muga Silk of Assam will indicate its close relationship with the culture of Assam which may lose its identity if not protected.

3. Results and Findings:

To assess the contributions of the Muga Silk industry and to understand the performance of GI of Muga particularly in the rural economy and protection of the environment, the researcher has collected data from the years 2005-2006 to 2021-22 from the Directorate of Sericulture of Assam through RTIs. Its analysis is as follows-

Table 1: The Annual Turnover (in lakh) of Muga Silk

Year	Annual Turnover (Projected) in Lakh	Growth
2005-2006	3715.00	
2006-2007	3638.00	-2%
2007-2008	3718.00	2%
2008-2009	4873.25	31%
2009-2010	6675.00	37%
2010-2011	9204.00	38%
2011-2012	11742.40	28%
2012-2013	10716.35	-9%
2013-2014	4992.75	-53%
2014-2015	5626.50	13%
2015-2016	5926.72	5%
2016-2017	17247.30	191%
2017-2018	20267.50	18%

2018-2019	29359.00	45%
2019-2020	31590.12	8%
2020-2021	33396.70	6%
2021-2022	37525.04	12%

Source: Directorate of Sericulture, Assam

In respect of the "annual turnover" of Muga Silk from the year 2005-2006 to 2021-2022 an upward trend has been observed with a CAGR of 14.57%. 13 out of 16 years have seen a positive Y-o-Y growth which indicates an encouraging impact of GI in the sales and turnover.

Table 2: Income (Rs.) Trend of Muga Silk Producers

Year	Income of Producers	Growth
2005-2006	13,080	
2006-2007	12,750	-2.5%
2007-2008	13,080	2.6%
2008-2009	17,300	32.3%
2009-2010	20,533	18.7%
2010-2011	28,125	37.0%
2011-2012	30,400	8.1%
2012-2013	38,600	27.0%
2013-2014	35,800	-7.3%
2014-2015	39,900	11.5%
2015-2016	49,000	22.8%
2016-2017	49,600	1.2%
2017-2018	58,100	17.1%
2018-2019	66,580	14.6%
2019-2020	87,000	30.7%
2020-2021	87,750	0.9%
2021-2022	100,600	14.6%

Source: Directorate of Sericulture, Assam

In respect of the "income of the producers" of Muga Silk from the year 2005-2006 to 2021-2022 has also seen steady growth barring a few years. A CAGR of 12.75% has been observed over the years with a positive Y-

o-Y in 14 out of 16 years. This also indicates a positive impact of GI on the income of producers.

Table 3: Direct Employment Generated by Muga Silk Industry

Year	Direct Employment	Growth
2005-2006	745500	
2006-2007	770400	3%
2007-2008	724200	-6%
2008-2009	676000	-7%
2009-2010	640800	-5%
2010-2011	763740	19%
2011-2012	822240	8%
2012-2013	785750	-4%
2013-2014	318750	-59%
2014-2015	275740	-13%
2015-2016	321824	17%
2016-2017	801540	149%
2017-2018	764870	-5%
2018-2019	990660	30%
2019-2020	1013270	2%
2020-2021	1026000	1%
2021-2022	1063050	4%

Source: Directorate of Sericulture, Assam

Similarly with respect to "direct employment" generated by Muga Silk Industry from the year 2005-2006 to 2021-2022, though the number of direct employments has seen peaks and valleys, the overall CAGR has been 2.11% showing improvement over the years.

In Assam, the '*Som*' and '*Soalu*' trees play a vital role as the primary food source for Muga silkworms, and massive plantations of Som trees and other secondary host plants can improve the biodiversity in the area and prevent afforestation.

Table 4: Plantation of Host Plants of Muga Silk

Year	No. of Host plant	Growth
2005-2006	4390750	
2006-2007	4735476	8%
2007-2008	4737476	0%
2008-2009	4748100	0%
2009-2010	5869360	24%
2010-2011	5897096	0%
2011-2012	6026400	2%
2012-2013	6326264	5%
2013-2014	6539400	3%
2014-2015	6405120	-2%
2015-2016	6565428	3%
2016-2017	6500450	-1%
2017-2018	7063750	9%
2018-2019	5859000	-17%
2019-2020	5427090	-7%
2020-2021	5978500	10%
2021-2022	6177600	3%

Source: Directorate of Sericulture, Assam

The information collected from the Directorate of Sericulture of Assam through RTIs in respect of the plantation of the host plant of Muga from the year 2005-2006 to 2021-2022 reveals that the plantation of the host plant of Muga silk are increasing with a CAGR of 2.03% which will have a positive impact on the environment and the overall production of Muga Silk.

