

# STAND AGAINST POVERTY



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## About the Journal

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## Introduction to Special Issue on Indian Perspectives on Environmental Justice

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**Abstract:** India's environmental-justice discourse is shaped by two inter-related factors: grassroots community stewardship and environmental judicial activism. Based on the inter-play between law and society, these factors have played an important role in mitigating some of the challenges of development and implementing a balanced approach between development and ecology. However, the relationship between law and society has witnessed challenges, especially since the onset of neoliberalism, where the state has been going forward with its policies of development-led growth in the garb of public welfare and the common good. These challenges are extremely detrimental for the environment and also pose risks amid increasing climate and disaster vulnerabilities such as air pollution, rising heatwaves, floods, and depletion of natural resources. Law and society must work in unison within the broader principles of constitutionalism and rule of law for ensuring environmental justice.

**Keywords:**

1. Constitution
2. Environment
3. Judiciary
4. Justice
5. Society

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This Special Issue on *Indian Perspectives on Environmental Justice* emerged from thought-provoking and stimulating discussions at an International Workshop on Environmental Justice, organized by Academics Stand Against Poverty (ASAP), the Yale Global Justice Program, and TERI School of Advanced Studies, India. The one-day workshop started with the keynote address by Prof. Thomas Pogge, who ignited the discussion with his novel idea of an *Ecological Impact Fund*, an innovative international financing mechanism that would enable the originators of innovative green technologies to trade some of their monopoly privileges in exchange for impact rewards (Pogge, 2023). The workshop brought together scholars from India to discuss the critical and emerging environmental challenges in India, including coastal mitigation, food security, forest rights, waste management, depletion of wildlife, soil erosion, and air pollution. The stimulating discussions focused on developing actionable solutions to such challenges — solutions that reduce ecological harms while promoting social justice.

India's environmental-justice discourse is shaped by two inter-related factors: community-led grassroots movements and a proactive judiciary. The former environmental movements were deeply immersed in the Gandhian Philosophy of *ahimsa* (non-violence) and community stewardship. India's proactive judiciary has stimulated a discourse on environmental jurisprudence and established various international environmental principles, including the Public Trust Doctrine, the Polluter-Pays Principle, the Precautionary Principle, Equity, and Sustainable Development, which are international environmental law principles for protecting and conserving the environment. There have been significant milestones in the evolution of international environmental law including the United States National Environmental Policy Act (NEPA) in 1969, the establishment of the United Nations Environment Programme (UNEP) following the Stockholm Conference in 1972, and the Earth Summit in 1992. These landmark events have led to the adoption of significant international treaties for environmental governance, including the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), and Agenda 21. They also played a major role in the adoption of environmental law principles in India's legal jurisprudence to mitigate the challenges of development and industrialization led growth.

Both community stewardship and a proactive judiciary have been essential for achieving a symbiotic relationship between law and society as well as an equitable distribution of natural resources — also aligning with the Constitutional principles of Articles 48A<sup>1</sup> and 51A(g)<sup>2</sup>. However, this relationship has witnessed challenges in the recent past, especially since the onset of neo-liberalism, where the state has, in fact, broadened its concept of development by diverting its natural resources, giving fast track clearances for developmental projects, and averting the legal principles of Environmental Impact Assessment (EIA), thereby jeopardizing the natural resources, lives, and livelihoods of humans and nonhumans.

These challenges are not limited to the ecological pristine areas where land has been taken away for building of dams, industrial hubs, manufacturing zones, and new infrastructures. Modern cities in India like Chennai, Bangalore, Gurugram, National Capital Territory of Delhi (NCT), Mumbai, Pune, and Hyderabad are also grappling with the issues of unplanned linear expansion of cities and migration, which have made these cities vulnerable to newer challenges, such as air pollution, urban flooding, and heatwaves. Every year NCT suffers from air pollution and smog, which make the air extremely toxic, almost unbreathable, with long-term health impacts. There are measures taken, such as the National Clean Air Programme (NCAP), launched by the Ministry of Environment, Forests and Climate Change (MoEFCC) in 2019 to improve air quality in 131 cities. But these measures remain primarily ad-hoc and response-driven with no pre-emptive action being taken to mitigate the cause and effects of air pollution.

It is now important to examine the emergence of environmental-led social movements which took the country onto the path of seeing development from a humanist point of view. The decade of the 1980s heralded a new era of transition deeply rooted in the Gandhian philosophy of non-violent action and *satyagraha* which aimed to guarantee every living being a basic life of dignity. The genesis of these environmental-led movements was essentially not an anti-thesis of development-led growth but was in fact, a wake-up call for policy makers to save the pristine ecology from the dangers of disastrous destruction. These community-led environmental movements aimed to raise awareness and sensitivity against the rapid ecological destruction that was resulting in declining soil fertility and food production as well as depletion

<sup>1</sup> Part of the Directive Principles of State Policy (DPSP): "The State shall endeavour to protect and improve the environment and to safeguard the forests and wildlife of the country."

<sup>2</sup> Assigning every citizen of India the duty "to protect and improve the natural environment including forests, lakes, rivers and wildlife, and to have compassion for living creatures."

of water and land resources. Such community-stewardship-led environmental movements have been a part of India's rich cultural history and heritage, and the most prominent example of such grassroots movements can be traced back to the Khejrli Massacre of 1730 where local communities came together to protect the Khejri trees. This in fact also laid the foundation of many environmental movements, especially the Chipko Movement in the last decade of the 20<sup>th</sup> century. The environmental movements in India differed from the west as they were concerned with both environmental conservation and issues of economic equity and social justice (Karan, 1994). Grassroot environmental movements like Chipko (1973), Save the Narmada (1985), and Silent Valley Movement (1973-83) have been built on the massive destruction and exploitation caused by resource-intensive development which was undermining the needs and concerns of local communities. These movements became a countervailing power to state's authority (Swain, 1997).

The Chipko Movement can be traced back to the Forest Satyagraha of 1930-31, when local village communities came together to protest against the reservation of forests for exploitation by British commercial interests (Shiva, et. al, 1986). Similar peaceful protests were also held in Central India where the Gond tribals were gunned down for participating in the satyagraha. In fact, Chipko Movements, philosophically and organizationally can be described as an extension of Gandhian satyagraha (Shiva, et. al, 1986). Similarly, Save the Narmada holds immense cultural significance, as the river was revered as sacred by the communities and the struggle against the dams was intertwined with broader issues of human rights and environmental justice (Kala, 2001). The movement can be described both as a war of words, which included the cultural assemblage to show their struggle against the exploitation through cultural resistance that included the use of songs and poems while at the same time, also a material struggle, which involved community stewardship in protecting their natural resources from exploitation (Kala, 2001). The Silent Valley movement also raised significant environmental concerns against the hydroelectric project and its potential ecological harm to wildlife and natural resources (Subrahmanyam, 1980). A key feature of these environmental-led grassroots movements was the prominent role of women.

Another significant shift in India's environmental-justice discourse occurred through the adoption of global environmental law principles, which became a beacon of hope in the face of the dangers of industrialization and modernization. In the wake of the global deliberations on critical environmental concerns and community-led grassroots movements, the 1972 Stockholm Conference emerged as a paradigm shift in the discourse on environmental governance and laid the foundation of various laws and policies around environmental protection, wildlife, biodiversity, and protection of forests. This laid the foundations for the Wildlife (Protection) Act of 1972, the Water (Prevention and Control of Pollution) Act of 1974, the Forest (Conservation) Act of 1980 and the Environmental (Protection) Act of 1986. These laws and policies proved to be extremely critical for protecting the ecosystem and paving the way toward an equitable use of natural resources based on inter-generational and intra-generational equity and justice. This was also the era in which the judiciary emerged as a sole dispensation of securing environmental justice in India, not only protecting the sustainable utilization and consumption of our natural resources but also giving a platform to the voiceless and the marginalized. By relaxing the principle of *locus standi*, the judiciary provided a platform to environmentally sensitive citizens to raise environmental issues such as land degradation, illegal mining, chemical pollution, wildlife protection, and coastal protection. Baxi (1985) argued that the Indian model of Public Interest Litigation (PIL) was fundamentally different from the American understanding of PIL as it allowed the marginalized and the voiceless to raise their socio-economic concerns to the highest court of appeal. Baxi (1985) called this as Social Action Litigation (SAL), which changed

the discourse of securing justice in a more transparent way by allowing public spirited citizens to file petitions and also giving room for epistolary jurisdiction.

Prior to the emergence of PIL, environmental justice was provided through Criminal Law provisions as enshrined in the Indian Penal Code (IPC) and Civil Law remedies under the law of torts, while the Criminal Procedure Code (CPC) provided remedies for public nuisance cases related to air, water, and noise pollution (Sahu, 2008). The emergence of PIL fundamentally altered the shift from procedural to substantive forms of justice by expanding the horizon of accessing the court of law. This also paved the way for environmental jurisprudence in India through the application of key legal principles including the Precautionary Principle, the Polluter-Pays Principle, and Absolute Liability (Chakravarty, 2006). In *MC Mehta v. Union of India*<sup>3</sup>, famously known as the Oleum Gas Leak Case, the court rejected the doctrine of Strict Liability which came up in the *Ryland v. Fletcher* case<sup>4</sup>. Singh (2025) argued that absolute liability left no scope for bringing in the exception of “Act of God”, by making the industry or enterprise fully responsible for carrying out any dangerous or hazardous activity to the community.

In the *Indian Council for Enviro-Legal Action v. Union of India*<sup>5</sup>, the apex court invoked the Polluter-Pays Principle and ordered the closure of chemical industries for inflicting harm towards the local communities and for destroying the natural resources. The court came down heavily on the industries for deliberately causing harm by allowing the release of untreated acidic wastewater and held them absolutely liable to compensate for the environmental degradation. *Vellore Citizens Welfare Forum v. Union of India*<sup>6</sup> was a landmark judgment that integrated the international Environmental Jurisprudence, Precautionary, and Polluter-Pays Principles into the Indian constitutional law. These principles are integral to sustainable development: balancing development with environment rather than viewing them as antagonistic to each other. This case also fundamentally changed the legal understanding of the Precautionary Principle, putting the onus on the developer to prove that its action is environmentally benign.

In the era of neoliberalism, there is a shift in the locus of decision making from resource-dependent communities towards capital and technology (Parikh & Sahu, 2023). Such a system of environmental governance has reduced the substantive notion of environmental justice based on equity and inclusion. Neoliberal policies and laws have to a significant extent diluted the environmental laws and institutions developed since the 1970s. The most disturbing trend that has emerged in Indian environmental jurisprudence is the manner in which environmental irregularities have been legitimized by applying the principle of *fait accompli* (Parikh & Sahu, 2023). The rule of law has been set aside by applying the principle of *fait accompli* which seriously undermines the concerns of environment, biodiversity, and ecology. But amidst these challenges, the symbiotic relationship between law and society deeply embedded in community rights was witnessed remarkably in the Niyamgiri case judgement, where the Supreme Court protected the indigenous and cultural rights of indigenous tribal communities over their natural resources. The court held that Gram Sabha has the ultimate authority to evaluate whether mining holds any public good for them and how rights of indigenous communities need to be protected. Jena (2013) argued that this judgement is significant not only for protecting religious and cultural rights but also for setting a precedent for other tribal communities and Particularly Vulnerable Tribal Groups (PVTGs) to resist displacement and assert their rights over their ancestral lands.

<sup>3</sup> M.C. Mehta v. Union of India (1987) 1 SCC 395

<sup>4</sup> Ryland v. Fletcher (1868) LR 3 HL 330

<sup>5</sup> Indian Council for Enviro-Legal Action v. Union of India and Others, AIR 1996 (3) SCC 212

<sup>6</sup> Vellore Citizens Welfare Forum v. Union of India, AIR 1996 SCC 2715

Amidst environmental law governance in India, Environmental Impact Assessment (EIA) proved to be an important tool for ascertaining the likelihood of environmental damage from proposed development projects. EIA helps in making informed decisions, before a project is approved, about its potential harms and preventive measures to avoid the subsequent harms (Leelakrishnan, 1992). In 2006, EIA notification was issued by the MoEFCC under the 1986 Environment Protection Act, legally mandating that development projects undergo EIA before project approval. However, in recent years, the principle of *fait accompli* has been used in cases where a project has substantially progressed without undergoing the legally mandated EIA. This goes against the legal principles of the EPA Act of 1986, which mandates EIA. Through its recent executive orders, its 2017 Notification<sup>7</sup>, and its 2021 Office Memorandum (OM), the government has granted *ex post facto* environmental clearances to development projects where work has been ongoing and also in cases of completed projects. In 2025, the Supreme Court bench comprising of Justice Abhay S. Oka and Justice Ujjal Bhuyan in a landmark judgement, *Vanshakti v. Union of India*<sup>8</sup>, struck down the notification and OM as arbitrary and *ultra vires* of the provisions as enshrined in EPA 1986, Articles 21<sup>9</sup> and 14<sup>10</sup> of the Constitution. However, in a three-judge bench led by former Chief Justice of India, B.R. Gavai, the Supreme Court has recently (November 2025) recalled the Vanshakti judgement in a review petition.

The next big challenge India is likely to face is that of keeping intact the principles and tenets of environmental justice based on inter-generational and intra-generational equity and justice amidst the increasing over-exploitation of natural resources for development-led public purpose projects. Among development projects, the most significant in coming years will be the rapid expansion of Artificial Intelligence (AI) driven data centers, which have an unprecedented impact on the use and exploitation of natural resources. The water footprint due to global AI demand could reach 4.2-6.6 billion cubic meters of water withdrawal by 2027 (Li et.al 2023). India is a resource-constrained country with just 2.4 per cent of world's land area and 4 per cent of its fresh-water resources to sustain its (rising) 18% of world population and its demands for better infrastructural growth. India is emerging as a global hub for cloud and AI infrastructure with enormous need for more land, water, and energy for grid stability. This could have an impact on India's move towards decarbonization, climate resilience and sustainable use of natural resources. To incentivize the growth of developing these AI data centres, the Government of India has announced India AI mission and tax holiday till 2047 for eligible foreign cloud providers using India-based data centres for global operations. These AI data centres will be coming up in metropolitan hubs such as Mumbai, Bangalore, Vishakhapatnam, Greater Noida, and Chennai, which are already grappling with the issues of climate change, urbanization, disaster vulnerability, heatwaves, water scarcity, and land mis-management.

The papers published in this Special Issue on Indian Perspectives on Environmental Justice underlines that environmental justice is not merely about ecological conservation but also about achieving rights, justice, representation, and equitable utilization of natural resources. The papers examine diverse yet interconnected issues related to climate adaptation, coastal resilience, community forest rights, the role of environmental law clinics in achieving environmental justice, the role of Green Social Work (GSW) in addressing ecological and climate concerns, and the rising impact of air pollution on women's reproductive health. These papers

<sup>7</sup> "To appraise and regularise the projects, already taken up or under implementation without obtaining the prior environmental clearance in terms of the provisions of the EIA Notification, 2006 and thus identified to be in violation of the same. The Notification enables consideration of such proposals at Central level by providing one-time opportunity to submit the request in this regard within 6 months"

<sup>8</sup> *Vanshakti v. Union of India* 2025, SCC Online SC 1139

<sup>9</sup> Right to life, "No person shall be deprived of his life or personal liberty except according to a procedure established by law."

<sup>10</sup> Equality before law and equal protection of the laws to all persons within the territory of India.

highlight how environmental burdens are disproportionately born by vulnerable and marginalized communities. They also reveal how decision-making processes, policies, and legal frameworks often exclude the voices of the marginalized. Amidst intensifying challenges from climate change and the anthropogenic risks associated with it, it is essential that India's environmental management be compliant with the principles of Constitutionalism and Rule of Law and that any changes in law and policy be consistent with the broader principles of Articles 21, 14, 48A and 51A(g). Law and society must work in unison to foster a participatory, transparent, and accountable system of environmental governance based on community stewardship and rights. This requires richer, substantive notions of equity and justice that go well beyond the merely procedural.

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**Coastal resilience, (mal)adaptation, and justice in Chennai****Rajesh Ramakrishnan<sup>1</sup> & Prakash Kashwan<sup>2\*</sup>**<sup>1</sup> Independent researcher, e-mail: [rrajesh31@gmail.com](mailto:rrajesh31@gmail.com)<sup>2</sup> Environmental Studies, Brandeis University, USA, ORCID: 0000-0001-5540-5994, e-mail:[pkashwan@brandeis.edu](mailto:pkashwan@brandeis.edu)

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**Abstract:** India's central and state governments have proposed large-scale projects to promote coastal resilience. The ongoing efforts to adapt to frequent episodes of urban flooding in Chennai, the capital of the state of Tamil Nadu in southern India, have led to thousands of people being displaced from urban centres to peri-urban areas. This "relocation" of population with the ostensible goal of climate adaptation has led to adverse impacts on coastal ecology and local livelihoods. It has significantly undermined the goals of improving coastal resilience and climate justice, and constitutes a process of maladaptation. What are the root causes of the apparent contradiction between climate adaptation and climate resilience interventions promoted by national and subnational governments? Drawing on field research involving key-informant interviews and analysis of ongoing policy developments, we show that maladaptation results from a lack of democratic decision-making and a failure of accountability. We conclude that policy responses for climate resilience and adaptation are mediated by the socioeconomic and political context. Under a policy context that excludes most of the city's residents from participating actively in the policy process, decision-makers do not pay heed to the interests and perspectives of low-income residents. Skewed policy responses are not only unjust; they are also ineffective. The "resettlement" of residents from the city's slums into the ecologically sensitive zones in the surrounding areas, and a failure to prevent the siting of infrastructure in ecologically sensitive areas of peri-urban Chennai, have led to continued degradation of the city's ecology. Future research must consider proposals for introducing mechanisms of accountability in climate resilience and adaptation.

**Keywords:**

1. Climate justice
2. Maladaptation
3. Coastal resilience
4. Accountability
5. Informal settlements

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## 1. Introduction

Climate adaptation and climate resilience are usually seen as complementary goals, which reduce vulnerability and ensure that communities can recover quickly from the impact of climate change. Arguments about such synergistic relationships have been popularized by multilateral institutions and coalitions, such as the United Nations Foundation and the Organization for Economic Co-operation and Development (OECD), which suggests that national policy measures that prioritize adaptation are crucial for building countries' resilience to climate impacts.<sup>1,2</sup> However, the relationship between adaptation and resilience is not that simple.

Ambiguities in the operationalization and use of the concepts and paradigms creates potential for confusion and contradictions (Meerow & Newell 2016, pp 309, 312-13; Zanotti *et al.* 2020). The involvement of a diverse group of stakeholders, including policymakers from different sectors working at different scales, further exacerbates the potential for such confusion. It poses additional challenges to the field of climate adaptation and resilience, resulting in a tendency to prioritize building new physical infrastructure to counter climate impacts. Yet, climate resilience depends as much, if not more, on ecological infrastructure – natural vegetation, mangroves, wetlands, and waterways that are crucial for responding to landscape level stocks and flows of flood waters and to urban heat effects. If not planned carefully, construction of new physical landscape or other types of urban planning interventions can adversely affect vital ecological infrastructure.

Social scientists have developed the concept of maladaptation to describe such cases in which adaptation planning and implementation produce adverse socioeconomic outcomes, especially for marginalized groups. Maladaptation could also undermine ecological functions that are crucial for building long-term climate resilience. In this article, we analyse the relationship between climate (mal)adaptation and resilience in the Indian city of Chennai, the capital of the state of Tamil Nadu in southern India, which suffered large-scale urban floods in 2015 that caused massive damage to city infrastructure and cost more than 200 human lives. We investigate the interactions between climate impacts and socioeconomic factors that influence policy and programs to address climate change and climate resilience. Our analysis shows that policies related to climate adaptation and resilience benefit affluent groups and disadvantage poorer populations. Yet, these policies are often justified—incorrectly—by citing the need to prevent environmental harm.

Climate change impacts are experienced differentially, and responses to climate change are mediated by social, political, and economic inequalities in society. This is also true of urban climate policy responses, which are often driven by a top-down approach by national and provincial governments, working with market actors and local governments (Chu and Michael, 2022). These climate resilience and adaptation responses are nested within broader contestations over urban development in which popular politics, elite aesthetics, middle-class environmentalism, and real-estate interests jostle for influence. As a result, strategies required for climate change adaptation can worsen the climate resilience of the already marginalized. This article presents a critical examination of the climate adaption and resilience building efforts on Tamil Nadu's coast.

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<sup>1</sup> Organisation for Economic Co-operation and Development (OECD) (n.d.). Climate adaptation and resilience. <https://www.oecd.org/en/topics/policy-issues/climate-adaptation-and-resilience.html> (last accessed 4 July 2025).

<sup>2</sup> Toth, E., & Del Rio, C.R. (2023, June 2). Climate adaptation is key to a climate resilient future. But what does it mean? *United Nations Foundation*. <https://unfoundation.org/blog/post/climate-adaptation-is-key-to-a-climate-resilient-future-but-what-does-it-mean/> (last accessed 4 July 2025).

## 2. Theory and Methods: Unpacking the Links between Climate Adaptation and Resilience

The Intergovernmental Panel on Climate Change (IPCC) defines climate adaptation as an “adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities” (IPCC, 2007, p. 6). The success of climate adaptation depends on how individuals, specific social groups, and society at large, “manage risk and moderate harm from perceived or projected change,” sometimes referred to as “adaptive capacities” (Nelson, 2011, p. 114). Yet, as Jesse Ribot (2009) has argued, damages from climate change-related disasters are distributed unevenly among local populations. This is so because, apart from geographical factors, socioeconomic structures – gendered social inequalities, intergenerational differences, and inequalities along social identities, political ideologies, and economic classes – mediate the distribution of local impacts of climate change. The ability to manage risks and adapt to climate change is conditional on “place-based social and political-economic circumstances” (Ribot 2009, p. 49).

The diversity of actors, interests, and institutions involved in adaptive processes creates possibilities of unintended and undesirable consequences of some efforts toward climate adaptation. Frequent reporting of such adverse effects prompted social scientists to develop the concept of maladaptation, which refers to adaptation strategies or interventions that may lead to “increased risk of adverse climate-related outcomes, including via increased greenhouse gas emissions, increased or shifted vulnerability to climate change, more inequitable outcomes, or diminished welfare, now or in the future” (IPCC, 2022a, p. 7, footnote 15). Maladaptation can result in infrastructure or institutional lock-in, that is, costly investments that are difficult or costly to reverse. Such lock-ins can increase vulnerability, exposure, and risks, and further exacerbate existing inequalities. For example, researchers have argued that the Mumbai Coastal Road (MCR) project that is intended to reduce flood risk and protect against sea level rise could cause damage to intertidal fauna and flora and livelihoods of fishing communities. (IPCC, 2022b, p. 1504). The concept of maladaptation is quite helpful in comprehending the full scope of links between climate adaptation and resilience.

Resilience is defined as “the ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity of self-organization, and the capacity to adapt to stress and change” (Tyler and Moench, 2012, p. 312 citing IPCC, 2007). Improving climate resilience involves assessing how climate change will create new, or alter current, climate-related risks, and taking steps to better cope with climate-related risks and shocks. Urban resilience can be defined as sustaining key functions within a city in the face of climate impacts, such as urban flooding and heat island effects. Following an extensive review of scholarly literature that identified contradictory definitions and conceptual tensions, scholars defined urban resilience as “...the ability of an urban system-and all its constituent socio-ecological and socio-technical networks across temporal and spatial scales-to maintain or rapidly return to desired functions in the face of a disturbance, to adapt to change, and to quickly transform systems that limit current or future adaptive capacity” (Meerow *et al.* 2016, p. 39). Urban actors’ understanding of “desired functions” vary significantly between urban residents and power holders with divergent interests, though these tensions are not always part of the analysis, especially by multilateral agencies and private sector actors keen on investing in urban resilience (Webber *et al.*, 2021).

These omissions are related to the origins of the concept of resilience in the field of ecological sciences, which meant that early scholarship on resilience focused heavily on the biophysical environment and infrastructure (flood-proofing; heat proofing etc.) without paying adequate attention to the social dimensions of resilience. The legacy of the natural sciences also

shaped early scholarship on socio-ecological systems, which often black-boxed social systems and neglected the agency of social actors. Resilience scholarship tended to focus narrowly on the goal of maintaining or reverting to a social and institutional status quo, which privileges social structures favourable to the beneficiaries of unequal power relations. Such an approach to resilience avoids questions of agency, power, and knowledge, which are crucial to address an important set of questions, as to “resilience for whom and at what cost to which others” (Cote & Nightingale, 2012, pp 484-5). These effects have been especially pronounced in the context of the dominance of market-based approaches, often referred to as neoliberal policymaking.

Powerful donor and multi-lateral institutions frame neoliberal policy and institutional interventions as technical solutions, though they are implemented centrally through top-down governance structures (Kashwan *et al.*, 2019, pp 9-11). Such top-down interventions driven by powerful actors in the state and markets can foreclose wider deliberations on the potential for progressive socioecological transformation (MacKinnon & Derickson, 2012, p. 254). In this sense, climate resilience has a justice blind spot. Recent scholarship has paid greater attention to questions of power, inequality, and justice within the context of climate change, adaptation, and resilience (Dewulf *et al.*, 2019; Garcia *et al.*, 2022; Kashwan, 2022). Yet, more research is needed, especially research that is grounded in specific ongoing interventions in large and diverse cities with high levels of vulnerability to impacts of climate crisis. We use this research to advance scientific understanding of the links between climate adaptation and resilience, especially in contexts rife with high levels of socioeconomic inequalities in cities located in ecologically sensitive regions in the global South.

### **Research Methods**

This research draws on a toolbox of research methods. The first author conducted field research in Chennai, including 18 key-informant interviews with representatives from the state government, academics, NGOs, scientists, and environmental and social activists. In preparation for these interviews, we undertook an extensive analysis of past and ongoing policy developments drawing on the state and city-government policies on urban development, including slum redevelopment, resettlement and rehabilitation, climate action plan and resilience strategies for Chennai. We reviewed consultants’ reports on eco-restoration of rivers and on slum enumeration, and World Bank project documents on urban development and coastal resilience in Tamil Nadu. We also examined judicial documents and court judgements related to the cases of encroachment (i.e. squatting) on land classified formally as public land adjacent to waterways in Chennai. We drew extensively on media reports of the floods of 2015 and 2023, and on the links between Chennai’s urban planning, infrastructure development, and the city administration’s efforts to prevent floods in the city.

A second set of methodological choices ensure that our research is not biased by India’s age-old socioeconomic inequalities of caste, class, religion, and gender that greatly shape the workings of the Indian state and its institutions, including the judiciary (Kumar, 2014, pp 41-2). To this end, we also engaged with non-state perspectives from civil society groups, scholars, and environmental and social activists. We reviewed citizens’ reports on the impacts of the floods of 2015 and 2023, social scientists’ analyses of the impact of urban development on land use change and its environmental and social impacts, activist literature on neoliberal urban development policies and financialisation of urban land, NGO reports on eviction and resettlement, and reports by civil liberties and human rights groups on slum eviction and their assessments of the quality of life of resettled communities. This multi-methods approach allows us to capture a broad sweep of evidence and arguments relevant to the analysis of the links between climate adaptation and resilience in Chennai.

### 3. Background to Research Site: Chennai

The coastal city of Chennai, formerly Madras, is the fourth largest city of India and the capital city of the state of Tamil Nadu in southern India, and the state's main economic hub. The Chennai Metropolitan Area, covers an area of 1,189 sq. km which includes the city and its peri-urban areas, accounts for more than 16% of the state's income and contributes (as of 2021) an estimated US\$78.6 billion to India's GDP, which is expected to increase to US\$100 billion by 2025 (GoTN *et al.*, 2023, p. 45). It is home to a population of 8.5 million people (in 2021), which is projected to reach 10.677 million by 2030. With a decadal population growth rate of 32% between 2011 and 2021 and a population density of 26,553 people per sq. km., Chennai is the most densely populated city of Tamil Nadu (GoTN *et al.*, 2023, pp 38-9).

Chennai has the fourth-highest population of slum dwellers among major cities in India, with about 820,000 people (18.6 per cent) living in slum conditions (figures from 2016-17) and is sometimes referred to as "a city of slums" (GoTN *et al.*, 2023, p 49). It also has a large concentration of Dalit (lit. the oppressed; the so-called 'untouchables') settlements, known as *paracheris*, which housed the so-called "low-caste" migrants from the surrounding regions (Jain *et al.*, 2017, p. 11). Slums are the mainstay of housing for a significant proportion of the city's working population, employed in the informal sector, e.g., hawkers, family-based workers, and workers in low-paying sectors such as rickshaw pulling, repair of bicycles, and household services. The Tamil Nadu Urban Habitat Development Board (TNUHDB)<sup>3</sup> estimates that approximately 108,000 families from economically weaker sections live in undeveloped slums, of which about 67 per cent live in "objectionable" slums, i.e. those alongside rivers and water bodies, and those on land required for public purposes (GoTN *et al.*, 2023, pp 49-50).

Chennai has an almost flat land surface, with contours ranging from 2–10 m (7–33 ft) above mean sea level, and a few isolated hillocks. Chennai is located at the tail-end of a catchment of four large natural drains, each with its own catchment, that open to the Bay of Bengal – the Kovalam backwaters and estuary in the south, with Pallikaranai marsh as an additional holding area, the Adyar and Cooum rivers that drain central Chennai; and the Kosasthalaiyar river and Ennore creek in the north. In the flat coastal plains surrounding Chennai, water tends to run-off slowly. Early settlements in the region designed *eris* (lakes), *thangals* (tanks), *kulams* (ponds) and *ooranis* (drinking water ponds) to harvest rainwater to irrigate fields and supply villages. The landscape of Chennai, Thiruvallur, Kanchipuram and Chengalpattu districts is a mosaic of such wetlands. The natural ecosystem of Chennai comprises three rivers, six forest areas, five major wetlands, and three major tanks that supply water to the city and drain their surplus water into the rivers. A colonial-era navigation channel, which links two of the rivers and runs parallel to the coast, and 31 minor canals play an important role in the city's drainage system (GoTN *et al.*, 2023, pp 54-7). These water bodies and wetlands mitigated floods by trapping and storing rainwater, and slowing run-off to the drainage network.

Chennai's tropical climate puts the annual maximum temperatures between 38°C and 42°C from April to June and an average annual rainfall of 1,300 mm (GoTN *et al.*, 2023, p. 28). The city has experienced heavier rainfall in shorter spells resulting in floods, as well as deficient monsoons leading to drought. One notable study did not find evidence to attribute the 2015 floods, which is the subject of this article, to anthropogenic climate change, most likely because of the concentration of aerosols from industrial emissions and urbanization counteracting the effects of global warming at the regional scale (van Oldenborgh *et al.* 2016). Yet, as climate change accelerates, Chennai will likely experience harsher events of flooding, heatwaves, and sea level rise that pose a risk to human health. These challenges are

<sup>3</sup> Popularly known by its earlier name, the Tamil Nadu Slum Clearance Board (TNSCB).

likely to grow as the city's population and the economy grow. In the city's climate action plan, the adaptation strategy involves actions to make Chennai resilient against floods and droughts, with a focus on the impact on the vulnerable populations (GoTN *et al.*, 2023).

#### **4. Evidence: Climate Adaptation and Resilience in the Wake of Chennai Floods**

##### **4.1. The Evolution of Policy Narratives Around Slums**

Chennai's population and urban sprawl grew rapidly since the 1980s, leading to an urban sprawl on parts of hills, forests, agricultural land, and low-lying marshes and estuaries, ponds, and lakes. The World Bank financed housing projects on lakebeds in the 1970s and 1980s, including some housing development projects targeted at low-income residents and overseen by the TNUHDB (known then as the Tamil Nadu Slum Clearance Board). The Board interpreted "slum clearance" as *in situ* improvement of slums through tenement construction, which was the result of a negotiated accommodation between poor people's social movements and political parties, which sought to win and retain the support of low-income residents. Yet, these low-income neighbourhoods, many of which were located along waterways and water bodies, were threatened by the broader ecological changes from urban sprawl.

In the 1990s, the state government-led development of the IT Corridor ate into and fragmented the once-sprawling Pallikaranai wetland. The development of hazardous and polluting industries and thermal power plants undermined the ecological integrity of Ennore creek. Similarly, the expansion of private and public sector ports encroached upon beaches, salt pans and creeks, which along with the conversion of agricultural lands and flood plains into built areas compromised the landscape's flood mitigating mechanisms (GCC *et al.*, 2019, pp 22, 34-5).

On the other hand, the concept of "ecological value" began to figure in official planning documents in the 1990s. The state government's emerging attention to environmental issues could be attributed to three factors. One, under the Sustainable Cities Program of UN-HABITAT, the Government participated in the Sustainable Chennai Project to build capacities in urban environmental planning and management. Two, as protests by local environmental groups gained visibility among the public in India and beyond, policymakers could no longer ignore them. Three, the increased severity of droughts alternating with floods created unprecedented and contradictory crises of urban floods and scarcity of drinking water in the city. The emphasis on environmental planning and management led to greater attention to flood alleviation, water harvesting, and conservation of rainwater through water body reclamation and restoration. This was reflected in Chennai's Second Master Plan published in 2008 and in the planning documents of the Chennai Metropolitan Water Supply and Sewerage Board, each of which enjoyed widespread support in the state legislature (Coelho and Raman, 2013, pp 150-1).

The increasing concern about environmental issues in the 1990s converged with significant changes in the political settlement around the improvement and development of low-income neighbourhoods. The World Bank's funding of urban development programs, especially in the housing sector, steered the TNUHDB away from state support and political entanglements. State agencies and mainstream political parties began advocating slum resettlement as a way of mitigating risk from increased urban floods. The vision of a "slum-free Chennai," first articulated by middle-class environmental activists, started showing up in state government policy documents. In 2012, the state government issued the "Tamil Nadu Vision 2023," which included plans for the construction of 2.5 million affordable houses to create hut-free villages and

slum-free cities (ADB *et al.*, 2012, p. 15). The dominant form of intervention to render Chennai slum free was state-sponsored, large-scale construction of Economically Weaker Section tenement units in large resettlement colonies on the peripheries of the city (Coelho *et al.*, n.d., pp 20-30). These efforts were funded through various central government programs for 'slum-free cities.' The Tamil Nadu Urban Development Project funded by the World Bank, contributed to a shift from the earlier in-situ slum upgradation efforts to the sites-and-services schemes that offered serviced plots of land to low-income families on subsidised payment and thereafter to resettlement in peripheral areas of the city (Coelho *et al.*, 2022, pp 169-70). The TNUHDB developed large resettlement colonies on the urban peripheries, substantially funded by the central government's Flood Alleviation Programme, World Bank-sponsored post-tsunami projects, and the central government's Jawaharlal Nehru National Urban Renewal Mission (JNNURM). The central government also funded projects to restore lakes and tanks in the Chennai Metropolitan Area, including by removing squatter settlements (Coelho & Raman, 2013, p. 150).

In the 2000s, the narratives and reasoning for slum removal shifted from protecting low-income residents against urban floods to blaming them for the state of the rivers, with the implication that eco-restoration required their removal. Chennai's City Development Plan, written for the JNNURM in 2005, stated that approximately 35,000 households squatting in "objectionable locations" on the city's riverbanks would have to be removed as they were polluting the water with raw sewage.<sup>4</sup> This claim contradicted all available evidence which showed that slum settlements were responsible only for a small proportion of the pollution (Coelho & Raman, 2010, note 6). Under the Adyar Poonga Trust formed by the state government in 2007, hundreds of families were displaced for creating an eco-park, ostensibly to restore the estuarine creek near the mouth of the Adyar river in an upmarket area within the city (Coelho & Raman, 2010, pp 158-62).

Chennai's Second Master Plan released in 2008 emphasized the need for protecting lakes and water bodies from squatting, removing existing squatter settlements to revert water bodies to their original state, and prohibiting or restricting development on the Pallikaranai Marsh and in the Red Hills catchment area, which is one of the main sources of the city's water supply. The masterplan also proposed developing a city-wide network of open spaces that could act as flood moderators and outlined regulatory approaches to safeguarding waterways and water bodies (Bremner, 2020, pp 747-9). In 2009, the state government project to revive the Cooum river was launched with the displacement of low-income residents ("slum eviction"). Trained social workers from the TNUHDB's Community Development Wing ran outreach campaigns to persuade community leaders and members to accept the proposals for relocation. These developments weakened the unity and resolve of low-income residents to oppose the campaigns for their relocation to peri-urban areas (Coelho & Raman, 2010, p 23; Diwakar, 2019, pp 1328, 1333-4).

The city leaders' attention was focused disproportionately on the low-income settlements, though the largest and most environmentally destructive forms of urban infrastructure development were related to commercial and industrial developments supported by the state. Between 1980 and 2012, the city's built-up area expanded from 47 km<sup>2</sup> to 402 km<sup>2</sup>, while the area of wetlands declined from 186 km<sup>2</sup> to 71 km<sup>2</sup>.<sup>5</sup> Through the 1990s and the 2000s, a land baron who owned large areas of land in and around the Adyar estuary began to sell and build

<sup>4</sup> Whitcomb, T. (2020, 29 July). In *India's Chennai, river restoration lands hardest on the poor*. Undark. <https://undark.org/2020/07/29/chennai-river-restoration-impacts-poor/> (last accessed 4 July 2025).

<sup>5</sup> Jayaraman, N. (2017, 6 September). Viewpoint: Why poor planning leads to floods in Chennai and Houston. BBC. <https://www.bbc.com/news/world-asia-india-41144776> (last accessed 4 July 2025).

on tracts of land protected under the Coastal Regulation Zone rules. This building spree led to high-end residential complexes, five-star hotels, and commercial real estate targeted at IT companies on the fragile estuarine lands. A legal challenge against such construction in a fragile ecological zone failed, as the courts legitimized these constructions. Similarly, despite an earlier court ruling that the creek should be restored to its original condition, new construction came up in the neighborhood MRC Nagar near Adyar Creek (Coelho and Raman, 2013, pp 159-62).

In 2009, the state government began slum evictions as the first step to reviving the Cooum river. At the same time, the state government announced a project of the National Highways Authority of India for the construction of a 19-km elevated expressway for the movement of container trucks from the national highway at Maduravoyal, a neighborhood in western Chennai, to the Chennai Port. Hydrology experts and environmentalists pointed out that an expressway built into the riverbed would cause stagnation of sewage-laden river waters and inundation of adjoining areas during the monsoon. These concerns led to the government pausing the work on the highway in 2012, after pillars had already been sunk in the river (Coelho & Raman, 2010, pp 19-20). This history and the catastrophic 2015 floods notwithstanding, the central government revived the project in 2022.<sup>6</sup>

Following the destructive floods of 2015, activists highlighted instances of past elite encroachments: IT industry complexes built on waterways, the Phoenix Mall located in the Velachery watershed and high-end educational institutions along Thiruvallur, Kancheepuram and Chennai districts in the Chennai Metropolitan Area that occupied catchment areas,<sup>7</sup> and automobile factories of Renault Nissan, Daimler Benz, and Ford on lands that were once water bodies, paddy lands, and forests in Oragadam, south-west of Chennai.<sup>8</sup>

## 4.2. Government Agencies and the Judiciary Respond to the 2015 Floods

The November-December 2015 floods in Chennai, Kancheepuram and Tiruvallur districts, a major part of which fall under the Chennai Metropolitan Area today, claimed 289 lives and inundated 2.32 million houses (GoTN, 2017). German multinational insurance and reinsurance company Munich Re estimated the losses in and around Chennai to be on the order of USD 3.5 billion.<sup>9</sup> Some of the most severe flooding resulted from the secondary effects of surplus water released from nearby reservoirs, which flooded the Adyar, Cooum, and Kosasthalaiyar rivers, and Buckingham Canal beyond capacity, leading to widespread inundation. The city's low-income residents, including those who had been "rehabilitated" out of inner-city areas and into flood-prone outskirts, were worst affected and received the least amount of support during and following the disaster.<sup>10</sup> Yet, state institutions continued to direct their ire against the people living in informal settlements on riverbanks and around

<sup>6</sup> Perinchery, A., (2022, May 28). *PM Modi unveils infra projects of Rs 31,000 crore for TN. What will it cost the environment?* The Wire. <https://thewire.in/environment/pm-modi-unveils-infra-projects-of-rs-31000-crore-for-tn-what-will-it-cost-the-environment> (last accessed 4 July 2025).

<sup>7</sup> The New Indian Express (2016, January 28). Experts redefine 'encroachments'. <https://www.newindianexpress.com/cities/chennai/2016/Jan/28/experts-redefine-encroachments-874258.html> (last accessed 4 July 2025).

<sup>8</sup> Jayaraman, N. (2015, 6 December). *Making of a disaster: Satellite images show how Chennai's new urban jungles caused flooding*. The News Minute,; <https://www.thenewsminute.com/tamil-nadu/making-disaster-satellite-images-show-how-chennais-new-urban-jungles-caused-flooding-36595> (last accessed 4 July 2025).

<sup>9</sup> Vencatesan, A. (2021). From rains to floods: A case of Chennai in 2015. *Environment & Society Portal*, Arcadia (Summer 2021), no. 23. Rachel Carson Center for Environment and Society. doi:10.5282/rcc/9323 (last accessed 4 July 2025).

<sup>10</sup> Coelho, K. (2016, January 4). Placing the poor in the flood path: Post-disaster slum resettlement in Chennai. *Caravan*. <https://caravanmagazine.in/vantage/placing-the-poor-in-the-flood-pathpost-disaster-slum-resettlement-in-chennai> (last accessed 4 July, 2025).

waterways. In the midst of the Chennai floods, during November 2015, the judges in an ongoing lawsuit conjectured that “the entire loss due to the flood was due to maladministration” as the authorities failed to stop “encroachment” of water bodies and water courses, leading to a “reduction in their flood storing and carrying capacity..” and the denudation of “residential areas causing devastating effects.”<sup>11</sup> Noticeably, despite references to maladministration, the judges focused specifically on “encroachments,” which is a reference to the low-income settlements, even though constructions in violation of zoning laws and other regulations are not limited to those communities. In the enforcement of court orders, there is a perceived bias against low-income neighbourhoods, whereas upper class residential and commercial complexes receive sympathetic consideration.

On 7 December 2015, the Chief Minister of Tamil Nadu directed state agencies to relocate about 50,000 families living on the banks of the Adyar river, Buckingham Canal, and the Cooum river (IRCDUC & HLRN, 2017, p. 3). The Chief Minister justified these orders, in part, “to ensure better outflow of rainwater in the city” (ibid., p. 2). Over the next year, state government agencies formalized this proposal by enlisting “objectionable settlements” located near water bodies, which were home to 50,096 low-income families.

**Table 1.** Details of “Objectionable Settlements” in Chennai

| <b>Name of the River/Canal</b>  | <b>Number of Households</b> |
|---------------------------------|-----------------------------|
| Cooum River within city limits  | 13,500                      |
| South Buckingham Canal          | 12,000                      |
| Adyar River                     | 9,539                       |
| North Buckingham Canal          | 9,000                       |
| Central Buckingham Canal        | 5,300                       |
| Cooum River outside city limits | 757                         |
| <b>Total</b>                    | <b>50,096</b>               |

*Source:* IRCDUC & HLRN, 2017, p. 6

Post-disaster, the narratives that conjoined environmental arguments with the fate of low-income residents grew louder. A 2015 executive order of the state government stated that “removal of encroachments is a critical activity” without which the authorities cannot undertake the cleaning, creation of walkways, cycle tracks, and parks (Diwakar, 2019, p. 1328).

Despite the objections from social movements advocating for the rights of low-income residents, government agencies and courts doubled down on aggressive measures. Though the past judicial decisions mandated “reasonable opportunities” and due process like legally mandated periods of notice prior to forcible removals, government agencies often violated these norms. Ironically, some of the Court orders themselves advocated the use of force, disconnection of electricity and water supply, and withdrawal of ration cards that entitled the families to government subsidized food grains. In one case, a judge ordered that encroachers should not be provided with alternative accommodation (IRCDUC and HLRN, 2019, p. 28). In another instance, a judge of the Madras High Court instructed officials to disconnect electricity and seek “appropriate assistance...from the military forces” to forcibly remove families.<sup>12</sup> Perhaps the most remarkable instructions came from a High Court order which forbade the

<sup>11</sup> From: Judgement in Writ Petition No. 1295 of 2009, delivered on 27.11.2015;  
<https://indiankanoon.org/doc/63753725/>

<sup>12</sup> Judgement in W.P.13648 of 2016, delivered on 29.04.2019.

affected families from seeking legal remedies in lower courts, thereby abrogating their right to appeal.<sup>13</sup>

The judicial pronouncements seemed to have encouraged government officials to launch aggressive relocation measures. Justifying a November 2017 drive to displace over 600 families living in Thideer Nagar slum on Greams Road, a police inspector argued that “we are evicting these slum dwellers since these dwellings are encroachments on the Cooum riverbed that makes them prone to flooding during heavy rains”. A social worker also defended this action by referring to a 1971 act, which identified and provided legal status to some slums recognized by the TNSCB. Since no new slums had been formally recognized since 1985, the social worker argued that the slums along Adyar or Cooum river ought to be cleared.<sup>14</sup> Yet, the displacement of hundreds of families, often at a few days’ notice, violated the legal requirement of a 30-day notice period before the squatters are forcibly removed. In one instance, over 340 families were moved in the middle of a school year.

Government officials justified these actions in the name of averting yet another disaster: “If we don’t remove them now, when monsoon arrives and flood water gushes through the Cooum, we will not be in a position to evacuate the families immediately. At no cost will we allow a repeat of 2015.”<sup>15</sup> In a little over 5% of these cases, government agencies commissioned a Social Impact Assessment required under the law (IRCDUC, 2025, p. 13). Between 2015 and 2020, more than 18,700 families comprising nearly 75,000 individuals from 69 settlements were evicted, with promises of “resettlement” in the sites of Perumbakkam, Ezhil Nagar/Kannagi Nagar, Navalur, Gudapakkam, AIR Site, and Athipattu. An estimated 96% of these evictions were justified by the goals of revival of water bodies (IRCDUC, 2022, p. 7).

In the next section, we provide evidence-backed analysis of the implications of these actions, often justified as a form of adaptation against urban floods, for social or ecological resilience in Chennai.

## 5. “Slum-Free” Chennai: Implications for Social and Ecological Resilience

The broader social and institutional effects of large-scale displacement and “resettlement” plans are worth examining in the fuller context of the urban and peri-urban landscape (and waterscape, that is, floodplains, marshlands, and lake catchment areas) around the city of Chennai.

As the city of Chennai continues to grow, there is a perceptible decline in the housing opportunities accessible to low-income residents working in the city. The classification of a larger number of urban neighbourhoods as ‘objectionable,’ and the imposition of stricter norms for allowing slum improvements and housing rights for the poor within city limits, has led to ‘scarcity’ of affordable housing (Coelho *et al.*, 2016, p. 9). At the same time, the resettlement sites are characterized by poor quality of construction, a poorly developed and dysfunctional healthcare system, inadequate early child-care and educational facilities, lack of adequate water, sanitation, and waste management services, and grossly inadequate and poor quality of roads and public transport. All of this translated into lack of safety for the “resettled” families and inadequate mechanisms of holding the government agencies and officials accountable for any of these failures (IRCDUC, 2022, pp 11-26).

<sup>13</sup> Judgement in W.P.No.1294 of 2009, delivered on 30.10.2015.

<sup>14</sup> Kalyani, S. (2017, November 29). Hundreds stare at uncertain future as Thideer Nagar slum evicted. *Citizen Matters, Chennai*. <https://citizenmatters.in/thideer-nagar-slum-perumbakkam-cooum-restoration-tnscb/> (last accessed 4 July 2025).

<sup>15</sup> Times of India (Chennai edition) (13 September 2017). Greater Chennai Corporation to evict 46 more families from Cooum bank. <https://timesofindia.indiatimes.com/city/chennai/corporation-to-evict-46-more-families-from-cooum-bank/articleshow/60485130.cms> (last accessed 4 July 2025).