4. Discussion and Suggestions

4.1 Performance of Muga Silk GI:

The data collected from the Directorate of Sericulture, Assam shows that the annual turnover of the Muga Silk industry since 2006 is progressing which indicates a positive impact of Muga Silk GI on market recognition, consumer acceptance, revenue generation, and increasing sales, and turnover. Moreover, the income of local Muga Silk producers is also increasing which affirms

that producers are getting premium prices for their origin assured, quality products. Consumers are ready and willing to pay higher prices to the local producers as GI assures them that they are buying products with unique characteristics attributable to Assam only. Another important parameter of rural economic development is employment generation. The Muga silk production involves different stages and procedures that require skilled hands. There are five stages involved in the production of Muga Silk which includes the Degumming of fiber with alkali extracted from the seeded banana tree (Bheem kol) typical to Assam, hand reeling, winding, warping, and weaving. Muga Silk production can generate various direct and indirect livelihood means. The data collected from the Directorate of Sericulture also indicates that "direct employment" generated by the Muga Silk Industry is also showing improvement over the period. Muga Silk production is also very closely connected with the environment. The Muga silkworm is fed on the leaves of food plants, particularly on *Som* (Machilus odoratissama) and *Soalu* (Teranthera monopetala). Increasing cultivation of Muga food plants over a period of years will improve the biodiversity of the region and prevent afforestation. Thus, it can be said that Muga Silk GI can be an effective legal vehicle for the region's sustainable growth and development. As it provides local producers a competitive advantage and niche market, protection of consumers, environment, traditional knowledge, and cultural integrity of the community.

However, to achieve the desired outcome equal emphasis on post-GI initiatives is important. In respect of Muga GI, the number of beneficiaries is negligible considering the total number of producers involved in Muga Sericulture. Producers of Muga Silk are not aware of the GI status of Muga Silk and its associated benefits which is evident from the fact that the number of registered "authorised users" of Muga Silk GI till 2022 is only 287. Moreover, being the first Geographical Indication from the State the performance of Muga Silk at national and international markets is not satisfactory. Moreover, the Muga Sericulture industry of Assam is also unorganized resulting in diverse marketing agencies[9]. Due to the absence of a proper supply-chain management system in the Muga silk industry and the existence of a large number of middlemen in marketing, it is observed that primary producers and weavers do not get their due profits.[10] Moreover, the golden Muga Silk is largely

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[9]Khakhlari, P., "Silk Products and Marketing Strategy of a Weaving Industry in Assam." Humanities & Social Sciences Reviews, 8(2), 91–101. (2020).

[10]Baruah, S., "Assam Silk Market: Problems and Probable Solutions." International Journal of Innovative Research in Science, Engineering and Technology, 5(7). (2016).

adulterated by mixing Muga yarn with local and Chinese tassar silk or tassar-like polyester during weaving, camouflaging the product as original Muga silk. In the markets of Delhi, Jharkhand, Bihar, UP, and others silk Known as 'Moonga' silk is floating. Further on many websites 'Moonga' silk is advertised by using pictures of traditional Muga silk attires and misguiding the customer to believe it as authentic Muga silk. These practices are affecting the image of Muga silk.

Registration of GI is a means, not an end. The success of GI depends equally on the post-GI initiatives which seem to be negligible in respect of Muga GI of Assam. Creating awareness among stakeholders, branding, promotion and advertisement, product diversification, skill upgradation, design upgradation, quality monitoring, watchdog mechanism, fighting legal battles, etc., plays an important role in the success of a particular GI.

4.2 Inconsistencies in Legal Protection of Geographical Indication and Its Impact on Regional Products:

The TRIPS Agreement is the first multilateral agreement that has recognized and defined geographical indication as an intellectual property right for the first time. However, under the TRIPS agreement, a dual level of protection is granted to geographical indication depending upon the category of product. Only wines and alcoholic beverages are granted an advanced level of protection, whereas all other recognized products are granted only a basic level of protection. Article 22(2) of the TRIPS Agreement requires all WTO members to implement effective legal measures for geographical indications to enable any aggrieved party to pursue legal action if the use of a false geographical indication constitutes unfair competition or misleads the public about the product's true origin. However, if a product has a false geographical designation listed alongside its real place of origin, it can be difficult to prove that consumers were misled. For instance, a Kenyan tea manufacturer may decide to use the prestige of "Darjeeling" on their packaging to profit from the demand for "Darjeeling Tea" while also mentioning the true origin, "Kenya," albeit in a less noticeable manner.

However, regardless of whether the product's true origin is disclosed on the label, Article 23 offers an even stronger level of protection for wines and spirits by expressly prohibiting the use of any words that might be interpreted as having a connection to a well-known geographical indication or the fabrication of geographical indications. The use of "Indian Champagne" or "Champagne-like wine from India," for example, is prohibited by Article

23, regardless of whether such use amounts to unfair competition or deceives the public. Consequently, Article 23 offers complete and unqualified protection.

Since Geographical Indications have been given different degrees of protection under the TRIPs Agreement wine and spirits, for example, have a higher standard than other products, developing nations with abundant natural resources, agriculture, handicrafts, and handlooms face difficulties in realizing the full commercial potential of GIs. A more equitable approach is required due to the shortcomings of the current GI protection regime, which emphasizes that GIs for all products should be treated equally with trademarks, copyrights, and other intellectual property rights.

A product's place of origin confers distinctive features, whether they are the result of human skill or natural forces. Geographical origin becomes equally significant for all products due to these attributes, which confer a clear commercial advantage. Therefore, it is unreasonable to treat wines and spirits differently from other GIs, especially considering the possible economic gains that developing nations can experience from GI protection for their wide range of products.