The TNUHDB takes a technical view of its mandate to manage the bare minimum procedures for physical eviction and relocation. Its approach to resettlement and rehabilitation of low-income urban residents outside the city is not anchored in a comprehensive framework for affordable housing and land use.<sup>16</sup> It also neglects the social geography of lives and livelihoods of target communities. As opposed to the middle and upper-class professionals whose jobs are rarely bound to the social geography of their residential situation, low-income, migrant workers often rely on social networks and place-based arrangements to support their livelihoods. The relocated communities had, in their original places of residence in the city, built housing, often built up to two or more stories, and secured amenities such as water supply, roads, streetlights and household electrical connections, which the residents had obtained by negotiating with authorities (Coelho *et al.*, n.d., p. 16). Employment, education, and healthcare were close at hand, and because of longstanding social networks and market spaces, there was a path for upward economic mobility, all of which were set back by involuntary resettlement.<sup>17</sup>

Instead of protecting people against floods, such “rehabilitation” introduces new vulnerabilities for tens of thousands of residents moved out of the city at such short notice. A survey among 9055 families that were relocated to Perumbakkam between 2017 and 2020 under the Integrated Cooum River Eco-Restoration Plan showed that 48 percent of the sampled relocated respondents experienced a significant loss of livelihoods and employment. There are no markets in the relocation sites or no designated spaces for small vendors. These effects were especially pronounced among women fish vendors (65 percent of whom lost livelihood opportunities) and women domestic workers (60 percent of whom experienced such losses) (IRCDUC and HLRN, 2021, pp 14, 16-17). Women’s mobility has been restricted because of the remoteness of, and lack of safety in, the new settlements.<sup>18</sup> The social resilience of communities, i.e. their ability to cope with external stresses and disturbances because of environmental change, has diminished after their involuntary eviction and resettlement. Ironically, government agencies and officials justified these displacements in the name of protecting poor people against flooding along waterways in the city. In practice, as others have shown, the disaster event actually allowed these agencies and officials to justify “the anti-poor policy of slum relocation...as pro-poor by framing slums as not just risky, but also at risk” (Diwakar, 2019, p. 1314). These narratives of the at-risk poor combined with the generalized discourse of bolstering city resilience following the floods of 2015. As discussed above, the question of social resilience cannot be separated from ecological resilience.

Ecological resilience within the city of Chennai is intricately tied to waterways and waterbodies inside the city and the larger catchment outside the city perimeter, which are crucial for regulating flooding. Modelling of flooding in the city found that the loss of existing tanks upstream of the city would increase the flood damage by 44% (as compared to the already high baseline of the extreme 2015 flooding), increasing the population at risk of flooding by 40.5% (Nithila Devi *et al.* 2025, p. 12). This is a remarkable insight for linking the extent of flooding within the city to the flood plains and waterbodies outside the city. This is why it is crucial to analyse the ways in which the city’s efforts to pursue a “slum-free Chennai” affects the city’s peripheral waterscapes. The state government has targeted the ecologically sensitive waterscapes for building new housing for tens of thousands of people displaced from the city.

The extent of devastation caused by the 2015 floods should have alerted the government agencies and local government officials responsible for regulating urban land use and enforcing

<sup>16</sup> Coelho, K. (2021, November 19). Missing an inclusionary vision for the urban poor. *The Hindu*. <https://www.mids.ac.in/assets/archives/urban%20poor.pdf> (last accessed 4 July 2025).

<sup>17</sup> Personal communication, Sriram and Zakir Husain, Socialist Workers’ Centre, April 11, 2023.

<sup>18</sup> Personal communication, Vanessa Peter, IRCDUC, April 12, 2023.

zoning laws. Yet, state government agencies and institutions continued infrastructure development in places and areas that were unsuitable for such development. As discussed above, this trend accelerated since the early 2000s, as TNUHDB built thousands of resettlement tenements in peri-urban Chennai. These settlements are built on the Pallikaranai marsh and in Perumbakkam, in or close to ecologically sensitive flood plains and waterways, as shown in table 2 below. Perumbakkam flooded frequently in the past – in 2015, 2018, 2019 and 2020.<sup>19</sup> Yet, in 2021, the state government constructed over 1100 new units in six-storey buildings at the Perumbakkam rehabilitation site under the central government’s Light House Project<sup>20</sup> (IRCDUC, 2023, p. 8). It was flooded again in 2021 and 2023, which means that the Light House Project did little to protect the residents displaced from the city against flooding.

Similarly, Kannagi Nagar is located next to the Okkium Maduvu, which formed the primary channel for the critical interchange of freshwater and saline water needed to sustain Pallikaranai’s marsh ecology. To compensate, the Public Works Department built a canal to directly channel waters from the Maduvu channel to the nearby Buckingham Canal. However, this constructed canal does not fulfil the absorptive and flood-mitigative functions of the Maduvu channel (Coelho and Raman, 2013, p. 154). Like Kannagi Nagar, Ezhil Nagar was developed on a large tract of marshland that is part of historically established flood pathways and served as a buffer for floodwaters. During heavy rainfall episodes they fill up and breach their banks (IRCDUC, 2023, p. 2).

**Table 2.** Location of resettlement colonies in water bodies and flood-prone areas

| Resettlement Site             | Number of houses | Location                                  | Affected Waterbody/Waterway                           |
|-------------------------------|------------------|-------------------------------------------|-------------------------------------------------------|
| Kannagi Nagar/<br>Ezhil Nagar | 23,704           | Thoraipakkam,<br>Chennai District         | Okkiyam Maduvu (South);<br>Buckingham canal (Eastern) |
| Perumbakkam/<br>Ezhil Nagar   | 21,528           | Shollinganallur,<br>Chengalpattu District | Marshland (Nookampalayam Canal)                       |
| Semmencherry                  | 6,734            | Shollinganallur,<br>Chennai District      | Marshland (Nookampalayam Canal)                       |

Source: IRDCUC, 2023, p. 10

Despite the excessive focus on low-income households, they are not the only “encroachers” within the city or without. A citizens’ report in 2016 concluded that the “government institutions and middle to upper class private residential houses are the biggest encroachers of the waterbodies and waterways” (Arappor and Magasool, 2016, p. 39). In 2015, the Kamarajar Port owned by the Government of India was filled with earth dredged from the Ennore harbour to “reclaim” a section of water identified as salt pans and mud flats in official maps. Such developments interfere with flood regulation in the area, which includes the area where the

<sup>19</sup> “In the 2015 flood, for 7 days, the flood water had risen to 3 to 4 feet because they had built houses in water bodies. In 10-storey buildings, there was no power, and elevators became non-functional. Toilets became unusable. For one bottle of water, people had to walk down 10 floors and climb back up. The elderly were not able to come down to collect the food supplied as relief.” (Personal communication, Sriram and Zakir Husain, Socialist Workers’ Centre, April 11, 2023.)

<sup>20</sup> The Light House Projects are model housing projects comprising nearly 1,000 houses at each location showcasing use of the best of new-age technologies, materials and processes in the construction sector, constructed by leading private agencies.

Kosasthalaiyar river flows into the Bay of Bengal.<sup>21</sup> The proposed international airport in Parandur will be constructed atop agricultural wetlands, or water or land commons. Large-scale constructions and rapid increase in the built-up area in Parandur will greatly increase the risks of overwhelming the Adyar river with floodwaters, which contributed to the 2015 Chennai floods.<sup>22</sup>

The Advisory Committee for Mitigation and Management of Flood Risk in the Chennai Metropolitan Area (CMA)<sup>23</sup> recommended protecting drainage pathways of floodwater and land that might serve as flood plain or flood cushion, and declaring them as "No Development Zones." It also recommended construction of new drainage canals and link canals in specific locations, automated pumping stations, completion of stormwater drains in the GCC area, and stoppage of sand mining in riverbeds that had damaged causeways.<sup>24</sup> This committee's final report is not in the public domain and no reasons have been cited for keeping it confidential.

Recent developments continue to undermine the ecology of the Pulicat lake and wetland complex north of Chennai, which act as a massive floodwater catchment site and climate buffer when cyclones hit the north Tamil Nadu coast. The Indian multinational Adani Group has proposed an expansion of the Kattupalli port south of the Pulicat lake, from the existing 300 acres to 6111 acres, which will bring the northern boundary within 2 km of the Pulicat Bird Sanctuary. The expanded area would be inside the Eco Sensitive Zone (ESZ), sited on a high coastal erosion zone, and encroach on large tracts of riverbed and wetlands, including the Kosasthalaiyar river, backwaters, salt marshes and creeks (Nagarajan *et al.*, 2021, p 14). In March 2024, the District Collector of Tiruvallur reportedly prepared for denotifying parts of the legally protected wetland-rich 10-kilometre Eco Sensitive Zone around the Pulicat Bird Sanctuary, which has been the target of the developers of industrial parks, factories, and other real estate projects.<sup>25</sup>

The analysis of urban and peri-urban developments over time, including since the devastating Chennai floods of 2015, suggests that the root cause of maladaptation is related to skewed urban planning, which continues to enable high-end constructions in sensitive zones while displacing the urban poor to ecologically sensitive waterscapes around Chennai.

## 6. Conclusion: Lessons to Foster Climate Resilience

Discussions of climate adaptation and resilience often presume a positive symmetry, though interdisciplinary research on the topic cautions us against such assumptions. The debates following the Chennai floods of 2015 have drawn attention to the failure of state agencies and city administrations to pursue a model of urbanization that is respectful of its ecological context. For example, courts have chastised the administration for destroying "water bodies or water courses formed naturally for the benefit of mankind" and questioned the

<sup>21</sup> Jayaraman, N. (2015, 25 December). *Shock, but no awe*. The Hindu; <https://www.thehindu.com/opinion/op-ed/Nityanand-Jayaraman-on-Chennai-floods-Shock-but-no-awe/article62116584.ece> (last accessed 4 July 2025).

<sup>22</sup> Jayaraman, N. (2022, 20 May). Growing pains: Why Chennai's run-in with disasters will only worsen. Question of Cities. <https://questionofcities.org/growing-pains-why-chennais-run-in-with-disasters-will-only-worsen/> (last accessed 4 July 2025).

<sup>23</sup> Popularly known as the Thiruppugazh Committee, after its Chair, the retired administrator Dr. V. Thiruppugazh.

<sup>24</sup> Shivakumar, C. (2023, 8 December). Action on Thiruppugazh panel report would have saved Chennai? *The New Indian Express*. <https://www.newindianexpress.com/states/tamil-nadu/2023/Dec/08/action-on-thiruppugazh-panel-report-would-have-saved-chennai-2639537.html> (last accessed 4 July 2025).

<sup>25</sup> Srimathi, G. (2024, May 5). Pulicat in peril, again. *The Hindu*. <https://www.thehindu.com/sci-tech/energy-and-environment/pulicat-in-peril-again/article68140658.ece> (last accessed 4 July 2025).

authority of state agencies to “alienate or re-classify the water bodies for some other purposes.”<sup>26</sup> However, other court directives have also targeted low-income residents in a prejudiced manner, including by prohibiting judicial appeals.

The evidence presented above suggests that long-term changes in central government policies, multi-lateral agency programs, and state-level support for the urban poor have shaped Chennai’s responses to urban floods. In recent years, we have witnessed further consolidation of the tendencies to blame the low-income neighbourhoods (“slums”) located along water bodies and waterways for the city’s flooding. Over the years, those narratives have narrowed down to focus almost entirely on the city’s slums, which detracts from addressing the more systemic challenges of urban sprawl in an ecologically sensitive coastal zone. This adds to past research suggesting that policy responses to climate change, including climate resilience and adaption are mediated by the socioeconomic and political context. Moreover, our research shows that the city’s flood disaster has been instrumentalized selectively to serve its middle-class residents and decision-makers. Under a policy context that excludes most city residents from participating actively in the policy process, decision-makers have few incentives to pay heed to the interests and perspective of the city’s low-income residents.

The analysis we presented above makes another important contribution to the scholarship on climate responses. We showed that skewed policy responses are not only unjust; they are also ineffective. Because the policy process lacks accountability and neglects the city’s socioecological context, the “resettlement” of residents from the city’s slums into the ecologically sensitive zones in the surrounding areas further disrupted the city’s waterscapes. As a result, despite relocating over 80,000 people out of the city and onto flood plains and marshlands on the city’s outskirts, the city continues to experience massive flooding, including in December 2023, when cyclone Michaung hit Chennai, and a large proportion of people from vulnerable groups like migrants, the elderly, people with disabilities, and marginalised communities living in low-lying areas and near drainage lines were evacuated and temporarily relocated (Sphere India, 2023, p. 43). Middle-class desires for a slum-free Chennai and a failure to prevent the siting of commercially and geo-strategically important infrastructure in ecologically sensitive areas of peri-urban Chennai have prevented meaningful responses to the city’s flooding woes. It has also led to continued degradation of the city’s ecology.

The failure to implement effective flood mitigation and climate resilience plans, nearly a decade after the 2015 Chennai floods, invites deeper investigations into the broader implications of socio-political and ecological contexts, beyond the all-important questions of social equity and justice. Future research would do well to consider proposals for introducing mechanisms of accountability in climate resilience and adaptation.

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<sup>26</sup> From: Judgement in Writ Petition No. 1295 of 2009, delivered on 27.11.2015; <https://indiankanon.org/doc/63753725/>

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**Whose Justice? Forest Rights, Civil Society, and the Remaking of  
Environmental Governance in the Western Himalayas****Aanchal Seth**

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**Abstract:** In the Western Himalayas, the idea of justice in forests begins with the people who live alongside them. Here, forests are not just resources but part of everyday life, memory, and community rules. This paper follows the journey of civil society organisations (CSOs) in Lahaul-Spiti and Kinnaur as they work to claim Community Forest Rights (CFRs) under the Forest Rights Act (FRA), 2006. For twelve months, I travelled between villages, joined local meetings, spoke with elders and women leaders, and studied the records and campaigns of these groups. The aim was to see how CSOs come together, how they deal with traditional authorities, and why CFRs have not been implemented despite active mobilisation. The study finds that CSOs differ in form and approach but share the goal of keeping forests in community hands. They have slowed down some development projects and revived old conservation practices, yet face stalled claims due to unclear rules, official resistance, and competing economic plans. Customary systems in Lahaul-Spiti and Kinnaur remain essential, though not always open to all voices. Without changes to how claims are processed and without broader inclusion in decision-making, these rights are likely to remain on paper.

**Keywords:**

1. Western Himalayas
2. Civil Society
3. Community Forest Rights
4. Himachal Pradesh
5. Environmental Justice

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**1. Introduction**

In the Western Himalayas, forest justice is not an abstract phrase. It is part of how people live, tied to the rhythms of collecting fodder, grazing animals in alpine pastures, gathering forest produce and observing rules about when a tree can be cut or a meadow rested. Forests here hold economic value, but they are also woven into stories, rituals and the shared memory of communities. When the Forest Rights Act 2006 (FRA 2006) was passed, it recognised that these connections matter. The law recognises and restores two main kinds of rights: Individual Forest Rights (IFRs) and Community Forest Rights (CFRs). IFRs allow forest-dwelling families to live on

and cultivate the forest land that sustains their livelihoods. CFRs, on the other hand, acknowledge the shared rights of entire communities to own, protect, and manage the forests they have relied on for generations. These rights are explicitly meant for Forest-Dwelling Scheduled Tribes and Other Traditional Forest Dwellers, whose lives and cultures are deeply tied to the forest. Once these community rights are recognised, they are documented through official titles that legally affirm a community's ownership and authority over specific forest areas. The gram sabha, or village assembly of all adults, has a central role in this process. It is responsible for verifying claims, ensuring fair decisions, and granting no-objection certificates before any forest land can be used for development activities. Together, these provisions ensure that communities retain control over their forests and that their traditions, livelihoods, and ways of life are protected and respected under the law (Ministry of Tribal Affairs [MoTA], 2006).

In Himachal Pradesh, Lahaul-Spiti and Kinnaur are scheduled districts under Article 244 (1) and the Fifth Schedule of the Constitution. A district is classified as Scheduled when a significant proportion of its population belongs to the Scheduled Tribes. Scheduled Tribes are communities recognised for their unique social and cultural practices and dependence on forests. Therefore, these districts, which constitute more than 50% of scheduled tribes, receive special legal and administrative safeguards to protect tribal rights, culture, and livelihoods. Along with the FRA 2006, this ensures that tribal communities can formally manage and benefit from their forest lands while preserving their traditions and way of life (MoTA & UNDP, 2021). Even with the Scheduled Districts recognition, the FRA 2006 has largely overlooked them. These districts have long managed their forests collectively, but so far, no CFRs claim has been approved.<sup>1</sup> The law exists, but on the ground, these communities' rights remain unacknowledged. This absence is puzzling given the strong presence of local governance systems and the mobilisation by civil society organisations (CSOs) in recent years. Understanding forest justice requires moving beyond neat images of harmonious self-governance and instead examining the contested arenas in which power, knowledge, and access are decided. Forests are not simply ecological spaces but political landscapes where struggles over property, authority, values, and recognition unfold unequally. Forest justice, therefore, is less about idealised participation and more about confronting the entrenched exclusions that mark how resources are controlled, who benefits from them, and how cultural identities are acknowledged or denied (Sikor, 2010).

At the same time, thinking critically about justice in forests means questioning the very production of environmental knowledge. Governance and policy are shaped not only by institutional reforms or rights discourses but also by narratives that privilege some forms of expertise and marginalise others. A critical political ecology lens highlights this co-production of knowledge and politics, showing how claims about sustainability or efficiency often conceal unequal power relations and reproduce vulnerabilities. Justice, then, cannot be reduced to technical solutions or distributive outcomes: it resides in addressing the politics of who defines problems, whose values become legitimate, and whose voices remain excluded (Forsyth, 2008; Sikor, 2010). In the CFRs context, official language about "forest classification" or "procedure" often hides the broad discretion that officials have to delay or reject claims without openly opposing them (MoTA, 2006).

CSOs have become key actors in this space. In Lahaul-Spiti and Kinnaur, they take many forms, from small volunteer groups formed to oppose a single project to more permanent advocacy networks with a broader agenda. They translate legal provisions into local idioms, run awareness campaigns, support the documentation of claims and represent communities in

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<sup>1</sup> The data for district wise was collected by filing Right to Information in Tribal Department Himachal. This data is up to March, 2025.

meetings with officials. They also provide a platform for collective action that individuals might otherwise face alone.

However, their work unfolds in a contested and unequal field. Studies of decentralisation in the Himalayas have shown that localising forest governance does not always lead to greater equality or better conservation. It can also strengthen the hand of local elites, allowing them to capture benefits while excluding poorer households (Baland et al., 2010). Evidence from other parts of the Indian Himalayas indicates the conditions that support successful community forest governance: inclusive membership, transparent and enforceable rules, mechanisms for resolving disputes, and supportive state policies (Agrawal & Chhatre, 2006). These conditions are often absent in Himachal's CFRs processes, where weak oversight, unclear timelines and administrative inertia stall progress. Where governance is weak, there are also ecological consequences. Forests tend to suffer when local management institutions are weak, leading to fewer species and poor growth of new trees (Ranjan, 2018).

The rules themselves are not always clear. The FRA 2006 says one thing, but other forest and revenue laws have their claims, and departments read the exact text in very different ways (Nandwani, 2022). What should be a straightforward process of identifying land, filing a claim and getting it approved turns into a maze. Nobody is sure who has the final word. In that confusion, disputes flare up. Sometimes it is two villages arguing over a boundary, sometimes the split runs right through a single community. They reflect what some scholars describe as a broader Himalayan governance crisis, where technical fixes fail because they ignore the political and economic structures that drive resource control (Satyal et al., 2017).

This is the terrain in which CSOs must operate: between state agencies reluctant to cede authority, community institutions that can be internally unequal and a policy framework whose rules are open to competing interpretations.

Not recognising CFRs is not just a paperwork problem. It affects how forests are managed and their long-term development. Research from other Himalayan areas shows that forests managed by local communities in active, inclusive ways tend to be healthier, with greater biodiversity and better natural regeneration. Well-managed forest areas, especially those established before 1980, are healthier and support more plant species (Pathak et al., 2021). Looking at this through the lens of justice helps us better understand the problem.

First, recognition justice means acknowledging and respecting tribal peoples' inherent rights to forests, including ownership, access, and their cultural connections. It is important because it affirms their identities and recognises them as the rightful stewards of the land. Second, distributive justice is about how benefits and responsibilities are shared. This matters both within the community and between communities and the government. Third, procedural justice is about making sure decisions are made fairly and openly. Everyone who is affected should have a voice, and the process should be transparent and accountable. Success in community forestry depends more on local fairness, sharing benefits, and respect for culture than on external funding or technical assistance (He et al., 2021; Nikolakis, 2022).

In Himachal Pradesh, CFRs still fall short on all these points. Restorative justice is missing because communities lack formal rights to the forest resources they have depended on for generations. Distributive justice suffers when a few influential people in local institutions take most of the benefits, leaving many others out. Procedural justice breaks down when the process of claiming rights drags on without clear answers, or when meetings are dominated by a small group, shutting out others. The politics here are complicated. Sometimes officials and community members switch roles, protecting forests at one moment, and supporting their exploitation the next, especially when short-term profits are involved (Baviskar, 2025). This shows why it is important not to unthinkingly copy "best practices" from other places without

understanding the local political and economic realities. What works somewhere else might mask the daily struggles over who gets access and authority in another place (Forsyth & Sikor, 2013).

This paper builds on these insights to examine the formation and role of CSOs in two tribal districts of Himachal Pradesh, focusing on their engagement with the stalled CFRs process. It draws on twelve months of fieldwork, including interviews, participant observation and analysis of CSOs records, to explore how these organisations navigate the tensions between community mobilisation, state resistance and economic pressures such as hydropower and road building. The aim is to shift the question from why CFRs have not been implemented to whose interests are served by their absence, and what kinds of forest justice —ecological, procedural, and distributive — can be realised in the Western Himalayas.

## **2. Research Framework**

### **2.1. Research Approach**

This study follows a qualitative approach to understand how CSOs in Lahaul Spiti and Kinnaur mobilise forest rights while navigating both formal legal frameworks and local customary systems. A qualitative design was applied because it allowed us to work closely with people in their contexts, hear their perspectives, and observe their everyday practices. This approach enabled exploration of the strategies organisations use, the challenges they face, and the meanings they attach to their work, rather than reducing these complex processes to numbers or summaries (Creswell, 2013).

Four central questions guided the research. The first examines how CSOs mediate forest rights claims and promote awareness in the tribal Western Himalayas. The second explores why the implementation of CFRs under the FRA 2006 has remained absent in Himachal Pradesh, despite mobilisation and awareness efforts. The third asks how customary forest governance systems coexist with, influence, or come into conflict with state-led conservation regimes. The fourth considers the kinds of legal, ecological, and social outcomes that emerge from civil society mobilisation. These questions shaped the study design, site selection, and method selection.

### **2.2. Selection of Civil Society Organisations**

The process of identifying CSOs involves combined field visits, conversations with community members, examination of organisational records, and review of local media reports. The study included only organisations founded and led by residents that operated entirely within their districts. This meant the study centred on organisations deeply embedded in their communities' social and cultural life. They differed significantly in their size, structure, and resources. Some were small, volunteer-led groups working informally, while others were formally registered bodies with established governance systems. This diversity enabled the examination of different ways of organising and advocating for forest rights within the same cultural and geographical context.

### **2.3. Data Collection**

Fieldwork was carried out over twelve months, using multiple qualitative methods recommended for applied field research.<sup>2</sup> Participant observation was central to the research

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<sup>2</sup> This study is part of the broader doctoral work on debates on tribal forest rights in Himachal.

process. I attended public meetings, forest rights workshops, protest gatherings, and community awareness events. These settings provided the opportunity to observe how advocacy unfolded in practice and how participation was organised and sustained. They also revealed the importance of rituals, symbols, and cultural references, which were woven into collective action and gave meaning to claims that might otherwise appear only procedural or legal.

Semi-structured interviews were conducted with members of the selected organisations in workplaces, community halls, and village meeting spaces. This format allowed for guided conversation while giving participants space to share their experiences in their own words. In situations where travel was not possible due to poor road access or seasonal closures, interviews were conducted by telephone to ensure representation from all relevant areas.

Desk research complemented the fieldwork. I reviewed petitions, official forest rights claims, government circulars, and organisational reports to understand the administrative and legal setting in which these organisations work. Social media platforms were also examined to study how organisations share information, frame messages, and connect with people across distances. Digital communication was essential in geographically isolated areas where physical interaction is often limited by terrain or weather conditions.

## **2.4. Data Analysis**

The material from observations, interviews, documents, and social media was analysed using Braun and Clarke's (2013) thematic approach, which involves systematically coding data, identifying patterns, and developing themes. This method provides a flexible, rigorous framework to interpret complex qualitative data, uncovering meaningful insights related to the research questions. I began by conducting close readings of all the data to identify recurring topics and patterns. These were coded and grouped into broader themes, including bureaucratic challenges, legal literacy, ecological stewardship, and mobilisation strategies. Themes were refined as the analysis progressed. Triangulating information from multiple sources helped confirm findings and reduce bias, ensuring that the results accurately reflected the realities of CSOs and their communities.

This approach enabled the systematic answering of the guiding research questions. It documents how legal and customary systems interact, why formal recognition of CFRs has stalled, how civil society bridges these systems, and the legal, ecological, and social outcomes that have emerged. By combining sustained field engagement with careful analysis, the study provides a grounded and reliable account of how communities in the Western Himalayas organise, negotiate, and act to protect their forests.

## **3. Results and Discussion**

### **3.1. Community Forest Rights in Himachal Pradesh: The Case of Lahaul-Spiti and Kinnaur**

The FRA 2006 was meant to reset the balance between the state and forest-dependent communities by recognising rights that had been historically denied. Among these, CFRs carry particular significance because they provide not only secure access to forest resources but also the authority to participate in their governance. In Himachal Pradesh, however, and especially in the tribal districts of Lahaul-Spiti and Kinnaur, the move from policy to actual practice has been halting and incomplete.

Official statistics and Right to Information responses show just how slow the process has been. By May 2025, only 146 CFRs claims in the entire state had resulted in titles, while 537 remained pending (MoTA, 2025). In Lahaul-Spiti, no CFRs had been issued. Ten claims of CFRs in the Spiti subdivision were still pending in March 2025, and the Lahaul subdivision could not provide even basic details on the pending CFRs. In Kinnaur, no CFRs titles were issued; 21 claims were pending at the district level, and another 30 awaited decisions at the sub-divisional stage.<sup>3</sup>

These numbers are difficult to justify given that both districts have Scheduled Tribe populations exceeding fifty per cent, a higher proportion than in many states where CFRs have advanced far more quickly (Census of India, 2011). In Madhya Pradesh, Odisha, Gujarat and even the newly reorganised Jammu and Kashmir, thousands of CFRs have been distributed with state support (MoTA, 2025). This contrast points to a larger truth: legal eligibility alone is not enough. Without political will, clear institutional procedures and a readiness to devolve control, laws like the FRA 2006 remain little more than promises.

The difference becomes observable when looking at how people use the forest resources. A right written as law does not automatically translate into benefits for anyone unless it is effectively implemented. As Ribot and Peluso (2003) argue, the realisation of such rights depends on the networks, institutions, and resources that enable communities to incorporate them into their everyday lives. In Himachal Pradesh, this bundle of powers is rarely available to communities. Claims stall at the sub-divisional or district level, not because the law is unclear, but because forest departments hesitate to share control, bureaucratic routines favour inaction, and vast tracts of land are tied up in the ambiguous category of Protected Forests or in laws previously misread by the government. There is also a communication gap between the authorities and local people.

These obstacles are not new. The state's forest governance history has been shaped by alternating phases of local involvement and reasserted state dominance (Vasan, 2001). The present situation fits that pattern: while the FRA 2006 appears to offer a shift toward community control, its implementation in Himachal shows the persistence of centralised authority, particularly over forests considered ecologically or commercially important.

Power dynamics within communities further complicate the picture. As Naidu (2005) has shown, differences in wealth, caste and political influence shape collective action in Himalayan villages. Such differences affect who engages in CFRs claims and who stands to gain from them. Elite capture, where local or bureaucratic elites shape outcomes to their advantage, is a documented risk in forest governance (Rana, 2014). This means that even when claims are filed, they may not reflect the needs or priorities of all community members.

Gender inequalities add another, often overlooked, layer. Women in Lahaul-Spiti and Kinnaur are deeply involved in day-to-day forest care, closing forests for regeneration, leading planting cycles and maintaining sacred groves. However, their contributions remain largely invisible in formal claim processes. Early research across rural South Asia shows that participation in name rarely translates into decision-making authority for women (Agarwal, 2001), and the CFRs process here is no exception.

The ecological argument for recognising CFRs is strong. Comparative studies demonstrate that secure tenure and community-led governance often produce better conservation outcomes than centralised, exclusionary approaches (Brandt et al., 2017; Larson et al., 2010; Poffenberger et al., 1996).

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<sup>3</sup> The data on Lahaul-Spiti and Kinnaur were collected by me from the district administration by filing Right to Information for same. The state data is from the official Indian Government site maintained by Ministry of tribal affairs data up to May, 2025.

In this context, the lack of CFRs titles is more than a matter of slow administration. It represents a lost chance to strengthen governance systems that have already shown they can sustain forests. Elsewhere in India, CFRs recognition has given communities the legal assurance to continue managing forests in accordance with their own traditions and ecological knowledge. In Himachal Pradesh, these practices continue but remain vulnerable to state encroachment or commercial exploitation without formal recognition.

The experience in Lahaul-Spiti and Kinnaur makes clear that the obstacles to CFRs go far beyond the law's written provisions. They grow out of long-entrenched ways of holding power, shaped by years of central control and by inequalities that run through and beyond the community. Until these roots are acknowledged and dealt with, the FRA 2006 will remain more of an idea on paper than a force for real change in forest governance in Himachal Pradesh. For this reason, it is vital that CSOs, many of which have emerged from within these communities, are recognised by the relevant authorities in both districts as legitimate actors in decision-making processes.

### **3.2. Civil Society Organisations: Their Origins, Identity, and Ways of Working**

The politics of forest rights in Kinnaur and Lahaul–Spiti is sustained less by the official machinery of the state and more by the associational life of these valleys. CSOs, whether voluntary forums, village-level committees, youth collectives or registered non-government organisations, have become the institutions through which people interpret the FRA 2006, discuss their anxieties, and shape their demands. Their origins lie in the local context of struggle, and their identities are inseparable from the communities they represent. Their ways of working combine petitions and meetings with cultural expression, pamphleteering in local languages, and direct conversations with villagers. Putnam's reflections on associational life are especially resonant here: it is not the abstract strength of the state but the density of collective associations that enables communities to act (Putnam, 2000).

In Kinnaur, the Him Lok Jagriti Manch (Himachal People's Awareness Forum) has been a key forum. It was formed in late 2008, in the immediate years after the FRA 2006 was passed, by activists, teachers, and retired officials who felt the need for a common platform to discuss rights. The Manch is not a registered non-governmental association. It is a voluntary forum based in Reckong Peo. What made it important was not only the issues it raised but the way it brought people together. When I met the members in June 2024, they told me they had printed pamphlets in Hindi and the local dialect. Sometimes these were typed on old typewriters. Sometimes they were just written by hand. The aim was to explain the Act in a way villagers could understand. They said that unless people felt the law was theirs, it would remain just a piece of paper. Volunteers carried the leaflets from village to village. In some places, they stayed back in courtyards or temples to answer questions. One member said, *"We had to say again and again, this is not a law for others, this is yours."* At first, families filed IFRs claims for small plots. Slowly, as people learnt more, they began to ask about grazing commons and deodar groves. That is how the demand for CFRs started to take shape.

The Hangrang Sangharsh Samiti (Hangrang Struggle Committee) in Nako village, Kinnaur, moved in a similar direction, though its starting point was different. It began with opposition to a hydropower project. When I spoke to members in July 2024, they said the protest gave them a hard lesson. No matter how strong the resistance, projects would still come unless communities could speak through the law. Step by step, they began to connect their struggle with the FRA 2006. They saw that provisions for community consent and rights could become

their defence. Now, the Samiti says that no-objection certificates under the FRA 2006 should not be treated as a formality. They must be seen as binding statements of community power.

Youth activism has also grown strong in Kinnaur. The campaign called No Means No brought young men and women together. They turned legal ideas into slogans and drawings. In a group discussion in Moorang in July 2024, primarily young men explained how they made posters, painted rocks, and short videos for social media. Later, they carried these messages back to their villages. Their role was not only to join protest marches but also to explain the law to the elders. One of them told me, *“I would hold up a pamphlet and say, See, this Act says your signature can stop a project.”* For them, IFRs were important but limited, as they secured only family plots. Without CFRs recognition and binding consent procedures, they argued, these individual gains could be swept away.

The Zilla Van Adhikar Sangharsh Samiti (District Forest Rights Struggle Committee) represents the more organised face of this activism. Operating across the district, it gathers information from villages, prepares petitions, and presses the state to act. Interviews in July 2024 revealed how its leaders consciously shifted attention away from household claims alone. They repeatedly emphasised that forests cannot be fragmented family by family, and that only community rights can preserve the commons. Their advocacy is closely tied to the argument that no objection certificates under the FRA 2006 should serve as a legal safeguard for communities before any project is granted clearance.

Cultural collectives complement these forums. Kyang is a group of youth that emerged alongside the ‘No Means No campaign and focused on direct mobilisation in villages. It held meetings in village squares and devised local performances to spark debates. Pahadi Poet (Mountain Poet) and youth pages similarly use verse and short writings to remind communities that rights are not abstract entitlements but part of their lived heritage.

Village committees reveal another form of associational practice. The Jangi Sangharsh Samiti (Jangi Struggle Committee) emerged from concerns about the possible loss of deodar forests and grazing lands. Its members often describe their claim not as technical but as a matter of dignity, for to lose the forest is to lose the essence of their village life. The Kinnaur Parya Varan Samrakshan Sangharsh Samiti (Kinnaur Environment Protection Struggle Committee) functions as a broader umbrella, linking several valleys to speak in unison on environmental and rights-based issues. These Samitis show how local grievances expand into district-wide articulations of rights.

In Lahaul and Spiti, there are fewer associations than in Kinnaur, but the ones that exist are significant. The Lahaul Spiti Ekta Manch (Lahaul Spiti Unity Forum) was among the first to advocate bringing people across the valley together. When I met the elders in Keylong in August 2024, they told me that the Manch (forum) had begun by addressing land issues. Over time, it also began to take up questions about forests. Its role has been to nurture a sense of valley-wide identity, ensuring that rights are not seen only in fragments. The Lahaul Spiti Van Adhikar Manch (Lahaul Spiti Forest Rights Forum), a more recent platform, has made the FRA 2006 central to its work. After a few IFRs were recognised in Lahaul, villagers realised that the commons were still unprotected. At a meeting in Keylong in September 2024, members explained how families initially rejoiced when they received their papers. However, they soon felt uneasy as they saw that pastures and forest tracts still belonged to the state. This unease led to a turn toward CFRs claims, which the Manch now champions through panchayat resolutions and petitions.

Mahila Mandals (Women's Association) in Lahaul add an everyday texture to the movement. Traditionally associated with welfare and savings, they have begun to take up ecological issues. In Tandi, women explained in August 2024 that for them, forests are not an

abstract category but the daily source of fuelwood and fodder. If commons are lost to outside projects, their labour becomes impossible. By linking gendered work to collective rights, Mahila Mandals reframe the struggle in terms of survival and dignity.

In Lahaul and Spiti, registered local organisations have become increasingly significant. The Save Lahaul Spiti Society, which began with a focus on cultural preservation, now places equal emphasis on environmental concerns. In Sissu in September 2024, members explained how they prepared detailed submissions arguing that ‘no objection certificates’ under the FRA 2006 must be treated as binding. That recognition of the CFRs is essential for protecting fragile mountain landscapes. The Spiti Civil Society, established by young professionals in Kaza Village, Spiti, has followed a similar trajectory. Initially centred on heritage, it soon recognised that without secure community rights, heritage itself would remain at risk. By documenting grievances and converting them into petitions and reports, its members lend institutional weight to demands that might otherwise be disregarded as purely emotive.

Across both districts, a typical pattern emerges. The early emphasis fell on securing Individual Forest Rights, which brought satisfaction to many households but also exposed the limits of individual entitlements. Once land titles were distributed, it became clear that pastures, groves, and forests remained outside the community’s control. As one farmer in Lahaul remarked in September 2024, *“We were happy when families got their plots, but then we saw the pastures still belonged to the state”*. This recognition has since shaped collective strategies, explaining why organisations of varied backgrounds now converge on the same demand: the recognition of CFRs and a legal requirement that consent procedures under the FRA 2006 be treated as mandatory before any clearance is granted.

Civil society in Kinnaur and Lahaul–Spiti is, therefore, a layered associational world. From pamphlets printed in regional languages to cultural songs and youth slogans, from women’s Mahila Mandals to district-level Samitis, the forms vary widely. At the same time, their identity is anchored in a shared belief that rights have value only when experienced and claimed as collective entitlements. The way they organise themselves shows that law takes on meaning only when it is translated into familiar forms, such as pamphlets, songs, or village meetings, that connect with everyday life. This illustrates how democratic life grows not simply through formal institutions but through everyday associations that build trust and encourage people to act together (Putnam, 2000). For the people of these valleys, CSOs are not auxiliary to law but the very medium through which law enters lived practice.

### 3.3. Customary Forest Governance and Its Relationship to State-led Conservation

The mountains of Lahaul–Spiti and Kinnaur are home to systems of forest governance that long predate the arrival of state forestry. These arrangements are not simply remnants of a distant past but continue to provide moral and social order for how communities interact with their forests. They emerge from a combination of ecological knowledge, religious faith, and the practical necessities of survival in a fragile environment where the balance between use and regeneration has always been delicate.

In both these tribal districts, people follow their customary forest governance laws. In Kinnaur, people believe that their forests, pastures, water sources and animals are protected by local guardian deities known as the ‘Shu’. This belief system, called the Shu culture, combines elements of Hinduism, Buddhism and older local traditions. It shapes the way communities care for their surroundings. Villages have deity committees that not only look after rituals but also manage how resources are used. They decide when people can collect pine nuts, herbs, and grasses, and they regulate grazing so that the land is not harmed. When someone ignores the

rules, they may be fined or asked to perform a ritual to restore balance with the deity. These practices help to protect resources and also keep the community united (Bhagat & Dogra, 2022).

Alongside the 'Shu' system, the Wazir rules form another important pillar of customary governance in Kinnaur, Lahaul and Spiti. The Wazir is a respected local authority, usually hereditary, but his role is not limited to leadership. The Wazir represents a body of customary law that regulates village life. These Wazir rules cover the use of forests, pastures and water, and are understood by the community as binding law. Decisions about who can cut timber, when animals may graze or which areas must remain closed are taken in village meetings, where people can voice their concerns. However, the Wazir ensures that the final decision is carried out. Violations are punished with fines, social disapproval, or, in some cases, spiritual penalties, which give these rules the same weight as formal law in the local context. In Spiti, for example, Buddhist monasteries own some forest areas but leave their management to village groups, who continue to govern them under these customary rules (Sinha, 2015; Gupta & Singh, 2003).

What makes both the Shu committees and the Wazir rules effective is their flexibility. They are not rigid codes but living systems that adjust to circumstances. During particularly harsh winters, villagers may be allowed to graze their herds in areas that are usually restricted. This balance allows survival without causing lasting harm to the land.

In Lahaul, Spiti and Kinnaur, these customary institutions show how culture, belief and law are closely tied to the management of forests and pastures. They are not written in state law but have been accepted and followed by communities for generations. These practices have enabled people to survive in a fragile mountain environment while also protecting their cultural identity.

However, it would not be right to think of these customary systems as rigid or frozen in time. They have shown great flexibility in responding to new challenges. In many of my interviews, people described this as the moment when the forest, once a part of daily life, was turned into something managed by distant officials. In both Kinnaur and Spiti, for example, village councils have begun to link their traditional decision-making processes with those introduced under the FRA 2006. What we see here is a form of hybrid governance, in which a decision first receives the sanction of the deity or the village council and is then written into official records. This blending is not always smooth and can sometimes lead to friction, but it shows the resourcefulness of communities in keeping their systems alive while working within state structures.

Seen through Elinor Ostrom's lens of polycentric governance, these practices make clear that there is not just one centre of authority (Ostrom, 1990). The state, the local deity, oral codes, and statutory committees all operate simultaneously, side by side. This creates a plural order that can strengthen conservation but can also complicate it. What binds people to their forests is often trust and reciprocity, which can secure compliance far more effectively than laws imposed from above. Still, because these systems rarely receive formal recognition, they remain exposed and fragile whenever state projects or large-scale development moves into community lands. The FRA 2006 promised a way to bridge this divide by recognising CFRs and giving legal weight to practices people have followed for generations. However, translating spiritual norms and oral codes into legal documents has not been easy. Villagers expressed frustration that, while they know their rules by heart, they struggle to produce written evidence or maps when asked. Officials, for their part, frequently see ritual consultations as superstition rather than legitimate governance. It is in this gap that the real challenge lies. The law promises to protect customary institutions, but the way it demands evidence often undermines their spirit.

In practice, what is emerging is neither a pure revival of tradition nor a complete surrender to bureaucracy. It is instead a layered form of governance where customary and statutory logics

intermingle. This pluralism, though fraught, may offer one of the most promising paths for ecologically sensitive and culturally rooted forest management in the Himalayas.

### **3.4. Environmental Justice in the Context of Forest Rights**

The debate over forest rights in Kinnaur and Lahaul-Spiti is not simply about who can use forest resources. It raises more profound questions about justice, belonging, and recognition. In these regions, environmental justice is understood in broader terms: whether communities can participate in decisions, whether their cultural relationships with forests are valued, and whether the benefits and burdens of development are shared fairly. To interpret these dynamics, this study draws on Elinor Ostrom's work, which emphasizes the value of governance systems that are locally adapted and have multiple centres of decision-making, and on David Schlosberg's framework, which understands justice in terms of fair distribution, meaningful participation, recognition, and the ability of communities to live with dignity (Ostrom, 1990; Schlosberg, 2007).

One key dimension is procedural justice. Communities have consistently noted that major decisions affecting their landscapes are often made without their meaningful participation. Hydropower projects, road expansions, and even conservation schemes have proceeded with limited or token consultations. During my fieldwork in July 2024 in Kinnaur, villagers repeatedly narrated that they learned of proposed projects only after survey teams arrived, rather than through prior consultation. Similar experiences were shared in Spiti a few weeks later, where people said that decisions on declaring eco-sensitive zones were taken in distant offices with little regard for local voices. The result is a pervasive feeling of exclusion, as though the communities most affected are the least considered. From an Ostromian perspective, genuine procedural equity requires rules that are created and applied locally rather than handed down through distant bureaucratic orders (Ostrom, 1990). In practice, the absence of such locally grounded arrangements often produces a strong sense of exclusion. Communities that depend most on forests feel that they are the least considered in decisions that affect their everyday lives.

Distributive justice is evident in the unequal burdens these communities bear. Restrictions on forest use, the diversion of land for dams, or the tightening of rules under state conservation regimes have often come without adequate compensation. In interviews, local farmers in Lahaul explained that while they faced restrictions on seasonal grazing, commercial ventures in the valley rarely encountered the same scrutiny. Schlosberg's emphasis on distributive justice underscores that burdens and benefits must be balanced not only among current actors but across scales of livelihood and industry (Schlosberg, 2007). This double standard, in which local subsistence practices are penalised while industrial-scale activities proceed with ease, was a recurrent theme. It underscored the sense that the burdens of conservation and development are distributed unevenly.

Equally significant is recognition justice. For Kinnauri and Lahauli alike, forests are not inert resources but sacred and cultural spaces. Sacred groves, ritual forests, and sites associated with deities are essential to community identity. The state's tendency to treat these spaces merely as biological assets ignores how communities live their relationships with the forest. Schlosberg further argues that recognition justice demands honouring cultural identities and knowledge systems, which in Kinnaur and Spiti are inseparable from forest life (Schlosberg, 2007). Women, in particular, expressed this most vividly. In mahila mandals across Lahaul, women described how they bear the primary responsibility of collecting fodder and fuelwood and conducting household rituals tied to forest produce. However, their voices remain marginal in formal

governance committees, even as their everyday labour sustains both families and ecosystems. Recognising these roles is crucial if forest governance is to achieve justice that is not only procedural but also cultural and gender-sensitive.

The climate dimension intensifies these justice claims. Communities in both districts are acutely aware that the snowlines are retreating, glaciers are thinning, and pastures are shifting. Their ability to adapt depends on secure access to forests, since these resources cushion households during lean years. Forest rights, therefore, are not simply about present access but about the resilience of future generations. Justice, in this context, must be understood as both intergenerational and distributive. Ostrom's design principles remind us that sustainable institutions must adapt over time and safeguard access for future generations (Ostrom, 1990).

The FRA 2006 was supposed to give people a way to settle these questions, but the reality has been quite different. In many places, claims for CFRs are still waiting for approval, stuck in official procedures that move very slowly. When I spoke with villagers in Kinnaur in July 2024, they told me that some families had received papers for their forest rights. However, the larger, shared rights over pastures and forests were still out of reach. This has gradually changed the way people think about the law. At first, they were glad to see individual plots recognised, but now there is a stronger feeling that only collective rights can protect their forests from outside projects. Experience in Lahaul-Spiti in August and September reinforced this shift, as villagers said they now push for a no-objection certificate under the FRA 2006 to assert their say in development decisions. Civil society groups such as Him Lok Jagriti Manch in Kinnaur and Save Lahaul-Spiti Society in Lahaul have been instrumental in spreading this awareness, sometimes through pamphlets in local languages, sometimes through courtyard meetings where people are reminded that the law is on their side.

These practices of mobilisation highlight how environmental justice is not achieved merely through the letter of the law but through collective action. By reframing forest rights as not only economic but also cultural and ecological entitlements, local organisations and community members are broadening the very idea of justice. Their claims insist that justice must be procedural, distributive, and recognitional at once, or else it will not endure.

In due course, the pursuit of environmental justice in these mountain districts calls for a transformation in the way governance is imagined. Top-down models that prioritise bureaucratic control are ill-suited to the lived realities of these regions. What is needed is a pluralist approach that honours customary authority, empowers women and marginal groups, and allows communities to negotiate development on their terms. Together, Ostrom's call for polycentric, nested governance and Schlosberg's multi-dimensional justice lens point toward pluralist approaches that are adaptive, equitable, and culturally grounded (Ostrom, 1990; Schlosberg, 2007). Justice here is inseparable from dignity, and dignity rests upon the right to be heard, the right to cultural identity, and the right to shape one's ecological future.

#### **4. Conclusion**

This study has explored the intersections of forest rights, civil society engagement, and environmental governance in the Western Himalayas, showing how questions of justice are negotiated within layered and often contested institutional settings. The findings demonstrate that governance is not a straightforward, top-down process but a dynamic arena where policies are continually reinterpreted through the actions of communities, CSOs, and state actors (O'Toole, 2000; Hill & Hupe, 2022).

Civil society plays an especially significant role in this landscape. Non-governmental organisations and grassroots coalitions help translate legal frameworks into practices

meaningful to local communities (Gupta et al., 2020). However, their influence is shaped by political conditions, power relations, and their ability to mediate among multiple stakeholders (Barnes & van Laerhoven, 2015). At the same time, their role raises important questions about whose interests are advanced and what forms of change are enabled or constrained (Bebbington et al., 2007).

The Western Himalayan case highlights the limits of simplistic binaries such as state versus community or conservation versus development. Governance in this region is better understood as plural and layered, with traditional systems, modern laws, and diverse actors overlapping in ways that produce both opportunities and conflicts (Bisht et al., 2023). These arrangements are also shaped by historical patterns of control and exclusion, which continue to influence present-day struggles over access and authority (Shah et al., 1998).

Justice emerges as a central concern throughout this analysis. It involves not only participation and recognition but also the equitable distribution of rights and resources (Kashwan, 2013). Tribal communities in particular face barriers to asserting their claims despite the legal protections available to them. The question of “whose justice” remains central, as different groups bring distinct visions of fairness and legitimate access to forests (Springate-Baginski & Blaikie, 2007; Bisht et al., 2023).

Looking ahead, several challenges and opportunities become clear. Governance systems must adapt to rapid environmental change while retaining legitimacy among diverse stakeholders (Ojha et al., 2019). Civil society will likely play an increasingly important role as state institutions alone prove insufficient to address these challenges (Barnes et al., 2016). Above all, equity must remain central, since technical solutions that ignore distributional concerns risk reinforcing existing inequalities (Villamayor-Tomas & García-López, 2018).

The Western Himalayan experience suggests that effective governance requires hybrid approaches that combine state regulation, community management, and civil society engagement in ways that respond to local contexts. Such approaches will always be shaped by power imbalances and competing visions of justice, but they offer a path toward more inclusive and resilient arrangements (Fleischman, 2014, 2016).

Finally, this research underlines the need to view environmental governance as a political process rather than a purely technical exercise. Understanding how governance evolves requires attention to local realities, long-term institutional change, and the perspectives of those whose lives are most affected. Future research would benefit from interdisciplinary approaches and sustained engagement with governance processes over time. In regions such as the Himalayas, where livelihoods and ecosystems are deeply intertwined, such approaches are vital for ensuring both sustainability and justice.

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## **Green Social Work: A Pathway to Social and Environmental Justice in India**

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**Abstract:** India faces severe environmental challenges, including climate change, deforestation, pollution, and resource depletion, which disproportionately impact marginalized communities. Green Social Work (GSW) offers a crucial framework for integrating environmental sustainability with social justice, promoting inter and intra-generational equity and justice. This study explores the role of GSW in India, analysing its potential to address ecological and climate concerns through community organization, social action, and policy advocacy. Using an exploratory and descriptive research design, the article synthesizes existing literature to examine Indian social work practices that incorporate environmental consciousness. It highlights initiatives such as the National Action Plan on Climate Change (NAPCC) and grassroots interventions that strengthen resilience and sustainability. The findings emphasize the need for an interdisciplinary approach, positioning social workers as key agents in promoting ecological sustainability and sustainable development in India.