Geographical Indication Act, 1999 of India is mere compliance with the TRIPS Agreement. Although the Central Government has the power to grant certain products or classes of products extended protection like that afforded to wine and spirits, the other WTO members are not bound to ensure Article 23 level of higher protection for the products recognized by the Central Government of India thereby it proves to be inefficient in the international arena. Therefore, to leverage maximum benefit out of the geographical indication instrument for all products without any discrimination it is first necessary to address the anomalies present in the TRIPS agreement.

Conclusion

Geographical Indication can bring sustainable growth to the designated geographical region with proper enforcement mechanisms. Being a collective right Geographical Indication enables the producer's community to use the tag as a marketing tool to differentiate their product in the market, assure origin, and guarantee the quality, reputation, and other characteristics of the product which it has derived from its place of origin. The economic success of the Geographical Indication of products depends on the demand for those products and the willingness of consumers to pay a premium price. The registration of geographical indication alone would not be helpful in this regard. Rather extensive post-registration strategies are required. However, such

post-registration initiatives are often neglected due to which geographical indications have not yielded many benefits. Therefore, for a geographical indication to be successful, it must be backed by post-registration strategies.

Through the decades, the Muga Silk culture of Assam has been practiced and preserved as a traditional practice. Muga sericulture not only supports its local economy by providing a source of income for local people in Assam, but it also helps to preserve and promote the state's rich cultural legacy. Muga Silk GI is the first geographical indication from the state of Assam. Muga Silk GI indeed helps the local indigenous producers to market their products as it enables the local producers to ensure the origin, quality, and other unique characteristics attributable to its geographical origin. This helps the local producers to stand out in the market and attract premium prices. Muga Silk GI also protects customers from deception and misleading market practices. Muga Silk GI is a potential tool to protect and preserve the associated traditional knowledge of Muga sericulture and the cultural integrity of the Assamese community.

Although Muga Silk GI has the potential to bring sustainable development to the region, even after many years since its registration, it has failed to achieve the right place in the national and international market because of less emphasis on post-registration initiatives. Government authorities, registered proprietor, right holders, and other stakeholders should give equal attention to the creation of awareness both among producers and consumers, brand building, promotion and advertisement, product diversification, design upgradation, quality monitoring.

EXAMINING LEGAL APPROACHES AND CHALLENGES IN ADDRESSING ECOCIDE IN INDIA: A CRITICAL ANALYSIS

Pallavi Lakhera*

*Assistant Professor School of Law and Public Policy, Avantika University, Ujjain (M.P.)

Abstract

This legal research paper aims to delve into the pressing issue of ecocide in India, focusing on the legal frameworks, challenges, and potential solutions to address and prevent widespread environmental destruction. The paper will critically analyse the existing legislative and regulatory mechanisms, international treaties, and case law related to ecocide in the Indian context. By examining the effectiveness of these measures, this research seeks to provide insights into the feasibility of introducing specific legal provisions to combat ecocide within the Indian legal system. The paper will also explore the implications of recognizing ecocide as an independent offense and its potential to serve as a deterrent against large-scale environmental harm.

Keywords

Ecocide, Environmental Law, Legal Framework, India, Biodiversity, Environmental Destruction, Criminal Liability

1. Introduction

Inherent within Earth's system are instances of severe climate and weather-related upheavals. However, with the ongoing planetary warming, these occurrences are demonstrating heightened frequency and amplified intensity. This escalation knows no geographic bounds; continents worldwide experience the ravages of heatwaves, droughts, typhoons, and hurricanes. Presently, a staggering 90% of catastrophic events are attributed to weather and climate dynamics, contributing to an annual financial toll of 520 billion USD on the

global economy. Alarmingly, these incidents are exacerbating poverty, propelling 26 million individuals into the depths of destitution.[1]

On March 20, 2023, the scientists of the Intergovernmental Panel on Climate Change (IPCC) conveyed a stark and definitive message regarding the climate crisis. This proclamation came through the final installment of the sixth assessment report (AR6), a culmination that is likely the conclusive effort of its kind as long as an opportunity still exists to curtail the ascent of global temperatures to a 1.5 degree Celsius increase above pre-industrial levels. This threshold stands as the pivotal demarcation beyond which our detrimental impact on the climate assumes an irreversibly rapid trajectory. The report underscores the unmistakable reality that humanity's present actions wield the power to profoundly reshape the planet's trajectory for countless generations to come.

Today, the world is experiencing record-breaking hurricanes in California and catastrophic drought in East Africa, among other regions. The report predicts that by the 2030s, as temperatures continue to rise, climate hazards will increase globally, with countries facing more debilitating heat waves, worsening coastal inundation, and agricultural failures. In addition, the report states that mosquitoes carrying diseases such as malaria and dengue will migrate to new regions. According to the IPCC report, this decade is the "make or break" decade. The present situation, according to UN Secretary-General António Guterres, is a red alert for humanity. The actions we take in this decade will determine whether we leave future generations a habitable planet or not.[2] There has never been a more appropriate time to advance the criminalization of large corporations' and multinationals' crimes against nature on a global scale. Ecocide is one of these offenses and the most heinous. Ecocide, defined as the extensive damage, destruction, or loss of ecosystems and their inhabitants, has emerged as a global concern due to its far-reaching ecological, social, and economic implications.