### **Keywords:**

1. Climate Refugees
2. Environmental Policies
3. Extreme Events
4. Resilience
5. Social and Environmental Justice
6. Sustainable Development Goals (SDGs)

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### **1. Introduction**

The environmental crisis has severely worsened in recent times due to both natural and anthropogenic processes. Extreme weather events, pollution and war situations have intensified the environmental crisis on a global scale (Dominelli 2014; Peek et al. 2020). These factors have exacerbated socio-economic, political, and cultural inequalities, thereby subjecting vulnerable communities to environmental injustice (Dominelli 2014). Dominelli (2014) had defined *environmental injustice* as *society's failure to ensure environmental security and sustainability*. However, according to The Office of Environmental Justice of the USEPA,

environmental justice is defined as *the fair treatment and meaningful involvement of all people regardless of race, colour, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies* (Stephens et al. 2008; Stephens & Chang 2025). This definition addresses the special injustice of unequal exposure to environmental harms.

In present society, environmental security is not included within national security at any level (extending from local to global). Hence, there are no military solutions to environmental security (Mukherjee 2017). Environmental insecurities are often seen to stem from scarcity of natural resources and pollution caused by the lifestyles of the affluent. Exploiting the environment for ensuring economic growth leads to a rise in poverty, unemployment, and spread of diseases. This cannot truly be considered development. Furthermore, rising living costs worsen the condition of the poor (Mukherjee 2017). Unsustainable planning and development with unequal distribution of power and resources aggravate structural inequalities and exert the worst impact on poor and low-income people (Dominelli 2013). These also impact the risk mitigating potential and resilience of low-income communities (Dominelli 2013).

Such environmental crises experienced in recent times have significantly worsened the environmental and social injustice suffered by poor and vulnerable communities of developing countries like India (Agnimitra & Sharma 2023). Indigenous communities have lost their land and access to natural resources due to the pervasiveness of globalization and the influential multinational corporations. This has transformed the '*ecosystems people*' into '*ecological refugees*'. Climate extremes, displacement, physical and mental health issues, and economic crises are some of the challenges affecting these communities. Recent studies have reported that these challenges have a higher probability of affecting densely populated countries with significant socioeconomic inequality, such as India (Madhanagopal et al. 2022a). Therefore, it has become imperative for social work professionals in India to proactively address issues like discrimination, inequality, marginality, and oppression.

Ensuring environmental justice has been a primary agenda for social workers all over the world. Social workers play a significant role in assisting and mobilizing people and natural resources for formulating models of sustainable development and ensuring environmental justice (Dominelli 2013). Social work professionals actively undertake initiatives for achieving environmental justice for affected marginalized communities (Wu, Karabanow & Hoddinott 2022). Social work professionals assess the situation of these communities and administer interventions for the affected. These interventions emphasize how different parameters of environment, industry, urban development, and human society impact environmental and social justice in an interrelated manner (Breen et al. 2023; Dominelli & Ku 2017; Wu & Bryan 2021). They also ensure that concerns regarding human and citizen-based rights are included in relevant curricula (Dominelli 2014). *Green social work* (GSW), a concept introduced by Dominelli (2012a), reportedly combines theories of social and environmental justice to equip social workers to address environmental crises. GSW is expected to provide a holistic understanding of these social issues by including environmental parameters and analysing their impact on the same (Rajput & Jadhav 2021).

## **2. Objective and Research Design**

The present study is a systematic literature review of two related inquiry areas including social work practice and environmental consciousness. This study explores the role of GSW in India, analysing its potential to address ecological and climate concerns through community organization, social action, and policy advocacy. Pertinent environmental issues of India have

been critically discussed herein for identifying the sectors requiring active GSW interventions for ensuring environmental justice and security for people of this country. This study also discusses different initiatives, policies, and grassroots interventions that strengthen resilience and sustainability of vulnerable communities in India. Moreover, this study highlights the need for an interdisciplinary approach by GSW professionals for ensuring social and environmental justice for vulnerable communities across India. This is followed by a discussion about their inter-relations as well as future research agendas.

### 3. National Initiatives for Ensuring Environmental Justice in India

As the world's most populous and diverse nation, India is presently at a critical stage in its trajectory for achieving sustainable development goals (SDGs). Major environmental issues like urbanisation, environmental degradation, climate crisis, internal displacement, and disasters pose significant challenges to achieving sustainable development (Didenko et al. 2021; Hasnat et al. 2019; Kumar et al. 2022). The constitutional initiatives included the addition of articles 48A and 51A(g) under State Directives and Fundamental Duties specified in The Constitution of India respectively. The legislative mechanisms safeguarding the environment of this country include The Wildlife Protection Act of 1972, the Water (Prevention and Control of Pollution) Act of 1974, the Air (Prevention and Control of Pollution) Act of 1981, the Environmental (Protection) Act of 1986, etc. Moreover, judiciary initiative like the formation of the National Green Tribunal have also been proactively preserving and protecting the environmental sustainability of this country (Devarhubli & Shrivastava 2024; Gill & Ramachandran 2021; Meena 2023). Furthermore, in recent times, significant emphasis has been given to sustainable human development which is expected to empower every community to become environmentally sustainable (Parida et al. 2023). The initiatives, policies, and schemes undertaken in recent times reflect India's commitment to achieving the SDGs (Kumar & Shobana 2023). The plans and policies listed in Table 1 have been undertaken by the Government of India for achieving environmental justice and sustainability as well as for addressing the major environmental issues of this country.

As of now, India is yet to undertake any comprehensive national initiative for major environmental issues like hyper-urbanisation or internal displacement (Rajan & Bhagat 2021). However, the National Action Plan on Climate Change (NAPCC) is India's most comprehensive strategy to address a few major environmental issues of recent times (Deshpande et al. 2025; Pandey et al. 2024). This is comprised of the following national missions (GoI 2025) that are aligned with global initiatives related to the same concerns:

- *National Mission for a Green India* (for protecting, restoring, and increasing forest cover).
- *National Mission for Sustaining Himalayan Ecosystem* and *National Mission on Strategic Knowledge for Climate Change* (for research, development, and capacity building)
- *National Solar Mission* (for enhancing the usage of solar energy)
- *National Mission on Sustainable Agriculture* (for addressing impacts of adverse climatic conditions)
- *National Mission for Enhanced Energy Efficiency* (comprised of the PAT scheme and the Financing Energy Efficiency Programme for increasing energy efficiency of industrial sectors).
- *The National Programme on Climate Change and Human Health* (for addressing health concerns posed by climate change).
- *National Water Mission* (for encouraging the development of Rain Water Harvesting Structures).
- *National Mission on Sustainable Habitat* (implemented through the Atal Mission on Rejuvenation and Urban Transformation, the Swachh Bharat Mission, and the Smart Cities Mission).

**Table 1.** Initiatives undertaken to achieve environmental justice in India

| <b>Initiatives<br/>(Year of Initiation)</b>                   | <b>Environmental<br/>Issue Addressed</b>                 | <b>Focus</b>                                                 | <b>Key Features</b>                                                                                                                                                                                                           |
|---------------------------------------------------------------|----------------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Antyodaya Anna Yojana (2000)                                  | Food security                                            | Affordable food for the most vulnerable households           | Ensuring highly subsidized food grains for the poorest households                                                                                                                                                             |
| National Environment Policy (2006)                            | Environmental degradation and sustainable development    | Integrate environment in development                         | Protection of ecological systems, and sustainable resource management                                                                                                                                                         |
| State Action Plans on Climate Change (2009)                   | Climate crisis                                           | Localization of climate strategies                           | Develops state-specific actions aligned with NAPCC                                                                                                                                                                            |
| National Water Policy (2012)                                  | Water security                                           | Water resource management                                    | Manages transboundary rivers; Guides planning and development of water resources                                                                                                                                              |
| The PAT (Perform, Achieve, Trade) scheme (2012)               | Climate crisis                                           | Energy efficiency in large industries                        | Sets targets for energy reduction; Those exceeding targets are issued Energy Saving Certificates which may be traded with those unable to do so                                                                               |
| Swachh Bharat Mission (2014)                                  | Environmental degradation                                | Sanitation and waste management                              | Improves domestic waste management; Promotes waste segregation                                                                                                                                                                |
| Atal Mission for Rejuvenation and Urban Transformation (2015) | Environmental degradation                                | Improved infrastructure and living standards for urban areas | Improves water supply and storm water drainage; Improves sewerage management; Enhances green spaces; Promotes non-motorized transport                                                                                         |
| Unnat Jyoti by Affordable LEDs for All (2015)                 | Climate crisis                                           | Energy efficiency of households                              | Reduces electricity consumption; Encourages usage of energy-efficient appliances                                                                                                                                              |
| National Policy on Biofuels (2018)                            | Climate crisis                                           | Alternative source of energy                                 | Reduces dependence on fossil fuels; Enhances production and use of biofuels; Encourages conversion of waste to wealth                                                                                                         |
| Jal Jeevan Mission (2019)                                     | Water security                                           | Domestic water supply                                        | Ensuring access of potable water for every rural household                                                                                                                                                                    |
| National Electric Mobility Mission Plan (2020)                | Climate crisis                                           | Reduce fossil fuel use in transport                          | Targets hybrid/electric vehicles; FAME India scheme and PM E-DRIVE scheme are primary components of this plan; Focuses on developing shared transportation and charging infrastructure for all                                |
| National Bioenergy Programme (2021)                           | Climate crisis                                           | Promote biomass and waste-to-energy                          | Cleaner energy, waste reduction                                                                                                                                                                                               |
| National Action Plan on Climate Change (2025)                 | Climate crisis                                           | Addressing climate change                                    | Comprises of nine national missions in specific areas of agriculture, energy efficiency, green India, Himalayan eco-system, human health, solar energy, strategic knowledge on climate change, sustainable habitat, and water |
| International Environmental Commitments                       | Climate crisis; Natural disasters; Resource conservation | Aligning with global targets and commitments                 | Implementing climate actions; Achieving disaster resilience. Ensuring resource sustainability                                                                                                                                 |

Despite the aforementioned initiatives, India needs stronger policy enforcement and monitoring, public-private partnerships in green technologies, awareness, and behavioural change at the grassroots level as well as investment in research, innovation, and climate-resilient infrastructure for ensuring environmental justice for vulnerable communities (Bhattacharya & Stern 2023). This may be actively achieved by engaging professionals trained in interdisciplinary programmes based on social work, environmental studies. GSW professionals may work in collaboration with other professionals from fields of engineering, economics, public health, architecture, forestry, agriculture, etc. to develop sustainable solutions for vulnerable communities. GSW professionals can play a lead role in interdisciplinary collaborations by articulating the needs, interests, and circumstances of the people, groups, and populations most at risk of environmental harms (Saleh et al. 2024).

#### **4. GSW as Preeminent Promoter of Environmental Justice**

Conventional SW professionals have reportedly been found to be on par with the general population in terms of consciousness regarding environmental factors. Moreover, a dearth of focus on environmental issues has rendered the existing social policies unsustainable and detrimental for social well-being. Hence, with an increase in environmental concerns in recent times, national and international organizations of social work (SW) have urged SW professionals to include environmental issues within their professional practice (Shaw 2013). Global aggravation of climate change, natural disasters, and ecological crises recorded in present times have subjected the field of conventional social work to new challenges. In this context, GSW has emerged as a specialized paradigm of conventional social work to enable GSW professionals to respond more appropriately to the needs of communities facing environmental crisis and injustice (Dominelli 2013). Table 2 provides a comparative account of conventional SW and GSW professionals.

As evident from Table 2, GSW may be considered an extension/evolution of conventional social work that focuses on human-environment interdependencies and addresses the impacts exerted by one on another (Närhi & Matthies 2025). Specialized and interdisciplinary trainings gained by GSW professionals render them more appropriate for working with vulnerable communities as they may provide both immediate human support and participate in advocacy or planning for sustainable mitigation and ecological restoration. GSW professionals are extremely critical of unsustainable development initiatives stemming from neo-liberal capitalist trends of production and consumption as the same results in social and environmental injustice (Dominelli 2023). GSW professionals engage in long term transformative initiatives which pave the path for environmentally just and sustainable communities.

**Table 2.** Comparative account of conventional and green social work

| <b>Dimension</b>         | <b>Conventional Social Work (CSW)</b>                                                                                              | <b>Green Social Work (GSW)</b>                                                                                                                                                                                                                                 | <b>Reference</b>                  |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
| Primary focus            | Supporting individuals, families, groups, and communities to enhance social welfare, address life challenges, and access services. | Besides conventional priorities, GSW encompasses well beings of ecological systems, understanding of human-environment interdependency, and socio-environmental justice.                                                                                       | Dominelli 2013                    |
| Conceptual framework     | Based upon the impact of social/environmental context on individuals and groups.                                                   | Based upon the fact that humans are not only affected by socio-environmental issues, but are a part of them. Rather they are interdependent with each other.                                                                                                   | Närhi & Matthies 2025; Saleh 2024 |
| Challenges addressed     | Social issues including poverty, inequality, health, welfare of women and children, addiction, homelessness, discrimination, etc.  | Besides social issues addressed by CSW, GSW also addresses environmental issues like ecological degradation, climate crisis, disasters, pollution, loss of biodiversity, overpopulation, environmental injustice (especially for vulnerable populations).      | Kumar & Suhel 2024                |
| Justice aimed for        | Social justice including individual/group rights, equity, empowerment, and human welfare.                                          | Both social and environmental justice. The latter includes recognition of the fact that environmental impacts often disproportionately affect the marginalised and vulnerable communities, and that sustainable ecosystems are essential for human well-being. | Dominelli 2012                    |
| Levels of practice       | Micro, mezzo, and macro                                                                                                            | Same as CSW but with new or modified practice areas including but not restricted to disaster resilience, climate adaptation, ecological restoration, capacity building, community engagement, inclusivity, advocacy for sustainable development, etc.          | Breen et al. 2023                 |
| Sites of activity        | Health facilities, educational facilities, social agencies/NGOs.                                                                   | Besides conventional settings, GSW operates with environmental NGOs, disaster relief organisations, climate crisis response teams, community sustainability initiatives, urban/rural ecological planning bodies, etc.                                          | Wu et al. 2022                    |
| Training and skills      | CSW professionals are trained in counselling, case management, human behaviour, social policy, group work, ethics, advocacy, etc.  | GSW professionals possess additional/ expanded trainings regarding environmental issues and policies, sustainability frameworks, disaster management, environmental justice, and systems thinking.                                                             | Maheswari & Yesudian 2025         |
| Primary assumptions      | The welfare and functioning of human beings within social and environmental systems.                                               | Promotion of sustainable “eco-social” well-being (by considering human society and environment as integrated systems).                                                                                                                                         | Kumar & Suhel 2024                |
| Challenges & limitations | High caseloads, burnout, and limited resources hinder the addressal of complex interdisciplinary issues                            | GSW is an emerging field necessitating specialized training and structured curricula. Practice models are gradually evolving. Yet to gain global institutional recognition.                                                                                    | Wu et al. 2022                    |

GSW professionals are specially trained to engage with the following concerns (Dominelli 2012):

- Violation of human rights;
- Degradation of the environment;
- Dearth of equality and corporate accountability in the prevailing economic system;
- Exclusion of cultural diversity and indigenous lifestyles;
- Dearth of inclusive communities (especially ones with sustainable economic development);
- Insufficiency of health and social services;
- Disregard for the physical environment;
- Acknowledgement of interdependency between the natural ecosystems and the human societies;
- Unavailability of resilient societies, infrastructures, and resources.

In keeping with these concerns, GSW professionals engage in the following tasks (Dominelli 2012):

- Affirming the social, environmental, and human rights of vulnerable communities;
- Facilitating protection of the environment;
- Securing justice for both vulnerable communities and ecosystems;
- Mobilizing people and organizations to undertake collaborative initiatives for achieving environmental sustainability;
- Facilitating the inclusion of the marginalized and the vulnerable sectors of the society in policy and decision making.

Knowledge and training regarding the functioning of environmental systems helps GSW professionals develop sustainable interventions that facilitate long-term, prevention-oriented environmental justice. GSW professionals carry out their practice in alignment with global SDGs addressing environmental concerns, resource consumption, sustainable development as well as peace and justice. This enables their participation in global policy dialogues and improves their access to interdisciplinary tools that link sustainability with human and environmental welfare (Mavely et al. 2023).

## **5. Application of GSW for Securing Environmental Justice in India**

In India, the aforementioned initiatives have been undertaken to address conventional environmental problems. However, these problems have been further exacerbated with time and changes in dynamics of the society, thus rendering them more complex in nature. Therefore, in recent times, it has become imperative to ensure environmental justice for vulnerable communities affected by major environmental concerns for progressing on the path towards sustainable development (Prameela & Sundaram 2024). GSW professionals, equipped with the knowledge of both social work and environmental parameters, may effectively address complex socio-environmental issues. They can engage with the vulnerable communities and ensure environmental justice and sustainability for every individual. Scope and application of GSW for addressing major socio-environmental issues affecting this country in recent times have been discussed as follows.

### **5.1. Hyper urbanisation**

Hyper-urbanisation has exerted severe negative impacts on the environment (Dominelli 2012, 2019; Faxriddin o'g'li et al. 2022; Gizelis et al. 2021). Rural to urban migration has been largely

responsible for hyper-urbanisation in developing countries (Awasthi 2021). Such migration is motivated by lack of employment, adverse environmental conditions (like droughts or floods), lack of proper infrastructure and services, better job opportunities, etc. (Marta et al. 2020; Medina et al. 2022; Dominelli 2019). In recent times, India is rapidly undergoing transformations in urban landscape and infrastructure development, which is also referred to as hyper-urbanisation. Such extensive intra-regional migration occurring as a result of hyper-urbanisation in India is faced by challenges like insufficient health care services, inadequate employment and housing, discrimination against rural migrants in existing urban communities leading to social insecurity of the former, and lack of natural resources (Awasthi 2021). Social work educators are responsible for producing trained professionals who can effectively address such complex challenges posed by urban transformations (Claes et al. 2021). Inclusion of GSW as separate or integrated academic courses will help facilitate such training.

GSW professionals can address issues of hyper-urbanisation by identifying underlying environmental causes, considering the accountability of different decision makers responsible for it, and engaging with the affected communities for increasing resilience and promoting sustainability. They can contribute to the empowerment of rural communities and in turn reduce forced internal migration (Keyvanara & Sarfaraz 2024). They can design and implement programs and projects that exert positive socio-economic impacts while ensuring environmental justice. These initiatives include sensitization to and awareness of environmental issues, creation of job opportunities, development of sustainable infrastructure and communities, establishment of local social networks, enhancement of community participation, etc. (Keyvanara & Sarfaraz 2024). GSW professionals can also address public health issues as social issues, i.e., with a concern for the entire community and not just an individual.

Moreover, GSW professionals may collaborate with The World Urban Forum and UN-Habitat in addressing issues arising from hyper-urbanisation by raising awareness regarding sustainable urbanisation, facilitating collaborations between different stakeholders and organizations involved in developing sustainable cities, planning and implementation local initiatives, and encouraging public participation (Dominelli 2019). They are reportedly trained to endorse the SDG targets related to food security, sustainable economy, poverty alleviation, and decent employment for everyone. These professionals can participate and present at conferences where they will find ample opportunities to collaborate with other stakeholders engaged in similar commitments. Such collaborations are expected to highlight social work in initiatives for achieving sustainability (Dominelli 2019).

## **5.2. Climate crisis**

Climate change is one of the most pressing global environmental concerns. Climate change is exacerbating existing environmental challenges, leading to displacement and migration, both within and across borders. Extreme environmental events, such as droughts, floods, and sea-level rise, are forcing people to leave their homes due to loss of livelihoods, food and water insecurity, and increased risks of natural disasters (Islam & Khan 2018). The Paris Agreement adopted in 2015 addresses mitigation, adaptation, and financial issues related to the global climate crisis. This agreement is reckoned to be the most important in terms of scope and impact (Mukherjee 2017). India was the 62<sup>nd</sup> country to ratify this agreement in October 2016. Hence, India needs to undertake every possible initiative for ensuring climate resilience of vulnerable communities. This will only be achieved through coordinated community participation and individual initiatives (Mukherjee 2017). Social work professionals play a significant role in ensuring the same (Cwikel 2025). For some of these professionals working at levels of intervention, environmental activism may be a personal initiative.



**Figure 1.** Levels (left) and themes (right) of interventions for green social work professionals  
*Source:* Reproduced with permission from Wu & Greig (2022)

Climate challenges include direct (physical stress) and indirect (vector-borne) health issues, mental health issues, exposure to extreme weather events and disaster induced displacement. GSW professionals assist with relocation, provide mental health support, and facilitate access to resources for populations at risk or those that are adversely affected. GSW professionals have been reportedly involved in micro (supporting populations at risk), mezzo (educating professionals and working with vulnerable communities) and macro (advocating for enhanced policies) levels of intervention for addressing climate challenges (Cwikel 2025). Schematic representation of such involvement is shown in Figure 1.

According to Madhanagopal et al. (2022a) students pursuing social work will be better prepared to respond to climate crises if they participate in social-work internships and certificate programs as part of their course curricula. Adding translational classroom content on relevant topics is also expected to prepare them better. In a recent study by Madhanagopal et al. (2022b), authors discussed GSW practices for recovery and rehabilitation of disaster-affected communities of India and Nepal. According to them, practicing decolonized social work and ensuring human rights of vulnerable communities will help achieve environmental and social justice for such communities and in turn help build disaster-resilience in these regions. Social work professionals working with disaster-affected communities reportedly enhance community participation in disaster management (Hossain 2013). Similar findings have been reported by Samuel et al. (2018). According to them, culturally relevant GSW practices implemented during floods in Chennai had played a crucial role in disaster management and promotion of ecological security. In comparison to conventional social work, GSW is found to be more effective for addressing complex disasters due to its holistic and transdisciplinary approach (Devassy et al. 2024). GSW professionals also play a crucial role in advocacy for national and international climate policies (Nagoshi et al. 2025).

**5.3. Environmental Degradation**

Environmental degradation is a transboundary phenomenon that globally exerts multifaceted impacts on both human communities and ecosystems (Ofem et al. 2023). Environmental

degradation is resulting from pollution, erosion, rising temperatures and sea levels, and an increase in frequency of extreme weather events. Untreated toxic industrial wastes released into the environment are also major causes of pollution (Tariq & Mushtaq 2023). This in turn is exerting detrimental impacts on Earth's fertility and productivity (Dominelli 2014). Environmental disasters have reportedly intensified socioeconomic and gender inequalities, destroyed homes and livelihoods, suspended essential services, and hindered economic growth of developing countries (Wu & Greig 2022). These events threaten sustainability at all levels from individual to societal (Peek et al. 2020; Wu 2020; Wu & Etienne 2021).

Moreover, environmental degradation has also caused significant forced displacement in the Global South (Hameed et al. 2025; Nguyen et al. 2023). Vulnerable ecosystems are under continuous pressure from migrating populations, which are rendering them even more fragile. Moreover, studies carried out in India reveal that women from poor rural households are worst affected by environmental degradation (Agarwal 2019). Hence, it is essential to understand the role of each gender and their interaction with the environment in order to ensure that development will be sustainable over a long term. GSW is a broader version of conventional social work, as it encompasses ecological considerations as well. GSW acknowledges the intricate manner in which the well-being of humans and environment are interconnected. Interdisciplinary approaches are essential for dealing effectively with such situations (Das 2020).

GSW aims to ensure environmental justice for such communities. Besides enhancing the resilience of these communities for future crisis, GSW professionals also undertake initiatives for designing environmentally benign models of development (Dominelli 2014). In a recent study by Madhanagopal et al. (2022a), the authors highlighted that social work educators and curricula should cover environmental degradation and associated challenges of environmental justice to work better with marginalised communities affected thereby across India. Social workers involved in interdisciplinary community development work are able to engage with the most vulnerable and disenfranchised individuals of a community (Rambaree et al. 2019). Besides focusing on the cultural, economic, social, and political aspects, GSW professionals also consider the biophysical relationships within a community. GSW, therefore, is expected to promote the concept of sustainable community development in a holistic manner.