This paper proceeds with an exploration of international perspectives on ecocide, showcasing notable case studies and outcomes to underscore the potential consequences of unchecked environmental destruction. It delves into the challenges that hinder the effective prosecution of ecocide-related offenses, such as the burden of proof and jurisdictional complexities.

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[1] "United Nations. (N.D.). the Climate Crisis– a Race We Can Win"
[2] Plumber B., "Earth to Hit Critical Global Warming Threshold by Early 2030s." The New York Times. (2023).

Furthermore, the paper presents potential legal reforms and solutions that could be adopted to address ecocide, considering lessons from international jurisdictions and the impact of such measures on India's legal landscape.

In conclusion, this research paper serves as a call to action, urging policymakers, legal practitioners, and environmental advocates to collaboratively address the critical issue of ecocide in India. By amalgamating legal reforms, public awareness initiatives, and international cooperation, a comprehensive approach can be formulated to ensure the sustainable future of India's diverse ecosystems and preserve its natural heritage for generations to come.

1.1 Position in India

India, a country celebrated for its rich biodiversity and natural resources, the urgency to address ecocide has gained paramount importance. As of the year 2023, India is home to approximately 7.7% of the world's recorded species, harboring an astonishing variety of flora and fauna across its diverse ecosystems. This biological wealth contributes not only to the nation's ecological balance but also plays a crucial role in sustaining livelihoods and supporting economic activities.

However, this ecological treasure trove faces mounting threats from industrialization, urbanization, deforestation, pollution, and other anthropogenic activities. According to the State of India's Environment 2022 report, rapid land-use changes and habitat destruction have led to the decline of many species, with approximately 41% of India's terrestrial ecosystems under threat. The report also highlights that 76% of India's water bodies are polluted, further exacerbating the environmental crisis.

In recent years, legal scholars, environmental activists, and policymakers have increasingly emphasized the need for a comprehensive legal framework to address ecocide, ensuring accountability for those responsible for the degradation of the environment. While India boasts a multitude of environmental laws and regulations, there is a discernible gap in specific provisions targeting ecocide as a distinct crime. International initiatives, such as the proposed ecocide amendment to the Rome Statute of the International Criminal Court, have underscored the importance of recognizing ecocide as a grave offense under international law.

As of now, several high-profile environmental disasters, including toxic waste leaks, deforestation-driven loss of biodiversity, and large-scale industrial accidents, have demonstrated the urgency of addressing ecocide within India's legal system.

1.2 Objectives

- This research seeks to evaluate the effectiveness of the current legal mechanisms in addressing ecocide within the Indian context. It involves analyzing the successes and limitations of these mechanisms in preventing and mitigating large-scale environmental destruction.

- The research intends to propose potential legal reforms and solutions to address ecocide in the Indian legal system. This includes considering the incorporation of ecocide as a distinct offense, drawing insights from both national and international legal frameworks.

- The paper will analyze notable case studies of environmental degradation and their legal outcomes within India. This will help in understanding the practical application of existing laws and the lessons that can be learned from these cases.

2. Definition and Conceptualization of Ecocide

The expression 'ecocide' lacks a legal definition. The term appears to be a spin on the word 'genocide', but what does it actually mean? Ecocide is formed by combining two carefully selected terms. The term 'eco' comes from the ancient Greek word 'oikos', which means dwelling or household. The word 'cide' is derived from the Latin verb 'caedere', which means to murder or to cut/strike down. Consequently, a literal translation of ecocide would be "killing our home" (i.e., the devastation of the natural environment). [3]

In 2010, British barrister and ecocide law expert Polly Higgins began advocating for the international criminalization of ecocide. Her definition of ecocide is currently the most widely accepted. Higgins defines ecocide as "the extensive damage, destruction, or loss of ecosystem(s) of a given territory, whether by human agency or other causes, to the extent that peaceful enjoyment by the inhabitants of that territory has been significantly diminished."[4]

Polly Higgins identifies two categories of ecocide in her work: (1) ecocide caused by humans and (2) ecocide that occurs naturally. Human-caused ecocide refers to instances in which human actions, such as hazardous industrial activity, cause vast environmental destruction. The term 'naturally occurring ecocide' encompasses destruction induced by natural occurrences such as tsunamis and flooding. Both forms of ecocide have a devastating effect on the global environment.[5]

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[3]Merz, P., Cabanes, V, et.al., "Ending Ecocide - the Next Necessary Step in International Law." (2014).

[4]Higgins, P, "Eradicating Ecocide." Shepard-Walwyn (IPG) (2016).

[5]TEDx Talks., "Ecocide, the 5th Crime Against Peace: Polly Higgins at TEDxExeter." (2012).

TEDx Talks., "Ecocide, the 5th Crime Against Peace: Polly Higgins at TEDxExeter." (2012).