#### **5.4. Food and Water Security**

All over the world, agriculture systems depend on climatic parameters. However, agricultural productivity has widely changed due to various anthropogenic activities and excessive use of farmlands. In 2020, almost 2.37 billion people lacked access to adequate nutritive food (Mrabet 2023). In present times, both developed and developing nations are striving to maintain a balance between securing food for their increasing populations and conserving the environment and natural resources in order to ensure sustainable food and farming systems in the near future. Marginalized communities of India are significantly affected by environmental issues like water and soil degradation, climate change, and natural hazards which in turn exert detrimental impacts on food and water security of these communities. Moreover, food insecurity has negatively affected initiatives of rural women empowerment in Assam (Sikdar & Anand 2025), Uttar Pradesh (Jhaveri et al. 2023), Gujarat (Pattnaik & Lahiri-Dutt 2024), Maharashtra (Nanda & Ray 2025), West Bengal (Dasgupta 2023), Odisha (Mishra 2021; Sam et al. 2021), etc. According to Dominelli et al. (2018), India needs to focus on GSW initiatives to effectively engage with these vulnerable segments of the society. In India, social work professionals may support farmers and citizens through adoption of proper Information, Education, and Communication

strategies that facilitate intergenerational transmission of indigenous farming practices and their documentation.

The Sustainable Development Goals (SDGs) related to climate action, hunger or natural resource management will not be attainable without involving the essential parameters of sustainable agriculture at both local and global scales. These parameters should be emphasized in policies, technologies, institutional settings, and the distribution of funds (Mrabet 2023). However, it has been observed globally that simply ensuring land for agriculture has not been enough to achieve food security (Dominelli 2013). Engagement of social work professionals in celebration of local food fests, responsible tourism, protection of farmer rights, ensuring advocacy support, and gender equity, as well as research on policies, methodologies, and economical aspects will help achieve food sovereignty in India (Thampi 2023). Social work interventions also reportedly play a significant role in ensuring food security and livelihoods for rural women in India (Joseph 2020).

### 5.5. Capacity Building

Disasters including environmental degradation destroy natural habitats as well as homes and livelihoods of those exposed to them. GSW professionals help build the capacity of these affected communities by assessing requirements, coordinating and delivering essential services, reunifying families, improving resilience for combating future disasters, as well as advocating and actively participating in protecting the environment (Dominelli 2013). GSW practitioners undertake these long-term initiatives for developing sustainable and environmentally just communities. Social work practitioners reportedly design, implement and promote inclusive growth, strengthen social welfare and pave the path for achieving sustainable development in India in collaboration with government bodies, NGOs, community-based agencies, and other stakeholders (Simkhada 2024). Social workers are significantly contributing to areas like capacity building of marginal communities, environmental preservation, disaster response, women empowerment, as well as child and youth welfare in India (Saha & Das 2023). Introduction of interdisciplinarity through GSW are expected to make their outcomes more efficient. Application of social work to environmental justice and sustainability of rural communities is shown in Figure 2.



**Figure 2.** Social work for environmental justice and sustainability of rural communities  
*Source:* Reproduced with permission from Wu, Greig, & Bryan (2022)

## 6. Discussion

So far, environmental issues have not been widely considered in conventional social work practices. GSW integrates the aspects of natural and physical environments with classical practices of social work and in turn enhances the well-being of both their clients and the ecosystems they depend upon. In recent times, GSW has gained significant attention due to student interest and an increasing need for integrated social work practices which holistically addresses issues related to natural and social environments. Furthermore, GSW differs from conventional social work frameworks addressing environmental issues as it considers cultural, economic, social, and political factors in a holistic manner as well. Thus, GSW advocates for unbiased access of natural resources for all (Ramsay & Boddy 2017).

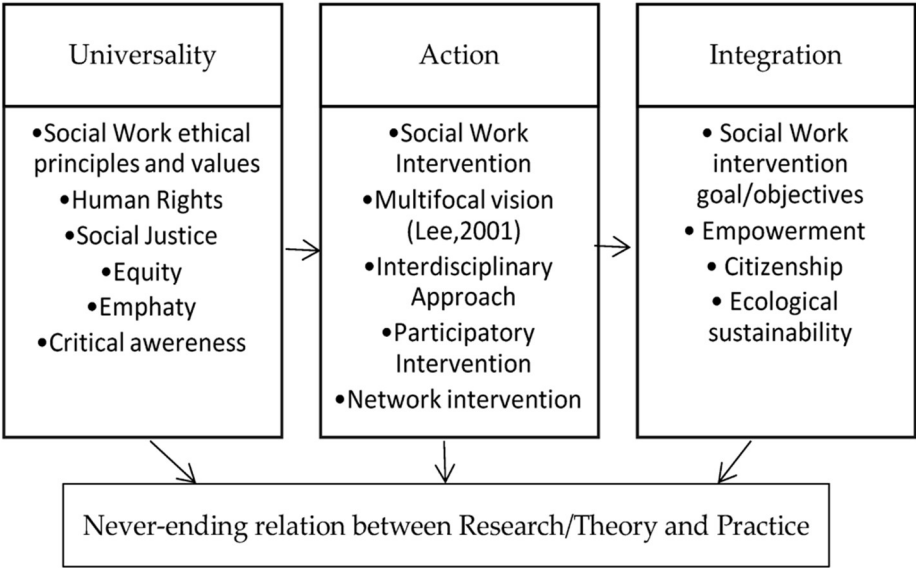
The addition of environmental paradigms reportedly strengthens the structural dimensions of conventional social work by addressing the needs of the most disadvantaged groups of the society (Närhi & Matthies 2018, 2025; Wu 2021). Hence, in recent times, a strong need has been felt for social work professionals of India to include environmental issues in both teaching and practice (Madhanagopal et al. 2022a). In India, academic social work programmes are considering the incorporation of concepts of environmental systems, climate crisis, disaster management, sustainable communities, and environmental justice within their curricula for training learners to become GSW professionals. Interdisciplinary training will enable these professionals to assume leadership roles in collaborative initiatives. Though GSW has gained significant global attention over the previous decade, several aspects of it require more extensive research and development (Wu & Greig 2022). In recent times, this limitation is evident in the scholarship and practice of several professionals working in relevant fields. It is reportedly considered crucial in recent times for social work professionals to proactively engage in disseminating environmental awareness, supporting initiatives and movements undertaken by grassroots actors, ensuring protection and preservation of the environment and participating in community-based activities (Agnimitra & Sharma 2023).

Trained GSW professionals may engage in the following activities:

- **Community development work:** Professionals will connect social welfare with environmental sustainability in terms of waste management, resource conservation, disaster mitigation, and livelihood diversification for vulnerable communities;
- **Policy advocacy:** Professionals can advocate for policies that protect both people and environment;
- **Intersectoral collaborations:** GSW often necessitates working with architects, economists, engineers, forestry and agriculture experts, public health experts, scientists, urban planners, etc., besides traditional social service agencies. An integrated model for interdisciplinary social work is shown in Figure 3. Such a model is expected to efficiently engage with communities affected by disasters.

GSW professionals also strive to achieve sustainable development for vulnerable communities of developing countries through interdisciplinary interventions. While public health experts, engineers, scientists, and other relevant professionals address the technical aspects of environmental challenges (like disease vector dynamics, pollution metrics, resilient-infrastructure, etc.), success of these interventions are completely dependent upon human acceptance, social trust, community participation, and local context. These are areas where green social workers are uniquely trained. GSW professionals bridge this gap between collaborators by translating scientific and technical innovations into socio-environmentally just, community appropriate, sustainable interventions. The same is evident from the work of

Dominelli (2023) who demonstrated that community acceptance and participation are primary essentials for the success of technical interventions. Few studies where GSW professionals have been found to be more effective than CSW professionals have been presented in Table 3.



**Figure 3.** An interdisciplinary model for social work practice  
*Source:* Reproduced with permission from Rocha (2018)

GSW professionals are equipped to identify and address the multidimensional factors leading to socio-environmental impacts. GSW professionals possess a holistic understanding of the environmental and societal dimensions. Therefore, they advocate and actively participate in ensuring both environmental and social justice for these vulnerable and marginalized communities. GSW professionals are concerned with violation of human rights, degradation of the natural environment, factors triggering disasters, interactions between human society and ecosystems, unsustainable development and resultant economic inequalities, advocacy for cultural diversity and indigenous lifestyles, as well as improved access to essential services and capacity building in vulnerable communities (Dominelli 2014).

Multi-dimensional impacts of adverse environmental situations affect the physical and mental health, as well as the well-being of the people exposed to environmental harm. These complex issues are well addressed by professionals trained in integrated and interdisciplinary curricula (Mitchel 2025; Wu & Greig 2022). Professionals pursuing integrated courses are better equipped to address real world issues. Interdisciplinarity is gradually being more emphasized in GSW curricula and training all over the world as it is essential for developing interventions to be implemented at micro-, mezzo-, and macro-levels of community development. A GSW practitioner can actively participate in community organization, social action, and policy advocacy to achieve sustainable environmental justice by assuming the roles of facilitator, coordinator, community mobiliser, resource mobiliser, negotiator, mediator, consultant, advocate, educator, trainer, cultural interpreter, interdisciplinary translator, therapist, and protector as and when required (Dominelli 2014). Hence, the component of interdisciplinarity in GSW ensures more effective practitioner engagement in achieving environmental justice and sustainable communities.

**Table 3.** Studies highlighting GSW professionals as more effective agents of socio-environmental justice than conventionally trained professionals

| Sl. No. | Major findings                                                                                                                                                                                                                                                                                                                                                                                               | Reference                 |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| 1.      | GSW frameworks implemented in disaster settings yielded more benefits for the vulnerable/marginalised populations than CSW.                                                                                                                                                                                                                                                                                  | Breen et al. 2023         |
| 2.      | Interviews of practitioners and educators from Canada/US about green/eco social work, highlighted how GSW was an upgradation of conventional roles.                                                                                                                                                                                                                                                          | Kowalski 2025             |
| 3.      | Results obtained in terms of achievement of SDGs in an Indian context indicated that GSW can more directly address integrated socio-environmental issues which are commonly overlooked by CSW professionals.                                                                                                                                                                                                 | Kumar & Suhel 2024        |
| 4.      | Highlighted how professionals trained in GSW facilitated capacity-building more than conventional SW professionals.                                                                                                                                                                                                                                                                                          | Maheswari & Yesudian 2025 |
| 5.      | A survey carried out with 337 US CSW professionals revealed that <40 % were prepared to respond to cases of environmental justice. This highlighted the need for an interdisciplinary approach as included in GSW for achieving environmental justice.                                                                                                                                                       | Mason et al. 2024         |
| 6.      | A study carried out with children from urban slums of Sri Lanka depicted the effective implementation of GSW interventions for securing environmental justice in terms of children's well-being. This study investigated the impact of environmental factors on mental health of children and highlighted the need for GSW professionals over CSW ones for ensuring environmental justice in such scenarios. | Mitchel 2025              |
| 7.      | A comparative study on SW professionals (engaged in disaster management) from Australia and Finland suggested a greater need for stronger GSW uptake/practice in Finland, where environmental concerns were comparatively less connected to human services.                                                                                                                                                  | Nöjd et al. 2025          |
| 8.      | In this recent study, the author proposed a leadership model tailored for GSW practice, which in turn reflected upgradation of CSW models.                                                                                                                                                                                                                                                                   | Park 2025                 |
| 9.      | This study emphasized the application of GSW for facilitating sustainable development in Indonesia. This study reported the expanding implementation of GSW in a non-Western country and highlighted the gradual rise in its global relevance.                                                                                                                                                               | Putri et al. 2024         |
| 10.     | This study integrated GSW practice with human rights in social work. It depicted how inclusion of issues related to natural environment in social work practice enhanced the achievement of justice for vulnerable communities.                                                                                                                                                                              | Stamm 2023                |

Moreover, in an interdisciplinary collaboration, GSW complements other professions rather than competing with them. Funding for the same facilitates integration of social expertise with multisectoral initiatives aiming for sustainability. Funds allocated for GSW enhances the impact of investments made for infrastructure, education, health, or technology by rendering the

concerned projects socially accepted, understood, and effective for the intended recipients. For instance, in a recent study, Kumar & Suhel (2024) reported that community-based sustainability projects implemented in India managed to achieve long-term outcomes when facilitated by social work professionals. In a similar study on community-based adaptation, cost incurred per beneficiary for social inclusion and capacity-building at local levels were much lower than that incurred for technical interventions necessitating constant maintenance, when tested over time (Maheswari & Yesudian 2025). Hence, any investment in GSW results in multiplier effects in terms of infrastructure, service, and governance outcomes.

In a recent study, Ramajo & Prat Bau (2024) have proposed several strategies for orienting social work practices toward ensuring environmental justice. They have suggested broadening and intensifying the political and ethical basis of this profession for addressing environmental concerns. According to them, community skills and participation may be strengthened by promoting skilling-emancipatory models. Multidimensional approaches including multi-level assessment and holistic understanding of concerned issues undertaken by GSW professionals will also help ensure environmental justice. GSW professionals need to identify novel sectors of practice like disaster response, transition to eco-friendly processes, development of community resilience and environmental security, economic sustainability, etc. Moreover, inclusion of interdependent, intersectional, and intergenerational aspects of environmental justice in social work curricula will lead to more efficient professionals and interventions.

## 7. Conclusion

GSW endorses sustainable development in every essence. The concept of GSW was developed on the basis of a holistic idea that acknowledged the entitlements of every member of society, the realization of human rights, the interdependencies among multiple systems of society, the interconnectedness among the various social and environmental factors as well as environmental justice. GSW critically analyses and assesses problems related to resource exploitation, environmental adversities, neo-liberalism, and social injustice as well as expert-recommended solutions to these problems. GSW also emphasises honing values and skills for promoting and protecting environmental justice. Improved GSW education and training necessitate the inclusion of interdisciplinarity and multi-stakeholder engagement within the course curricula. For effective GSW training, interdisciplinarity and multi-stakeholder engagement should be addressed from the perspectives of both the supervisor/trainer and the student/trainee. A GSW professional with sound interdisciplinary training will be extremely suitable for addressing the complex socio-environmental issues of present times.

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**Establishing environmental law clinics to strengthen environmental justice and the rule of law: a case study of the Sundarbans****M.P. Chengappa**

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**Abstract:** Climate change arguably constitutes the foremost global challenge facing the world today. Its impact is multi-faceted and manifests itself through various unpredictable weather phenomena, the brunt of which is borne largely by vulnerable low-lying areas in the Global South. This is exemplified by the ecologically-endangered Sundarbans region, which contains the world's largest mangrove forest, spread across the Ganga-Brahmaputra Delta on the Indo-Bangladesh border. Its inhabitants have suffered, with increasing frequency, from rising water levels and erratic weather phenomena, which imperil their very existence. These threats are exacerbated by man-made activities such as intensive agriculture and aquaculture, improper waste disposal, accumulation of hazardous materials, illegal construction and pollution stemming from unchecked tourism. The local inhabitants often lack legal recourse and are powerless to prevent such environmental degradation. In this context, this paper seeks to explore the potential that student-led legal aid clinics possess in providing a grassroots solution to this problem. Being incubated in law universities with established professional support networks, these clinics undertake grassroots-level work through active stakeholder consultation. By employing the case-study method, this paper will examine the functioning of an experimental environmental law clinic focused exclusively on the Sundarbans, with practicing lawyers, government officials, academics and students, both from India and abroad, as its participants. It will consequently assess the viability of such a bottom-up socio-legal approach. In doing so, this paper aims to catalyse, through its findings, the establishment of similar environmental law clinics in other ecologically sensitive areas, and to ensure that these clinics bring together lawyers, academics, activists and students in strengthening the cause of environmental justice as a larger goal underpinning the rule of law.

**Keywords:**

1. Clinical Legal Education
2. Environmental Justice
3. Climate Change
4. Sundarbans

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**1. Introduction**

Climate change, in the 21<sup>st</sup> Century, can hardly be called a novel phenomenon by any stretch of the imagination. Ever since the discovery of the "hole" in the Ozone Layer in 1985, climate

change and the causes and effects thereof have preoccupied the imagination of much of the climate scientists, ecologists, and environmental activists across the world (European Environment Agency, 2023). Over the course of the past few decades, it has evolved into one of the most pressing global challenges the world faces today. While Climate Action remains one of the United Nations' Sustainable Development Goals (SDG-13) a significant proportion of nation states have pledged mitigation and adaptation support, their efforts have largely failed to contain the increasingly egregious effects of climate change. At this juncture, together with concomitant issues such as global warming and rising sea levels, climate change has imperilled the basic human rights of vulnerable individuals (UNDP, 2023).

Moreover, the burden of accelerating climate change, global warming and allied phenomena falls heavily on inhabitants of vulnerable regions in the Global South, even while economically powerful nation-states in the Global North are primarily responsible for emitting the vast majority of greenhouse gases (International Energy Agency, 2023). These vulnerable areas, often low-lying and ecologically fragile, face intensified impacts such as rising sea levels, extreme weather events, and ecological degradation (Centre for Refugee Studies, 2023). The disproportionate political and economic influence wielded by the relatively developed players results in the perpetuation of an "Environmental Apartheid" of sorts, wherein individuals and entities hailing from underprivileged or vulnerable regions are usually denied environmental justice in judicial fora.

This disparity is exacerbated in situations wherein inhabitants and citizens of relatively underdeveloped nations are unable to take recourse to judicial fora by themselves. This imbalance highlights the urgent need for global cooperation and equitable solutions to address this challenge head-on, ensuring that those who are least responsible for its causes are not disproportionately affected by its effects. Consequently, it is imperative that alternative approaches be introduced to achieve the goal of environmental justice for all by borrowing inspiration from the recent proliferation of legal clinics in law schools and universities across the world, and leveraging their unique capabilities in delivering environmental justice. It is in this context that this paper seeks to assess and examine the transformative potential which legal aid clinics, affiliated with law schools and universities, might possess in this regard.

To this end, Section 2 of this paper undertakes a brief review of the extant literature, in relation to the development of Clinical Legal Education in India, and its impact as a tool for achieving social justice. Building on this discussion, Section 3 examines the proliferation of legal clinics in higher educational institutions across the world in the last few decades, focusing on a few landmark instances of legal clinics actively contributing to and shaping environmental justice goals abroad, especially in the United States of America, and to a lesser extent, Nigeria and Ghana. Subsequently, Section 4 of the paper will employ a specific case-study, namely the KCL-NUJS Legal Clinic, and examine its impact in securing environmental justice in the Sundarbans. In Section 5, this paper makes a few suggestions and recommendations based on the aforementioned findings, and finally concludes the discussion by offering a few closing remarks on the way ahead.

## **2. Literature review: Clinical legal education in India**

The Constitution of India, in its Preamble, enumerates justice as one of its foundational ideals. In pursuance of this ideal, the Indian Parliament inserted Article 39A via the 42nd Amendment (1976) to the Constitution, imposing the responsibility on the State to ensure equal access to justice, and to provide free legal aid to all citizens to ensure that those economically disadvantaged are not denied justice. Subsequently, the Indian Supreme Court has consistently

upheld the Right to Free Legal Aid, in landmark decisions such as in *Hussainara Khatoon v. State of Bihar* (1979),<sup>1</sup> *M. H. Hoskot v. State of Maharashtra* (1978)<sup>2</sup> and so on. As a natural progression of such welfare-minded initiatives, Parliament enacted the Legal Services Authorities Act in 1987,<sup>3</sup> whose purpose was to ensure access to justice for all, and to that end, to provide free and quality legal services to the weaker sectors of society.

More specifically, insofar as clinical legal education and its interplay with legal aid is concerned, one of the earliest instances of its official recognition in India was in the 1973 Report of the Expert Committee on Legal Aid, chaired by Justice Krishna Iyer. The Committee made a series of bold recommendations, which included, *inter alia*, amending the Advocates Act of 1961 to enable students and professors to directly represent disadvantaged individuals in court. At a similar juncture, in the early 1970s, Banaras Hindu University pioneered what became one of India's first clinical law courses, centred around a legal aid clinic with active student and faculty members, and operating under the guidance of a retired judge (Bloch & Prasad, 2007, pp. 165-169). This laid the foundation for clinical legal education elsewhere in India, and many universities quickly followed suit. In 1983-84, the Faculty of Law at the University of Jodhpur established a legal aid clinic (Bloch & Iqbal, 1990, pp. 92-120), which was actively involved in disseminating information about social welfare legislation, and advised on claims arising in motor vehicle accidents and matrimonial disputes (Narain, 1986, pp. 76-77). Their limited scope notwithstanding, these socio-legal interventions were encouraged by the Bombay High Court in its observations in *Inamdar Vahab Badasha v. Symbiosis Society* (1984).<sup>4</sup>

Subsequently, in the 1980s, law and legal education were increasingly being viewed as instruments of social change (Rajashree, 2021, pp. 79-94). This was catalysed by Professor N.R. Madhava Menon, who is widely recognized as the father of modern legal education in India (Sangroula, 2020, pp. 339-364). His efforts culminated in the establishment of a series of National Law Universities (NLUs) throughout the country, each of which embodied his vision of "socially relevant legal education" and "justice education" (Menon, 1998, p. 25). Menon's work also substantially influenced the Law Commission of India's 2002 Report, headed by Justice M. Jagannadha Rao, which made several key recommendations towards reforming the modalities of clinical legal education in law school curricula (Law Commission of India, 2002). Around the same time, the Bar Council of India (BCI), via Resolution No. 04/1997, introduced four mandatory clinic-oriented practical courses for all law degrees (Bar Council of India, 1997). These courses included, among other things, a compulsory clinical course on public interest lawyering, legal aid, and para-legal services.

In 2017, the Supreme Court in *Bar Council of India v. Bonnie FOI Law College*,<sup>5</sup> further asked the BCI to collaborate with the University Grants Commission (UGC) and to embark on a programme of comprehensively reforming legal education in India, focusing, *inter alia*, on ensuring greater student and faculty participation, greater collaboration with industry experts, practitioners and government officials, non-government entities and charitable organizations, and so on. More recently, the Indian government unveiled its new National Education Policy (NEP) in 2020, with a special focus on skill-based holistic education and the "learning by doing" approach (MHRD, 2020). In this context, Paragraph 11.8 places key emphasis on "environmental education" and encourages using credit-based courses for community engagement in the areas of climate change, pollution, waste management and so on, in order to maximise both student

<sup>1</sup> *Hussainara Khatoon v. Home Secretary, State of Bihar* (1980) 1 SCC 98

<sup>2</sup> *M. H. Hoskot v. State of Maharashtra* (1978) 3 SCC 544

<sup>3</sup> The Legal Services Authorities Act (1987).

<sup>4</sup> *Inamdar Vahab Badasha v. Symbiosis Society AIR* (1984) Bom 451

<sup>5</sup> *Bar Council of India v. Bonnie FOI Law College* (2017) 11 SCC 185

participation and stakeholder outcomes (Swaroop & Verma, 2022). While these positive developments are undoubtedly welcome, clinical legal education still has a long way to go in achieving its potential, despite almost five decades having passed since its inclusion in Indian law school curricula.

### 3. Beyond borders: the global impact of environmental law clinics

While law school clinics across the world are yet to fully realize their transformative potential, clinical legal education itself is not a novel phenomenon. Internationally, one of the earliest attempts to formally adopt clinical pedagogical models was as early as 1916, when the New York State Bar Association mandated, through a resolution, the establishment of clinics for legal aid work as a part of the law school curriculum (McManis, 1981, pp. 617-618). Later in the 20<sup>th</sup> Century, the Ford Foundation decided to fund the Council on Legal Education and Professional Responsibility (CLEPR) during the late 1960s and throughout the 1970s, which became instrumental in institutionalizing such legal aid clinics throughout the United States. In 1989, the American Bar Association's MacCrate Report set out detailed evaluation criteria for assessing the performance of legal aid clinics, and recommended relaxation of the extant rules allowing students and non-lawyers to be directly involved in litigation (American Bar Association, 1992).