Even though Higgins' definition of ecocide is currently the most prevalent, it has not escaped criticism. Peter Stoett considers that Higgins' definition of ecocide is excessively broad or "maximalist." Stoett differentiates the 'minimalist' and 'maximalist' approaches to ecocide. While the minimalist would only concentrate on cases of ecocide caused by military actions, the maximalist would include all instances of irresponsible environmental damage, including air travel. Stoett harshly criticizes Higgins' maximalist approach, arguing that Higgins' attempts to have a court prosecute 'anyone setting down a pipeline' are ludicrous and do little to advance a serious discussion.[6]

However, the increasing attempts to define the term and its repeated appearance in academic and legal discourse as well as the media show that the term is gaining worldwide recognition, clearly becoming at least 'a word of warning' despite the lack of an internationally agreed definition.[7]

3. Legal Framework for Environmental Protection in India

In the context of environmental preservation in India, significant legal structures underscore the nation's commitment to safeguarding its natural resources. Notably, the Indian Constitution and the Supreme Court of India play pivotal roles in demonstrating a steadfast concern for environmental conservation. While explicit ecocide laws are absent from the legal framework, specific constitutional articles and Supreme Court decisions are instrumental in ensuring environmental protection.

Central to this ethos is the Indian Constitution's Preamble, which articulates the State's obligation to achieve the foundational principle of socialism. This principle, characterized by an equitable standard of living for all citizens, is intrinsically linked to a pollution-free environment. To uphold these tenets, the Constitution enshrines fundamental rights that safeguard citizens' well-being. Notably, violations of these rights can be remedied through legal avenues, as articulated in Article III of the Constitution.

A cornerstone of this legal landscape is Article 21, which enshrines the "Right to life" as a fundamental right. The Supreme Court has consistently

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[6]Stoett, P. J., "The Evolution of and Future Prospects for Transnational Environmental Crime Prevention." (2015).

[7]South, N., "Ecocide, Conflict and Climate Change: Challenges for Criminology and the Research Agenda in the 21st Century." Crime and Justice (2009).

interpreted this right expansively, recognizing that it encompasses the privilege of access to pollution-free air and water for the holistic well-being of individuals. This judicial stance has led to the Court's intervention in numerous cases to uphold citizens' environmental entitlements.

Furthermore, the legal recourse available under Article 32 empowers individuals to seek redress for violations of their fundamental rights. This includes the ability to petition the Supreme Court directly for the issuance of writs, thereby providing an additional avenue for seeking relief in cases where environmental protection is compromised.[8]

Banerjee, S., "Ecocide Laws: The Need of the Hour" (2021). Article 48-A of the Indian Constitution adds a significant dimension to the directive principles, underscoring the government's responsibility to safeguard the environment, encompassing forests, aquatic life, and fauna. This constitutional provision is complemented by the expectation that individuals exercise the utmost care in preserving the natural environment and ecosystem, as delineated in the sections pertaining to fundamental duties.

India also have a range of environmental laws and regulations that address various aspects of environmental protection and conservation. Some of the key laws include:

- The **Wildlife Protection Act, 1972:** This law provides for the protection of wildlife and their habitats. It regulates activities related to the hunting, poaching, and trade of endangered species.

- The **Water (Prevention and Control of Pollution) Act, 1974:** This law aims to prevent and control water pollution by regulating the discharge of pollutants into water bodies.

- The **Air (Prevention and Control of Pollution) Act, 1981:** Similar to the Water Act, this law focuses on preventing and controlling air pollution through regulations on emissions and ambient air quality standards.

- The **Forest (Conservation) Act, 1980:** This act aims to conserve forests and wildlife by regulating activities that could lead to deforestation or degradation of forested areas.

- The **Environment (Protection) Act, 1986:** This comprehensive law empowers the central government to take measures to protect and improve the environment. It covers a wide range of environmental

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[8]Banerjee, S., "Ecocide Laws : The Need of the Hour" (2021).

issues, including air and water quality, hazardous waste management, and environmental impact assessments.

- The **Biological Diversity Act, 2002:** This act provides for the conservation and sustainable use of biological diversity. It establishes a National Biodiversity Authority and State Biodiversity Boards to regulate access to biological resources and associated knowledge.

- The **Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016:** These rules lay down guidelines for the environmentally sound management of hazardous and other wastes.

Nevertheless, despite the existence of these constitutional provisions, a series of incidents have unfolded, both past and present, that have prompted a clarion call for the immediate adoption of ecocide laws in India. The year 2020 witnessed cataclysmic events such as Cyclone Amphan in West Bengal and Odisha, as well as Cyclone Nisarga in Maharashtra, and a widespread grasshopper plague across western and northern India. Subsequent investigations by researchers and scientists unveiled that these occurrences bore the fingerprints of environmental shifts for which human activity bore sole responsibility.

Numerous development endeavors across India have necessitated the felling of trees with "historic significance," a practice that has cast shadows over the integrity of the Indian ecosystem. One recent example emerged in West Bengal, where a Public Interest Litigation (PIL) was filed against the proposal to fell more than 300 trees for road construction and widening of bridges.

A poignant case that underscored the pressing need for comprehensive environmental legislation unfolded in Mumbai on 30 August 2019. The Tree Authority, a division of the BMC (Brihanmumbai Municipal Corporation), sanctioned the felling of 2,702 trees in the Aarey Forest, one of the few remaining bastions of India's forests, to make way for a Metro Shed. It came to light that this area harbored a complex ecosystem housing endangered species, thereby accentuating the dire consequences that tree removal would have on local wildlife.

Further evidence of ecological distress emerged from a recent report by the Central Water Commission, indicating that 42 rivers in India contained elevated levels of at least two toxic metals. The Ganga River, a spiritual and lifeline entity, was found contaminated with chromium, copper, nickel, and lead, while six additional rivers exhibited unacceptable concentrations

of these four toxins. Contributing sources included industrial waste from mining sites and domestic effluent discharge, among others.

In the face of mounting instances of natural resource overexploitation and depletion, these revelations echo a resounding call for robust ecocide laws. The time is ripe for India to institute a comprehensive ecocide law, positioning it as a formidable guardian of its environment and ecosystems. This legislative framework assumes paramount importance as it holds the potential to safeguard the well-being of millions of citizens whose health and vitality are intricately tied to the ecological equilibrium of the nation.

In an effort to develop an understanding of spawning, the Kerala High Court in *Ratheesh and Others v. State of Kerala and Others*[9]defined "Ecocide" as "the destruction of the aspects of the environment which enables it to support life".

While the courts have hinted at the concept of ecocide, governance has been the most pressing issue for the majority of environmentalists. The 3000 MW Dibang multipurpose project in Arunachal Pradesh exemplifies India's deteriorating environmental governance. The dam, which is twice as large as the controversial Sardar Sarovar dam on the Narmada River, was twice denied forest permission in 2013. In The Vanishing: India's Wildlife Crisis, Prerna Singh Bindra argues that the project was approved a year later, not because the concept had been altered, but because the composition of the Forest Advisory Committee had been modified. Bindra discloses arbitrary decisions made in the labyrinths of power in Delhi and throughout India, the majority of which were made under pressure from corrupt legislators and avaricious industrialists.

In *Chandra CFS and Terminal Operators Pvt. Ltd. v. The Commissioner of Customs and Ors*, the Madras High Court noted,

"The reason for this is the drastic change in the environmental condition as a result of the unchecked activities of ecocide by a section of the population by removing the valuable and precious timbers that are essential for maintaining ecological balance and for economic growth."[10]

Beyond the realm of natural disasters, there have been notable incidents involving gas leaks, notably the LG Polymers gas leak in Vizag and the oil

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[9]K.R. Ratheesh v. State of Kerala, 4948/2018

[10]Chandra CFS v. The Commissioner of Customs, C.M.A. No. 1623 of 2015 and M.P. No. 1 of 2015.

spill in Baghjan Village, Assam. These unfortunate occurrences have cast a substantial shadow over the integrity of our ecosystem.[11]

Nabeela Siddiqui., "World Environment Day 2021: Advocating for an Ecocide Law in India."

Bar and Bench - Indian Legal News (2021).

Given the compounding challenges posed by these incidents and the broader context of environmental degradation, the necessity for India to adopt a comprehensive and effective ecocide law has reached an imperative juncture. The relentless encroachments upon the environment have yielded profound nationwide ramifications, ushering in widespread destruction and a marked decline in ecosystem vitality.

The urgency for legislative action is heightened by the collective toll that our environmental actions have taken on the nation. The scale of devastation has been formidable, encompassing diverse ecological realms. This reality underscores the gravity of the situation, emphasizing the compelling need to not only halt further deterioration but also initiate the process of restoration.

The forthcoming ecocide law must transcend the boundaries of intent and manifest as a potent symbol of India's resolute commitment to rectify the course of environmental despoliation. Its efficacy will be measured not only by its comprehensive provisions but also by the rigorous enforcement mechanisms that will be established once the law is ratified.

In conclusion, the imperatives for enacting a robust ecocide law in India are both compelling and timely. The transformative potential of such legislation lies not only in its deterrence but also in its capacity to inspire a culture of environmental responsibility. The ultimate litmus test of this legal framework's success will be its ability to recalibrate our relationship with the environment, fostering a harmonious coexistence that safeguards the present and future well-being of our nation.

To sum up, India's legal framework for environmental preservation, as demonstrated through the Constitution and the Supreme Court, underscores the nation's commitment to safeguarding its natural heritage. While specific ecocide laws are yet to be codified, the constitutional provisions and judicial decisions offer a robust foundation for ensuring environmental conservation and the protection of citizens' well-being.

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[11]Nabeela Siddiqui., "World Environment Day 2021: Advocating for an Ecocide Law in India." Bar and Bench - Indian Legal News. (2021).

4. Loopholes in Environmental Provisions of India

Following the seminal 1972 Stockholm Declaration, India's governmental focus on environmental concerns has yielded substantial advancements in the establishment of legal safeguards for the environment. However, within this framework, certain vulnerabilities persist. Despite the enactment of statutes such as the Air Act, Water Act, Factories Act, Forest Act, and Motor Vehicle Act, aimed at curbing noise pollution and enhancing water quality, these measures remain somewhat incomplete in addressing the entirety of these issues.