This encouragement from professional bodies has seen law school clinics across the US play a pivotal role in a plethora of landmark cases, especially those relating to environmental harms and climate change (Matasar, 1991, p. 488). For example, in March 2025, the Environmental Law Clinic (2025) at the Stanford University School of Law, on behalf of the International Council of Clean Transportation, filed *amicus* briefs in the D.C. Circuit Court of Appeals in support of the Environmental Protection Agency's multipollutant emission rules for vehicles in *Kentucky v. EPA*,<sup>6</sup> in *Nebraska v. EPA*,<sup>7</sup> and in *Oklahoma v. EPA*.<sup>8</sup> Student members also prepared and presented oral arguments before the Los Angeles Superior Court in *Center for Biological Diversity v. City of Long Beach*, which concerned the illegality of oil wells operating in ecologically vulnerable regions.<sup>9</sup> Elsewhere in the United States, the University of Virginia's Environmental Law and Community Engagement Clinic co-authored an *amicus* brief before the United States Supreme Court in *Sackett v. EPA*, a landmark case concerning the protection of wetlands.<sup>10</sup> Similarly, the Environmental Law Clinic at the Tulane University School of Law played a significant role in determining the outcome in *O'Reilly v. U.S. Army Corps of Engineers*, wherein the court halted the development of a 70-acre project, and mandated a comprehensive environmental review to assess its impact.<sup>11</sup> Likewise, the Sabin Center for Climate Change Law at Columbia University, which maintains a global climate litigation tracker in collaboration with the law firm Arnold & Porter, has also filed a slew of *amicus* briefs in recent climate lawsuits. A notable example of this is *New York v. Trump* (2025),<sup>12</sup> which concerns a challenge to a federal funding freeze that impacts climate action. Another non-governmental organization which involves students in pro bono litigation work is Our Children's Trust, a non-profit public interest law firm that was instrumental in helping 21 youth plaintiffs bring the famous climate lawsuit in *Juliana v. United States* (2015).<sup>13</sup>

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<sup>6</sup> *Kentucky v. Environmental Protection Agency* (2024) D.C. Cir. 24-1087

<sup>7</sup> *Nebraska v. Environmental Protection Agency* (2024) D.C. Cir. 24-1129

<sup>8</sup> *Oklahoma v. Environmental Protection Agency* (06/18/2025) 23-1067

<sup>9</sup> *Center for Biological Diversity v. City of Long Beach* (2025) 9th Cir. 23-3624

<sup>10</sup> *Sackett v. EPA* (2023) 598 U.S. 651.

<sup>11</sup> *O'Reilly v. U.S. Army Corps of Engineers* (2023) 5th Cir. 22-30608

<sup>12</sup> *State of New York et al. v. Trump et al.* (2025) 1st Cir. 25-1236

<sup>13</sup> *Juliana, et al. v. United States of America, et al.* (2020) 9th Cir. 947 F.3d 1159.

However, legal aid clinics and their successes are not only confined to the Global North but have also made their presence felt in underdeveloped countries as well. Apart from the aforementioned proliferation of such clinics in India, there have been instances of law school clinics enabling social change in several African countries, such as Nigeria and Ghana (Odigie-Emmanuel & Dahiya, 2023, pp. 44-51). In fact, one might go so far as to argue that such clinics have even greater transformative potential, in bridging the gulf between the law on paper and the law in operation.

At the international level, the United Nations Environment Programme (UNEP) has highlighted the centrality of clinical legal education vis-à-vis the ethos of Principle 10 of the Rio Declaration, and has recognized three broad models of law school clinics, each of which has been adopted in different parts of the world: the Law Reform Model, the Litigation Model, and the Consulting Model (UNCED, 1992). In 2015, the Doha Declaration of the Thirteenth United Nations Congress on Crime Prevention and Criminal Justice prompted the United Nations Office on Drugs and Crime to develop the Education for Justice Initiative, a significant component of which is centred around imparting practical lawyering skills to students, through the use of mechanisms like law school clinics (UNODC, 2015). The recent frequency in the activities of numerous legal clinics, particularly those associated with the Global Alliance for Justice Education (GAJE) network, represents a welcome development and reflects the increased impact of such legal clinics (Klein & Roe, 2022, p. 141).

#### **4. Case study: The Sundarbans (KCL-NUJS CLINIC)**

##### **4.1 Background – the situation in the Sundarbans**

The Sundarbans region, situated on the Ganges-Brahmaputra delta, the largest delta in the world, is also arguably one of the world's foremost biodiversity hotspots. Spread across 10,000 square kilometres, across both India and Bangladesh, it is home to the world's largest mangrove forest. Four of the protected areas in the Sundarbans are enlisted as UNESCO World Heritage Sites. It is also blessed with a huge variety of flora and fauna, many of which are endangered (Hasneen & Nagdeve, 2025, pp. 262-275). At the same time, however, the Sundarbans is an ecologically vulnerable region whose inhabitants find themselves and their traditional ways of life increasingly threatened by the vagaries of climate change, along with other human activities which have disrupted the fragile ecological balance in the region. Since 2020, its mangrove forests have been classified as "endangered" by the IUCN's (International Union for Conservation of Nature) Red List of Ecosystems (Sievers, 2020). Rising sea levels, accelerated by global warming, threaten the submergence of the low-lying Sundarbans region.

With much of the Sundarbans lying at an elevation of less than one metre above sea level, even a modest increase in ocean levels leads to significant flooding. While mangrove forests have a degree of resilience to water submersion, they cannot survive prolonged or frequent tidal inundation, which is becoming increasingly common. This persistent flooding not only threatens vegetation but also accelerates coastal erosion, gradually reducing the landmass of the delta (Frontline, 2024). Some islands in the region have already vanished, raising serious concerns about the long-term future of the remaining land and the communities living there. The loss of land also forces residents to migrate, creating a growing number of environmental refugees and adding pressure to nearby urban and rural regions.

Despite its status as one of the world's largest and most biodiverse mangrove forests, the Sundarbans faces several existential threats, which include rapid ecological degradation, illegal resource extraction, biodiversity loss, displacement due to climate change, and so on. Local

communities in the Sundarbans, especially those engaged in fishing, farming, and weaving, are largely dependent on the natural resources of the Sundarbans for their livelihoods. However, increasing salinity caused by rising sea levels and the frequent occurrence of cyclones has drastically affected agricultural productivity and freshwater availability (Dhaka Tribune, 2024). As a result, many residents have been forced to turn to environmentally harmful practices, such as prawn farming for export. The ensuing water pollution and growth of algal blooms further accelerates ecological degradation. Women, in particular, face disproportionate hardships due to the gendered impacts of climate-induced migration. Owing to the loss of traditional livelihoods, many able-bodied men leave in search of employment opportunities elsewhere, leaving the women to shoulder financial and domestic burdens. This notwithstanding, women's voices and experiences are often overlooked in decision-making processes (Sahana et al., 2019, pp. 40-52).

#### **4.2. The Clinic: Activities and stakeholder outcomes**

The NUJS-KCL Environmental Justice Clinic was established in 2021, jointly by the Dickson Poon School of Law at King's College London, and the West Bengal National University of Juridical Sciences (NUJS) Kolkata. Established with the *raison d'être* of providing access to justice to those living in the areas affected by climate change, such as the Sundarbans, the Clinic is physically headquartered at the NUJS Campus in Kolkata, a little over a hundred kilometres away from the Sundarbans region. With the aim of leveraging cross-border collaboration towards the goal of attaining environmental justice, the Clinic collaborates frequently with leading lawyers and academics from across the globe, with leading barristers from the United Kingdom also being intimately involved with the work of the Clinic.

Owing to the role played by government entities, especially in administrative and regulatory matters, the Clinic has also frequently liaised with government officials, including senior officials in the Indian Forest Service. These officials have also visited the NUJS campus on several occasions and engaged in extended discussions and Q&A sessions with the Clinic's student members, regarding matters ranging from the adequacy of the government's efforts towards the conservation of flora and fauna, measures to reduce and address human-animal conflict, compensation procedures and mechanisms for victims of wildlife attacks and their families, (especially the so-called "tiger widows"), and so on.

Moreover, both faculty advisors and student volunteers have made multiple field visits to the Sundarbans region. During such visits, the members of the Clinic have had the opportunity to observe first-hand the impact of climate change on the ecologically vulnerable region. These observations have been supplemented by interactions and interviews with local community members, many of whom have been forced to abandon their traditional occupations owing to the deleterious effects of climate change. These teams have not only documented the various issues, challenges, and concerns faced by the local communities in the Sundarbans region but have also imparted to them basic legal and educational training which can be utilized by them to access legal services and government benefits.

Through its various initiatives and endeavours, the Clinic has had a tangible positive impact and meaningfully contributed to better outcomes, not just for its constituent members, but also for the lives and livelihoods of the people of the Sundarbans. In the field trips undertaken, students have played a proactive role in the dissemination of information regarding the legal rights of the inhabitants of the Sundarbans, with such dissemination in turn empowering and inspiring the latter to exercise their legal recourse, and take, with the assistance of the Clinic and other Non-Governmental Organizations, appropriate legal action. Recently, the Clinic, in

collaboration with a prominent NGO, assisted in securing compensation for four widows of victims of tiger attacks, from the Sundarbans Tiger Reserve, pursuant to petitions filed before the Calcutta High Court. In its verdict, the High Court acknowledged the role played by legal aid providers in securing these women their due compensation.<sup>14</sup>

While the Bar Council of India currently prevents students from either filing cases or appearing in court, the Clinic's student members have assisted with a significant portion of the preparatory paperwork, especially at the evidence-gathering stage. An example of more direct student involvement is the context of improper fly ash disposal by boats traversing the adjoining waterways, in the course of exporting fly ash from India to Bangladesh. Herein, student members of the Clinic have prepared and filed applications under the Right to Information Act (2009) with the Central Pollution Control Board (CPCB) and the State Pollution Control Board (SPCB), which has facilitated complaints, in turn, to be made before these regulatory bodies. This is especially pertinent since the menace of fly-ash pollution poses a clear and present danger to the lives and livelihoods of the inhabitants of the Sundarbans, along with its flora and fauna, as numerous local inhabitants attested to during their conversations with the Clinic's members.

The findings of this case study affirm the viability and value of student-led legal clinics in ecologically sensitive areas like the Sundarbans and reflect the largely positive degree of correlation between improved human rights outcomes and the concentration of legal aid clinics which has been generally observed in India, as noted by the Supreme Court of India in its Report titled *Legal Aid through Law Schools: A Report on Working of Legal Aid Cells in India* (2024), released by former Chief Justice of India, Justice D.Y. Chandrachud (SC Centre for Research and Planning, 2024).

While the results are promising, the success of such initiatives hinges on sustained institutional support, adequate funding, and a strong commitment to community-centred legal practice. Extending this model to other ecologically vulnerable regions will require not only replication of best practices but also contextual adaptation to address region-specific legal, cultural, and environmental dynamics. Further, international cooperation and collaboration between like-minded groups and individuals across the globe, as exemplified by the NUJS-KCL Clinic, will be essential in ensuring regional ecological resilience, and, above all, securing access to environmental justice.

## 5. Key considerations going forward

In order to ensure that law school-administered legal aid clinics realize their transformative potential, and to maximise their socio-legal impact, particularly in the realm of environmental justice, several interlinked reforms must be pursued. Herein, especially in the Indian context, it would also be apposite to invoke the conclusions drawn by a 2013 research project, undertaken jointly by the Government of India and the United Nations Development Programme under the aegis of the "Access to Justice" Programme. Titled *A Study of the Law School based Legal Service Clinics*, the report focused on the functioning of law school-administered legal aid clinics, operating in seven Indian States: Orissa, Bihar, Chhattisgarh, Jharkhand, Uttar Pradesh, Madhya Pradesh, and Rajasthan (UNDP, 2013). It collected extensive empirical information regarding the nature of activities undertaken by such clinics, the frequency of activities, the quality of the services rendered, the percentage of the student population that participated in these activities, and the frequency of interaction with the communities outside the confines of the

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<sup>14</sup> *Binarani Mandal v. The State of West Bengal* (2024) WPA 21596

college campus, especially the socio-economically and educationally marginalized communities with little to no legal recourse.

Foremost amongst its key findings was the dismal extent of participation, of both students and faculty members, in the activities of such clinics. While nearly 80% of the law schools surveyed had some form of clinical legal education and/or legal aid programmes, a majority of these lacked adequately trained or dedicated faculty members, and were largely underfunded. At a more granular level, another limitation of these clinics was that their "legal awareness" activities were confined to isolated instances of lectures by practitioners, or the occasional public address, with no follow-up engagement or outreach.

At a more practical level, an often-overlooked impediment to the functioning of law school clinics is the lack of adequate institutional support and incentives for *pro bono* initiatives (Anderson, 2014, p. 427). Consequently, the limited success of these clinics is not because, but in spite of, their parent administrations. Herein, a common but easily addressed issue is the reluctance of university administrations to grant academic credits or similar exemptions in lieu of the work undertaken by student volunteers in these clinics. This extends to faculty members as well, and faculty participation, often pivotal for the functioning of law school clinics, is disincentivised owing to the lack of commensurate workload adjustments for other teaching, research and academic responsibilities (Barry, 2007, pp. 27-50). Similarly, law school clinics must liaise with practitioners, especially public interest lawyers and *pro bono* departments of law firms, in order to provide the requisite professional expertise to those whose circumstances such clinics seek to ameliorate. As highlighted in the Apex Court's report, such collaboration would also benefit students, by helping to bridge the gulf between theory and practice. Students must also be made aware of the practical benefits and incentives of obtaining work experience with legal aid clinics, especially for those interested in building careers in public interest lawyering. At the same time, government bodies such as the National Human Rights Commission (NHRC) in India, which routinely engages lawyers, must strive to provide adequate employment opportunities to students with such past clinical work experience.

Finally, to ensure accountability, it is imperative to institute evaluation and monitoring mechanisms to assess the performance of these clinics and their impact on society at large. This must be done in both qualitative and quantitative terms, and measurable outcome metrics could be used to allocate performance-linked institutional incentives, such as additional funding (Shanahan, 2018, p. 547). Such metrics could include the number of cases filed by the clinic, the number of cases successfully litigated or favourably settled, and lastly, if it can indeed be accurately measured, the feedback from litigants who choose to avail the clinic's services. Such evaluation must also be done periodically and at a granular level, as opposed to isolated broad-based assessments, such as the 1980-81 Committee for Implementing Legal Aid Schemes (CILAS), headed by Justice P.N. Bhagwati. Such monitoring can also be carried out by an independent non-affiliated authority, with the precise monitoring methodology and the composition of such authority to be decided by the Bar Council of India. Thus, by mobilizing the resources of law universities more effectively, leveraging professional support networks, and facilitating cross-disciplinary collaboration among lawyers, academics, students, and policymakers, these clinics would be uniquely positioned to secure access to justice for those who need it most. Utilisation of these clinics to advance the cause of environmental justice offers an innovative stakeholder-driven grassroots level approach, which not only responds to the immediate legal needs of local communities but also contributes to longer-term systemic change by embedding principles of environmental justice within the broader rule of law. Through community participation, dissemination of awareness, and stakeholder engagement, these clinics can empower

communities, especially vulnerable ones, to participate meaningfully in shaping their environmental futures.

## 6. Conclusion

At this juncture, the challenges faced by the Sundarbans region, owing to the vagaries of climate change and other anthropogenic causes, is emblematic of similar threats posed to ecologically fragile biodiversity hotspots across the world. As climate change continues to expose the constraints of traditional legal and judicial mechanisms that have hitherto secured environmental justice, the institutionalization of a participative and inclusive grassroots-level approach, manifested in the form of law school-administered legal aid clinics, offers a more promising alternative. These clinics must prioritize grassroots engagement, participatory governance, and the empowerment of vulnerable communities through legal awareness. These clinics possess enormous potential in securing for such communities their access to justice, an inalienable component of the ethos underpinning the rule of law. From the discussion undertaken in the foregoing sections of this paper, it is evident that student-led environmental law clinics can act as powerful agents of change in advancing environmental justice and climate resilience. By grounding legal education in real-world challenges and aligning it with the lived experiences of marginalized and vulnerable populations, these clinics embody the transformative potential of legal pedagogy. While it is still at a nascent stage, it is hoped that the NUJS-KCL Environmental Law Clinic and its success will catalyse the establishment of a greater number of environmental law clinics and enable them to fully realize their transformative potential.

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**Air Pollution and Reproductive Health of Women:  
A Case Study of Delhi National Capital Region****Neha Tiwari**

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**Abstract:** Air pollution in Delhi National Capital Region (NCR) has emerged as a critical public health concern, with increasingly severe implications for women's reproductive health. Exposure to pollutants such as particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), sulphur dioxide (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), ozone (O<sub>3</sub>), and carbon monoxide (CO) has been associated with adverse reproductive outcomes, including infertility, miscarriage, stillbirth, and low birth weight. Despite growing scientific evidence on these health risks, the gendered dimensions of air pollution remain insufficiently addressed within environmental governance frameworks in India. This paper examines the intersection of air pollution, women's reproductive health, and environmental governance by analysing key policy interventions implemented over the past 15 years, including the 2010 National Green Tribunal Act, the Graded Response Action Plan (GRAP), the 2019 National Clean Air Programme (NCAP), and the 2021 Commission for Air Quality Management (CAQM). Adopting a documentary analysis approach, the study draws on policy documents, academic literature, and available health data to assess the extent to which these frameworks recognise gender-specific health vulnerabilities and incorporate women into decision-making processes. The analysis finds that while these policies have contributed to pollution control, they largely remain gender-blind, lacking statutory provisions for women's representation and failing to adequately address differentiated health impacts across socio-economic groups. The paper argues for the integration of gender-sensitive approaches in environmental policymaking, emphasising targeted interventions and the institutionalisation of women's participation to achieve more inclusive and effective environmental governance.

**Keywords:**

1. Air Pollution
2. Environmental Governance
3. Gender Equity
4. Reproductive Health

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**1. Introduction**

Air pollution across major cities in India is worsening with time, but the situation in Delhi National Capital Region (NCR) is the most worrisome. A study conducted by the Centre for

Research on Energy and Clean Air found that Byrnihat (Meghalaya), Delhi, and Gurgaon (Haryana) ranked as the top three most polluted cities in India, with average PM<sub>2.5</sub> concentrations of 126 µg/m<sup>3</sup>, 105 µg/m<sup>3</sup>, and 91 µg/m<sup>3</sup>, respectively (N & Raj, 2021). It is beyond debate that poor air quality jeopardises human health. However, an important aspect often overlooked is the disproportionate impact air pollution has on women, newborns, and young children. The United Nations Development Programme (UNDP) calls it an environmental crisis intertwined with inequality.<sup>1</sup> The disproportionate impact manifests across multiple dimensions, including health and financial outcomes, among others. The focus of this paper is on the impact of air pollution on the reproductive health of women. Various studies have established that air pollution has a detrimental impact on the reproductive health of women. However, far less attention has been paid to how the state responds to women's reproductive health concerns in the context of worsening air quality and to the extent to which women are meaningfully involved in shaping and implementing environmental policies. The paper attempts to fill this gap in the existing scholarship on women and environmental governance by analysing policies implemented by the Indian state in the last 15 years.

## 2. Air Pollution in Delhi NCR

Air pollution in Delhi NCR is multifaceted, with both outdoor (ambient) and indoor sources of pollutants. The major air pollutants and their sources include: particulate matter PM<sub>2.5</sub> (stubble burning, fine particles from vehicles, industries, road construction, and dust) and PM<sub>10</sub> (coarse particles from road dust, smoke, construction, and open burning), nitrogen oxide (vehicle exhaust, thermal power plants and industrial combustion), sulphur dioxide (burning coal and furnace oil in industries and power plants), carbon monoxide (emitted from incomplete combustion in vehicles, diesel generators, biomass burning), ammonia (agricultural activities like use of fertilizer, waste burning), lead and heavy metals (lead, arsenic, nickel, manganese and cadmium produced from industrial emissions, e-waste burning, road/soil dust). The season also plays a major role in determining the severity of air pollution. During winter, a mix of PM, NO<sub>x</sub>, SO<sub>2</sub>, and ozone is worsened by low wind speeds and temperature inversion. During autumn, smoke from crop residue burning in Punjab and Haryana fields drifts to Delhi NCR, spiking PM<sub>2.5</sub> and PM<sub>10</sub>. During the summer months, dust storms blowing in from Rajasthan and neighbouring regions raise PM levels in Delhi NCR.

In the year 2014, the World Health Organisation (WHO) declared New Delhi the most polluted city in the world.<sup>2</sup> Around the same time, public and scientific attention to the deteriorating air quality escalated significantly. Many studies were conducted (and some are still in progress) to examine the causes and extent of air pollution in Delhi NCR, depending on the season and pollutant. We discuss the findings of some of the prominent ones. A study conducted during the winter of 2013 and the summer of 2014 found that particulate matter posed the most serious air pollution concern in the city, with PM<sub>10</sub> and PM<sub>2.5</sub> levels reaching four to seven times the national air quality standards in both seasons (IIT Kanpur, Dept. of Civil Engineering, 2016, p. 8). Delhi's annual average PM<sub>2.5</sub> concentration in 2021–22 was 100 µg/m<sup>3</sup>, 20 times more than the WHO guideline of 5 µg/m<sup>3</sup> (Guttikunda et al., 2023). A study by the Centre for Science and Environment reported a sustained rise in PM<sub>2.5</sub> levels for the second consecutive year since 2022, pointing to a deepening pollution problem in the region

<sup>1</sup> UNDP. "Environmental Justice." <https://www.undp.org/rolhr/justice/environmental-justice>

<sup>2</sup> Mallica Joshi (2015, 5 November). "Delhi, be prepared to breathe dirtiest air of season today". The Hindustan Times <https://www.hindustantimes.com/delhi/delhi-brace-to-breathe-dirtiest-air-of-season-today/story-jOocKTJELK8SE31OIDWCcl.html>

(Roychowdhury & Kaur, 2025). The same study found that this increase reflects the growing intensity of pollution in the region. It also reported a 26% rise in peak pollution levels compared to the previous year, along with two prolonged smog episodes (*ibid.*). In 2016, TERI, along with the Automotive Research Association of India, carried out a scientific source-apportionment study of PM<sub>2.5</sub> and PM<sub>10</sub> levels across Delhi NCR. Based on monitoring at twenty representative locations over two seasons, the study found that average concentrations of both pollutants consistently exceeded the national ambient air quality standards set by the Central Pollution Control Board (ARAI & TERI, 2018). In the year 2024, PM<sub>2.5</sub> air pollution in Delhi worsened to around 21 times the 5 µg/m<sup>3</sup> limit prescribed by the WHO. In a study on gaseous pollutants, it was found that SO<sub>2</sub> is likely to increase by 1.24 µg/m<sup>3</sup>, NO<sub>2</sub> is likely to increase by 16.77 µg/m<sup>3</sup>, O<sub>3</sub> is likely to increase by 6.11 µg/m<sup>3</sup>, benzene is likely to reduce by 1.33 µg/m<sup>3</sup> and NO<sub>2</sub> is predicted to reduce by 0.169 µg/m<sup>3</sup> in the coming years (Sharma et al., 2018). The highly polluted air of Delhi NCR is also responsible for many deaths. In 2020, Delhi experienced an estimated 54,000 avoidable deaths attributable to PM<sub>2.5</sub> air pollutants.<sup>3</sup> In a time series analysis of air pollution levels in Delhi between 2008 and 2019, it was found that Delhi had the largest attributable fraction and highest attributable yearly deaths (de Bont et al., 2024).

Based on the above discussion, it can be inferred that the combined presence of gaseous, particulate, and seasonal pollutants has rendered the air in Delhi NCR region highly toxic and unsuitable for healthy living.

### 3. Impact of air pollution on women's reproductive health in Delhi NCR

Harmful particles in the air, including sulfur dioxide, PM<sub>2.5</sub>, PM<sub>10</sub>, ozone, nitrogen oxides, and carbon monoxide, affect the reproductive health of women. Particulate matter of ≤ 2.5 µm and between 2.5 and 10 µm are associated with reduced fertility, whereas sulphur dioxide, carbon monoxide, and nitrogen dioxide might promote miscarriage and stillbirths (Conforti et al., 2018). Air pollution can also cause premature labour during pregnancy due to inflammation of the lining of the uterus (Margiana et al., 2023). Toxic air pollutants can also increase the incidence of cancers of the reproductive system and lower the birth rate (*ibid.*).

The adverse impact of air pollution on women's reproductive system has been highlighted by practitioners as well. According to Pristyn Care Fertility, air pollution wreaks havoc with hormone levels and the menstrual cycle. It further says, "High levels of pollution can lower Anti-Müllerian Hormone (AMH), which affects fertility. It reduces the Antral Follicle Count (AFC), a key factor in ovarian reserve. This disruption causes higher rates of miscarriage and even stillbirth."<sup>4</sup> The immediate impact of air pollution includes: endocrine disruption, reduced egg quality, and an increase in risk of miscarriages.<sup>5</sup> At the same time, there are long-term effects on fertility as well.<sup>6</sup> They include epigenetic changes and delayed puberty in offspring.