Similarly, the oversight of insecticide usage stands as an underaddressed concern. Alarming statistics reveal that one-third of global pesticide-related fatalities, totaling 22,000 cases, occur within India. The dominant culprits behind pesticide contamination are BHC, DDT, and endosulfane, underlining the gravity of this matter.

In tandem, the intricate predicament of nuclear waste management surfaces as a formidable challenge. Regulated by the Atomic Energy Act of 1962, nuclear waste management falls under the purview of the federal government. This framework assigns comprehensive authority to the Department of Atomic Energy, the primary agency overseeing this domain. However, apprehensions tied to national security have engendered a lack of public transparency in the department's activities, casting shadows over its accountability. This opacity distances the policy from the broader environmental agenda.[12]

In accordance with the 1972 United Nations Conference on the Human Environment, the 42nd Amendment also made modifications to the Constitution's seventh Schedule. Originally, forest was included in List II, Entry 19 of the State List. This subject has been transferred to the Concurrent List (List III) due to the lack of uniform rules in India regarding the preservation and development of forests. As a result, both the Union Parliament and State Legislatures may now adopt laws relating to environmental protection.

Protection and preservation of untamed animals and wildlife has been moved from State List, Entry 20 to Concurrent List, Entry 17-B. The 42nd Amendment to the Constitution for the first time included Entry 20-A in the Concurrent List, which deals with population control and management and family planning, because population growth is the leading cause of environmental

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[12]Bhavana Trivedi and Sangeeta Jain., "Environmental Issues in India." Discovery Pub. House (2007).

problems. Article 253 of the Constitution states: "The Parliament may enact any law necessary to implement any treaty, agreement, or convention with any other country or countries, as well as any international conference, association, or other body decision."

This Parliamentary authority is limited to the enforcement of decisions, and for a limited duration. Article 253's broad language suggests that "in the wake of the 1972 Stockholm Conference, Parliament has the authority to legislate on all matters pertaining to the protection and preservation of natural resources."

Numerous laws have been enacted in India for the enhancement and preservation of natural heritage. Nonetheless, judicial activism in the 1980s and 1990s gave impetus to efforts to "protect and preserve natural heritage." Armed with the power of judicial review and a constitutional framework of judicial independence, the Indian judiciary has been proactive in preserving and enhancing the natural environment and disseminating environmental awareness among Indian citizens.

In conclusion, despite the strides made since the landmark 1972 declaration, India's environmental protection measures exhibit areas of susceptibility. The existing legislative arsenal, encompassing diverse acts and regulations, often falls short of achieving comprehensive solutions. The realm of pesticide usage and the intricate realm of nuclear waste underscore these gaps. Addressing these issues is paramount to holistically fortify India's environmental protection framework and ensure a sustainable trajectory for the nation.

These spaces and voids cannot be adequately supplied by judicial activism. There is dissatisfaction regarding the legislative apparatus. It is proposed that environmental violence should be eradicated. It is necessary to investigate the operation of pollution control boards. It is also a well-known fact that Indian laws regarding pollution control are riddled with flaws. The models lack flexibility because they are more prescriptive and define uniform benchmarks without taking into account the type or scale of the business or the cost of contamination reduction. In India, there is a deficiency in the enforcement of natural protection laws, which has led to a lack of legal activity to protect and preserve the environment.

5. Ecocide as a Separate Crime in India

Ecocide as a concept does not yet exist in international law or criminal law in India, but it has gained worldwide attention over the past few decades.

Despite the severity of ecocide's consequences, the legal framework's current protections are insufficient to prevent, stop, and redress ecocide. Recognizing ecocide as a distinct offense under Indian law could have substantial legal, environmental, social, and economic consequences. Such an acknowledgment would represent a paradigm shift in environmental protection and accountability. Consequently, establishing ecocide as a discrete offense is a necessary means of enhancing this protection. Raising the severity of ecocide to that of a crime at the international level would act as a potent deterrent, compelling States and non-State actors to examine potential impacts on the environment and human rights prior to undertaking new projects.

Ecocide must be established as a new international crime immediately; the world should not wait for another enormous environmental catastrophe with devastating effects on humanity to realize this. Ecocide could be brought under the jurisdiction of the courts; this would assure the end of impunity for ecocidal perpetrators and provide greater protection for the environment and humanity.

Further, Companies and corporations, often responsible for major environmental damage, could face increased scrutiny and accountability for their actions. Ecocide provisions could hold corporate entities criminally responsible for their contribution to environmental destruction. The recognition of ecocide as a crime could pave the way for legal remedies focused on environmental restoration and compensation for affected communities. Those found guilty of ecocide could be mandated to participate in environmental remediation efforts.

The introduction of ecocide as a crime could prompt the revision of existing environmental policies and laws to align them with the new legal provisions. The recognition of ecocide as a crime would lead to the development of a body of case law specifically focused on environmental offenses, which could set important legal precedents. The legal recognition of ecocide could bolster environmental justice efforts by providing affected communities with a stronger legal basis to seek remedies and hold those responsible for environmental harm accountable which could further raise public awareness about the importance of environmental conservation and the dire consequences of unchecked environmental destruction.

From the International Standing, recognizing ecocide as a crime could align India with international efforts to combat environmental degradation. It would demonstrate a commitment to upholding global environmental norms and responsibilities. By recognizing ecocide as a crime, India could take a

leadership role in addressing environmental issues on a global scale and encourage other nations to consider similar legal reforms.

In conclusion, criminalizing ecocide is a positive step toward environmental and humanitarian justice, but its worldwide implementation needs more deliberation and prudence. 'Ecocide' cannot be stopped by just having the status of an offense attached to it; rather, the ideology and spirit of the law should be centered on minimizing environmental damage.

5.1 Challenges in Making Ecocide a Separate Crime

Legal Challenges:

- Implementing ecocide provisions would pose challenges related to defining ecocide, determining causation, proving intent, and establishing liability. Legal and procedural complexities would need to be carefully addressed.

- The interaction between ecocide laws and existing environmental, criminal, and civil laws would need to be carefully considered to avoid conflicts and ensure a comprehensive legal framework.

- Many environmental processes involve intricate scientific concepts and long-term effects that can be challenging to comprehend and prove in a legal context. This complexity may hinder prosecutors, judges, and juries from accurately assessing the extent of harm.

- Establishing guilt beyond a reasonable doubt is a cornerstone of criminal law. Meeting this high burden of proof in ecocide cases, particularly in complex environmental contexts, could be demanding, leading to potential difficulties in securing convictions.

- Environmental harm often crosses geographical and jurisdictional boundaries. Determining the appropriate jurisdiction for prosecuting ecocide offenses that impact multiple regions or countries can be legally and diplomatically complex.

- Holding corporations accountable for ecocide requires addressing legal challenges related to attributing responsibility to corporate entities, as well as determining the extent to which corporate officers and directors should be held liable.

Environmental Protection v. Economic Development:

Balancing environmental protection with economic interests and development needs can be challenging. The introduction of ecocide laws could raise concerns

about potential negative impacts on industries, employment, and economic growth. Industries with vested interests in activities contributing to environmental degradation might resist the introduction of ecocide laws. This could lead to lobbying efforts and political opposition that may hinder the enactment of effective legislation.

Implementation Issues: Even with well-crafted laws, enforcing ecocide provisions can be difficult due to the vastness of affected areas, limited enforcement resources, and potential corruption within regulatory bodies

Conclusion

In conclusion, recognizing ecocide as a separate crime under Indian law holds the potential to bring about transformative changes in the way environmental destruction is addressed and prevented. Such recognition would signal a firm commitment to safeguarding India's diverse ecosystems, biodiversity, and natural resources for present and future generations. The implications and challenges explored in this paper underscore the complexity of integrating ecocide provisions into the legal framework. While the road ahead is fraught with obstacles, it is imperative that India takes a proactive stance in addressing these challenges to pave the way for a more sustainable and just future.

Introducing ecocide as a separate crime in India is a complex endeavor that requires careful consideration and comprehensive planning. It further requires a balance between environmental protection, legal clarity, and fairness. By taking a collaborative and strategic approach, India can contribute to global efforts to combat environmental destruction and ensure a sustainable future. Here are some suggestions for crafting and implementing ecocide provisions within the Indian legal framework:

- Collaborate with environmental scientists, legal experts, and stakeholders to craft a precise and comprehensive definition of ecocide that accounts for various forms of environmental harm while ensuring legal clarity.

- Develop legal principles that hold corporate entities accountable for ecocide, while also considering the liability of officers and directors involved in decision-making. Differentiate between varying levels of culpability to ensure that actors with different degrees of involvement in ecocidal actions are held accountable accordingly. Invest in training judges, prosecutors, and law enforcement officials to better understand the scientific and legal complexities of ecocide cases. Consider a phased approach to implementing ecocide provisions, allowing legal

institutions, regulatory bodies, and stakeholders to adapt and build expertise gradually.

- Develop a mechanism for courts to access expert scientific testimony to evaluate ecological damage and establish causation in ecocide cases. Establish mechanisms for regular review and refinement of ecocide provisions based on legal precedents, case studies, and evolving scientific understanding.

- Involve civil society organizations, environmental activists, and affected communities in the process of drafting ecocide provisions to ensure that diverse perspectives are considered. Launch comprehensive public awareness campaigns to educate citizens about the significance of ecocide and garner support for its inclusion in the legal framework.

- Introduce provisions to protect individuals who come forward with information about ecocidal activities, encouraging reporting and assisting investigations.

- Garner political support for the enactment of ecocide provisions by highlighting the long-term benefits for both the environment and society.

- Introducing ecocide provisions is not only about legal reforms but also about securing a sustainable and resilient future for India's ecosystems, biodiversity, and generations to come.

In summary, recognizing ecocide as a separate crime under Indian law presents a promising avenue for addressing environmental degradation with a more comprehensive, accountable, and preventive approach. However, the complexities and challenges involved underscore the need for thorough planning, collaboration, and careful consideration of both legal and environmental implications.