The increase in female infertility seems to parallel the increase in toxic emissions, which suggests that the impact of air pollution on human health could increase in the coming years (Margiana et al., 2023). As air quality continues to deteriorate, doctors in Delhi NCR have expressed growing concern about the harmful effects of polluted air on pregnant women. Dr

<sup>3</sup> Greenpeace Southeast Asia (2021, 18 February). "PM<sub>2.5</sub> air pollution behind an estimated 160,000 deaths in world's 5 biggest cities in 2020." <https://www.greenpeace.org/southeastasia/press/44319/pm2-5-air-pollution-behind-an-estimated-160000-deaths-in-world-5-biggest-cities-in-2020/>

<sup>4</sup> Pristyn Care Fertility (2024, 29 November). "The Hidden Impact of Air Pollution on Fertility: A Growing Concern." <https://fertility.com/the-hidden-impact-of-air-pollution-on-fertility-a-growing-concern/>

<sup>5</sup> Centre for Infertility and Assisted Reproduction (2025, 17 January). <https://www.cifarivf.com/how-does-air-pollution-affect-your-fertility/>

<sup>6</sup> *ibid.*

Jayasree Sundar<sup>7</sup> said, “If I was seeing 10 miscarriages in a month, now I am seeing 20. Not only miscarriages, but a number of newborns have low birth weight, and there is an alarming increase in this. Women are healthy throughout the pregnancy, but it seems the child is not growing; blood flow to the baby stops in most cases. Baby starts compensating. This is happening more than ever.”<sup>8</sup> Another gynaecologist, Dr Vaishali Sharma, based in Delhi, is also seeing similar trends. In her words:

We get a higher percentage of women getting spotting during pregnancy at this point. In the last 10 days, I have had cases of 4-5 pregnant women who had completely asymptomatic pregnancies but started having bleeding and spotting without any reason. Air pollution is one of the major factors for such miscarriages. In case women do not take care and venture out in this pollution, they get such spotting which leads to miscarriage.<sup>9</sup>

Growing infertility has pushed many couples, as well as single individuals, to turn to assisted reproductive technologies in their efforts to have a child. Unfortunately, air pollution has a severe impact on those trying to get pregnant through assisted reproductive technologies as well. Among individuals undergoing in vitro fertilisation (IVF), exposure to nitrogen dioxide and ozone was linked to lower live birth rates, while exposure to particulate matter (PM10) was associated with a higher risk of miscarriage (Conforti et al., 2018). It cannot be denied that a major section of the population would be affected by this. In Delhi NCR, approximately 11,800 to 12,000 IVF cycles are performed annually. This indicates a significant demand for IVF treatment in the region (Ernst and Young, 2015). The National Family Health Survey (NFHS-5) also shows a decline in fertility rates in Delhi, with a Total Fertility Rate of 1.5 (Ministry of Health and Family Welfare, 2022). This fertility decline further contributes to the high demand for IVF. We can expect a good number of IVF pregnancies to be impacted by air pollution in Delhi NCR. These pregnancies are already complicated; air pollution further complicates them.

From the above analysis, it becomes clear that the state must urgently acknowledge the gendered health impacts of air pollution and develop policies that are sensitive to women’s specific needs and experiences. Failing to act now could have far-reaching and devastating consequences for women’s wellbeing and for Indian society as a whole.

#### **4. Air pollution exposure among women across different social strata in Delhi NCR**

While ambient air pollution poses serious risks to women's health, we must also examine indoor air pollution sources since many women spend most of their time indoors, whether managing households or working in offices. The World Health Organisation has stated that, “Household air pollution was responsible for an estimated 2.9 million deaths per year in 2021, including over 309 000 deaths of children under the age of 5.”<sup>10</sup> According to a report released by the Ministry of Health and Family Welfare in the year 2015, household air pollution due to the use of solid fuels accounts for 25% to 30% of the outdoor air pollution (Ministry of Health and Family Welfare, Govt. of India, 2015). The combined effects of ambient air pollution and household air

<sup>7</sup> Senior Gynaecologist, Madhukar Rainbow Children’s Hospital

<sup>8</sup> Sherine Elizabeth (2023, 17 November) “Delhi-NCR Air Pollution Fuelling Rise in Miscarriages, Other Complications among Pregnant Women, Babies.” <https://www.news18.com/india/delhi-ncr-air-pollution-fuelling-rise-in-miscarriages-other-complications-among-pregnant-women-babies-8664536.html>

<sup>9</sup> *ibid.*

<sup>10</sup> World Health Organisation (2025, 16 December). “Household Air Pollution.” <https://www.who.int/news-room/fact-sheets/detail/household-air-pollution-and-health>

pollution are associated with 6.7 million premature deaths annually (ibid.).

A woman's experience of suffering from indoor air pollution often depends on her socio-economic background. Those from lower-income households are especially vulnerable as they are more likely to rely on highly polluting fuels for cooking and heating, which exposes them to harmful smoke and pollutants every day. Limited financial means make it harder for them to access cleaner alternatives or healthcare, and often, they may not even be fully aware of the health risks they face. In lower-income homes, highly polluting fuels have been found to be a major contributor to indoor air pollution, releasing pollutants with extremely adverse impacts on women, including: particulate matter (PM<sub>2.5</sub> and PM<sub>10</sub>), carbon monoxide, black carbon (soot), sulphur dioxide, and nitrogen oxide. The World Health Organisation also says, "Household air pollution is generated by the use of inefficient and polluting fuels and technologies in and around the home that contain a range of health-damaging pollutants, including small particles that penetrate deep into the lungs and enter the bloodstream. In poorly ventilated dwellings, indoor smoke can have levels of fine particles 100 times higher than acceptable. Exposure is particularly high among women and children, who spend the most time near the domestic hearth" (World Health Organisation, 2024).

Although a major section of Delhi NCR has switched to clean energy for cooking, a major section of the society still uses highly polluting fuels (Sreenivasan et al., 2023). The usage of liquified petroleum gas (LPG) has expanded; however, its consistent use is a challenge. There are two major factors responsible for this, namely, affordability and easy availability of cheap or non-monetised solid fuels (ibid.). Despite the wide coverage of schemes like Pradhan Mantri Ujjwala Yojna (PMUY), many families continue to use biomass even today due to various barriers and access issues. Studies have found that although PMUY has played a crucial role in increasing the usage of LPG, there are several factors, ranging from socio-cultural norms to systemic gaps, acting as barriers against its sustained use. In a study conducted under the Cleaner Air Better Air project in five urban slums of Delhi (both notified and non-notified bastis),<sup>11</sup> it was found,

for the users, ease of access is more important than ease of use when deciding which fuel to use. Users' perceptions regarding LPG, such as LPG being unsafe, food cooked on LPG being unhealthy and less tasty, combined with supply-side bottlenecks such as challenges in applying for and getting an LPG cylinder, lump-sum cash outflow during ordering refills for an LPG cylinder are some of the factors that act as a hindrance in its sustained use by women in low-income households.<sup>12</sup>

Women employed in formal office spaces across Delhi NCR are also exposed to the hidden threat of indoor air pollution during long working hours. A study (conducted in three offices in Delhi, namely, Nirman Bhawan, BKK Copernicus Marg, and National Polio Survey Project Office, Safdarjung Enclave) by TERI underlines the importance of indoor air pollution as a significant health concern due to prolonged time spent indoors, especially in office environments (TERI, 2012). A study was conducted in Delhi NCR in four air-conditioned office buildings for the criteria pollutants PM<sub>2.5</sub> and CO<sub>2</sub>. The study showed high concentrations of these two pollutants in the office buildings. The close proximity to busy urban roads, insufficient ventilation conditions, and poorly maintained HVAC ducting systems are likely to be the causes. The concentrations of CO<sub>2</sub>

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<sup>11</sup> The sites include Lohar Basti, Sansi Camp, Khichripur, Kanchan Kunj, and JJ Colony.

<sup>12</sup> Express News Service (2023, 22 August). "High refill cost, lack of access deter the poor from using LPG: study" The Indian Express, <https://indianexpress.com/article/india/high-refill-cost-lack-of-access-deter-the-poor-from-using-lpg-study-8903063>

and PM<sub>2.5</sub> are recorded to be above the National Ambient Air Quality Standards (NAAQS) and the American Society of Heating, Refrigerating and Air-Conditioning Engineers Indoor Air Quality Standards (ASHRAE 62.1) (Gupta et al., 2020). A study was conducted on the indoor air quality of two office buildings and one educational building in Delhi in the pre-monsoon season. The average CO<sub>2</sub> levels in both office buildings were found to be considerably higher than the ASHRAE standard. A ductless air-conditioning system, combined with poor ventilation and inadequate air filtration, likely contributed to the elevated concentration of particulate matter observed in one of the offices. Significantly lower concentrations of all pollutants were recorded in the educational building (Datta et al., 2017). These studies underscore that even women in office settings remain vulnerable to indoor air pollution's insidious effects, with potential consequences extending to reproductive health.

The foregoing analysis suggests that women across different social strata experience exposure to air pollution in distinct ways. This underscores the importance of identifying pollution sources accurately and designing targeted policies to reduce their impact on women's reproductive health accordingly.

## 5. Women and environmental governance

Recognising women's disproportionate air pollution vulnerability requires gender-sensitive policies tailored to diverse socio-economic realities. To realize such policies, the inclusion of women in the decision-making process is essential, as women bring with them their lived experiences. At the same time, local women are also the knowledge holders. Research has established their prominent role in the conservation of nature through their knowledge. Local women as knowledge holders and decision makers in community-based conservation are linked to better protected area management (Allendorf & Allendorf, 2012).

In India, women have long been at the forefront of conservation and sustainability efforts. In the past, ecofeminists (especially in the Global South) have drawn a special relationship between women and nature due to their roles in food production, seed preservation, and caregiving. They link women's fertility with natural regeneration, and position both as forces that have been subjugated by patriarchal and capitalist systems (Merchant 1980; Shiva, 1988; Ruether, 1992; Mies & Shiva, 2014). However, Bina Agarwal calls for rejecting this claim. She argues for the inclusion of women in environmental governance (Agarwal, 2010). According to her, a stronger presence of women in the executive committees of community groups can play an important role in promoting more just and equitable forms of green governance in community forestry (*ibid.*). Highlighting the link between women's participation in policy decision-making on climate goals and policies, Strumskyte et al. (2022) have argued:

Environmental leadership can not only bring about improvements in representational justice and increased focus on gender-specific environmental impacts. It can also lead to stronger and more effective environmental action. Studies find that women's participation in decision-making can lead to better environmental outcomes, including by strengthening environmental policies and promoting sustainable investments, in both the public and private sectors (Strumskyte et al., 2022, p. 7).

The Centre for Sustainable Systems also calls for a meaningful involvement of all people in environmental decision-making to ensure full protection from disproportionate environmental and health impacts, and equitable access to a healthy, sustainable, and resilient environment

(Center for Sustainable Systems, 2024). On similar lines, to form well-informed policies, Wray and others argue, “perspectives outside of dominant systems, and engaging the voices, values, and ideas of underrepresented groups is critical to accelerating urgently needed, practical, and life-sustaining climate and environmental action” (Wray et al., 2023, p. 1088). Women’s voices in India often remain marginalised, particularly those belonging to socio-economically disadvantaged groups. For example, in a study in Gujarat, India, it was found that the lack of gender participation in the environmental hearing process is failing rural women. Hence, exacerbating discrimination and inequality. It is essential to respect the diversity of interests and their identities within the institutionalised public sphere to promote participation and recognition of their knowledge and role as crucial stakeholders (Gill & Joshi, 2024).

However, gender gaps in environmental decision-making persist across regions and sectors worldwide. In the context of good governance for sustainable ecosystem management, the International Union for Conservation of Nature seeks to understand these gender gaps and address the specific barriers involved, including the limited access women often face to resources such as land, technology, and finance. As a result, they may be excluded from decision-making processes related to ecosystem management, which limits them from contributing (IUCN, 2020). This gap is most pronounced in low-income countries that depend heavily on environmentally sensitive industries (*ibid.*). Women hold 39% of environment minister positions in OECD countries, yet their representation drops sharply in nations facing the heaviest climate impacts, where women already bear disproportionate environmental risks (Strumskyte et al., 2022, p. 7). Women are similarly underrepresented in key infrastructure ministries, such as energy, transport, and communications, which play a central role in shaping environmental outcomes (*ibid.*, p. 7). They have highlighted areas where women’s experiences and representation are under-represented:

Heads of environmental ministries/agencies, number of female heads of delegations to UNFCCC COPs, number of female delegates to UNFCCC COPs and other international negotiations, participants in national-level environmental fora, composition of corporate boards and senior management positions in green private sector companies, share of women on boards of climate mechanisms and funds, number of female entrepreneurs with adequate access to financing for low-carbon and climate resilient investment (*ibid.*, p. 24).

India lies in the low-middle-income category with many environmentally sensitive industries, where rapid economic growth coexists with deep inequalities in income, opportunities, and access to basic services. Women, as a result of this disparity, have limited opportunities to contribute to the protection of the environment. While many women have made important contributions in their individual capacities, efforts that the state has increasingly acknowledged, their presence in environmental leadership remains most visible within civil society organisations and international environmental negotiations. Across the world, women have built strong and influential networks within civil society to address environmental degradation and confront climate-related inequalities (*ibid.*, p. 7). However, women’s engagement should not be confined to civil society or environmental activism alone. Meaningful inclusion of women in environmental policymaking is essential, and achieving this requires the state to mandate women’s representation within formal environmental governance institutions.

Building on the discussion of air pollution in Delhi NCR, its harmful effects on the reproductive health of women, and the urgent need to include women in environmental decision-making, the following variables have been identified to analyse government policies aimed at reducing pollution in Delhi NCR:

- Inclusion of women in policy making process for mitigating air pollution
- Recognition of gendered health impact and needs across different social strata.

Before policy analysis, the following section provides a concise overview of the selected air pollution mitigation policies.

## **6. Policies to mitigate air pollution in Delhi NCR**

After the 1972 Stockholm Conference, environmental concern for air pollution began to be expressed in India in legislative terms (Mathur, 2013, p. 124). In the 1980s, civil society started raising its voice for clean air in Delhi. However, a lack of political will was evident in the government's inability to introduce legislation for curbing air pollution.

Over the next two decades, there was a constant tussle between the then Delhi government, judiciary, experts, and technocrats for the adoption of clean energy to reduce vehicular pollution. It was in the year 2002 that the Supreme Court of India was able to introduce Compressed Natural Gas as a single mode of fuel for public transport in the midst of considerable social and political conflict (Mathur, 2013, p. 117). However, this tussle clearly showed that, on one hand, political parties (in power or in opposition) lacked the political will to introduce strong laws for clean air. On the other hand, the citizens lacked awareness regarding the harmful impact of air pollution in Delhi. Political parties (both the party in power and in opposition) also did not make any efforts to educate the people about the Supreme Court's aims to promote a healthy environment. The focus of the public debate, carried out in the media, was more on the travails of the commuters rather than the need for clean air for the people living in Delhi (ibid., p. 136).

However, it was the "Great Smog of Delhi" in November 2016, which alerted the common man like never before. Since then, the air quality has remained very poor in Delhi NCR. Over time, this issue has drawn attention from the media, medical professionals, civil society, and academic scholars, as discussed earlier. The mounting pressure on the central government to take action to address this crisis has culminated in many policy interventions. Although the Government of India has introduced multiple policies and measures to control air pollution in Delhi NCR, for the present study only selective policies have been used for analysis. These policies were initiated by the government in the last 15 years. These policies are different in nature, dealing with different dimensions of the issue. Here is a brief description of the policies selected for the study.

### **6.1. National Green Tribunal Act**

National Green Tribunal Act was enacted in the year 2010 to provide for the establishment of a National Green Tribunal for the effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources including enforcement of any legal right relating to environment and giving relief and compensation for damages to persons and property and for matters connected therewith or incidental thereto.<sup>13</sup>

The National Green Tribunal is headed by a full-time Chairperson and includes between ten and twenty full-time Judicial Members, along with an equal number of full-time Expert

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<sup>13</sup> National Green Tribunal, <https://www.greentribunal.gov.in/about-us>

Members. In addition, the Chairperson has the discretion to invite individuals with specialised knowledge or experience to assist the Tribunal in specific cases.<sup>14</sup>

## 6.2. Graded Response Action Plan (GRAP)

Following a Supreme Court directive in *M. C. Mehta v. Union of India* in 2016, the Graded Response Action Plan (GRAP) was introduced to address deteriorating air quality in Delhi NCR. The plan laid out specific measures to be implemented under different Air Quality Index (AQI) levels, namely, moderate & poor, very poor, and severe, based on the National Air Quality Index. To deal with extreme pollution episodes, an additional category, “severe+” or “emergency,” was later incorporated (CPCB, 2017). It is a strategic framework launched to control air pollution in Delhi NCR by taking predefined actions based on the level of air pollution, especially Particulate Matter (PM<sub>10</sub> and PM<sub>2.5</sub>) concentrations. GRAP actions are pre-emptive and mandatory.

Initially, it was to be implemented by the Environment Pollution (Prevention and Control) Authority, but it is now enforced by the Commission for Air Quality Management (CAQM) with coordination from the State Pollution Control Boards, Municipal Corporations, Traffic Police, Transport, and Industry Departments.

## 6.3. National Clean Air Programme (NCAP) 2019

Introduced in 2019, the National Clean Air Programme (NCAP) represents India’s major long-term effort to tackle air pollution, targeting 131 cities across 24 States and Union Territories by bringing together governments, institutions, and other key stakeholders. It envisages achieving reductions up to 40% or the achievement of National Ambient Air Quality Standards for Particulate Matter<sub>10</sub> (PM<sub>10</sub>) concentrations by 2025-26. Its motto is “Clean Air for All.”

NCAP has adopted an integrated, collaborative, multi-scale, and cross-sectoral approach.<sup>15</sup> There are committees at the national, state, and city levels for coordinating, monitoring, and evaluating the programme. At the national level, there are four committees, namely; Apex Committee, the Steering Committee, the Monitoring Committee, and the Implementation Committee Chairman. At the state level, there are two committees, namely the Steering Committee and the Monitoring/Implementation Committee. Lastly, at the city level, there is one committee, namely the Implementation and Monitoring Committee.

## 6.4. Commission for Air Quality Management (2021)

The Commission was established to improve air quality management in Delhi NCR and adjoining areas by strengthening coordination, supporting research, identifying key challenges, and addressing issues related to air quality and its broader impacts. The Preamble of the Act clearly identifies the objectives sought to be achieved, which are the ‘better coordination, research, identification and resolution of problems related to the air quality index’ and incidental, connected matters.<sup>16</sup>

<sup>14</sup> Ibid.

<sup>15</sup> Prashant Gargava (2024, 9-10 December).” National Clean Air Programme (NCAP). Asia-Pacific Regional Action Programme on Air Pollution. Regional Workshop for South Asia.

<sup>16</sup> PRS Legislative Research (n.d). “The Commission for Air Quality Management in National Capital Region and Adjoining Areas Bill,” 2021 <https://prsindia.org/billtrack/the-commission-for-air-quality-management-in-national-capital-region-and-adjoining-areas-bill-2021>

The Commission is headed by a chairperson and supported by a Member-Secretary, who holds the rank of Joint Secretary and serves as the Chief Coordinating Officer. Its membership includes a serving or former Joint Secretary from the central government, three independent technical experts specialising in air pollution, and three representatives from non-government organisations.<sup>17</sup> The Chairperson and other members serve for a term of three years or until they reach the age of seventy, whichever comes earlier. In addition, the Commission includes *ex officio* members from the central and concerned state governments, as well as technical representatives from institutions such as the Central Pollution Control Board, the Indian Space Research Organisation, and NITI Aayog. When necessary, the Commission may also appoint representatives from relevant ministries.<sup>18</sup>

## 7. Analysis

### 7.1. Inclusion of women in the policy making process for mitigating air pollution

Previous sections of this paper have analysed the impact of inadequate participation of women in decision-making processes related to environmental protection. All the policies and bodies discussed above have an elaborate mechanism for implementation. NGT, drawing from the experiences of retired as well as currently employed judges and experts, is capable of making well-reasoned judgments regarding the protection of the environment and people. It has been established that the involvement of technical experts in decision-making promotes better environmental results, as environmental problems are complex and increasingly transnational in nature (Gill, 2016, p. 176). Their inclusion is necessary for values such as participation, inclusion, deliberation, and transparency for effective environmental governance (*ibid.*). Although Justice Pushpa Sathyanarayana was appointed as a Judicial Member of the National Green Tribunal in 2024 under the NGT Act, 2010, Dr. Nagin Nanda and Dr. A. Senthil Vel have been appointed as Expert Members. This shows that inclusion of women in NGT has been on a case-by-case basis and is not based on statutory inclusion. The tribunal does not include any provision that mandates the representation of women. Women's inclusion is necessary not only for their empowerment but for stronger and more effective environmental action as well (Strumskyte et al., 2022, p. 7).

The inclusion of women in the National Green Tribunal (NGT) holds significant potential for advancing gender-sensitive environmental justice in India. As discussed earlier, women from marginalised sections of society face disproportionate exposure to environmental hazards. Mandatory representation of women in the NGT can help ensure that the gendered dimensions of environmental harm are adequately recognised in adjudication and remedies. Their presence may also enhance access to justice by making the tribunal more approachable for women petitioners.

NCAP has an elaborate system to implement the program. There are bodies at the national, state, and city levels to ensure a hassle-free implementation of the program. The attempt to involve administration at the lowest level is an apt example of good governance. There are efforts by the government to involve women in the programme. For example, the District administration of Dimapur, Nagaland, organized training cum skill development of women leaders under NCAP in efficient waste management to reduce air pollution.<sup>19</sup> Olivi G. Choppy, a

<sup>17</sup> *ibid.*

<sup>18</sup> *ibid.*

<sup>19</sup> The Morung Express (2024, 11 March). "Women leaders trained under National Clean Air Prog in Dimapur," <https://morungexpress.com/women-leaders-trained-under-national-clean-air-prog-in-dimapur>

Senior Scientific Assistant, Nagaland Pollution Control Board, also urged women leaders to use the knowledge they have learnt from the training for the benefit of society as a whole, as mostly children and elderly people are victimised by air pollution.<sup>20</sup> The Council on Energy, Environment and Water, through its project called Cleaner Air and Better Health, is assisting in the implementation of NCAP in its capacity as knowledge partner, capacity builder and community outreach facilitator. Gender and social inclusion are intrinsic to the project. As part of these efforts, more than 3,869 women were trained on issues related to household air pollution and clean cooking (Council on Energy, Environment and Water, n.d). However, no comparable direct and structured initiatives have been undertaken in Delhi NCR.

GRAP has an elaborate mechanism to take pre-emptive actions. It has involved every institution responsible for controlling pollution, taking it down to the lowest level. CAQM has retired bureaucrats bringing rich experience with them, as well as experts from organisations like NITI Aayog, Indian Space Research Organisation, Central Pollution Control Board (CPCB). However, there is no gender dimension when it comes to the inclusion of women in its core body. In fact, in the year 2024, the central government assured the Supreme Court of the capability of the members of CAQM. Unfortunately, there was no mention of gender dimension when it comes to the membership.<sup>21</sup> On similar lines, there is no proof of mandated inclusion of women in the Commission for Air Quality Management (2021). They may hold office in an *ex officio* capacity. However, there is no clause for statutory inclusion.

Yet, it is appreciable that women were involved in the successful implementation of NCAP 2019, as women play a key role in community mobilisation and awareness. Their inclusion strengthens bottom-up compliance with households adopting cleaner fuels, schools adapting schedules, and local monitoring of burning practices. However, the mandated inclusion of women in the decision-making bodies of NCAP and GRAP could have led to the formulation of more gender-sensitive policies, as women also bring their lived experiences into the policy-making process. These two programmes in particular deal with particulate pollutants, i.e., PM10 and PM2.5, which have an extremely adverse impact on the reproductive health of women (as discussed earlier). Also, a major section of women living in Delhi NCR are primary caregivers and manage the household. These women face direct burdens from air pollution (e.g., children's health, cooking exposure, mobility restrictions). Women in GRAP as decision-makers would ensure the formulation of policies that reflect household and community-level impacts, not just macro air quality data. Therefore, mandated inclusion of women in decision-making bodies of these programmes can bring gendered health impacts and needs into discussion. This would make adopted measures and policies gender sensitive and would ensure that they are not only technical but also socially inclusive, eventually encouraging women-led groups, Residence Welfare Associations, and Non-Governmental Organisations to engage with GRAP rather than seeing it as purely technocratic. Research has also highlighted the importance of including women in decision-making processes for more effective environmental protection. An analysis of grassroots movements across India shows that women's knowledge and leadership play a crucial role in strengthening biodiversity conservation and climate resilience. The study argued for integrating ecofeminism into environmental governance for achieving ecological sustainability and social justice in India (Mahamuni, 2023).

CAQM (2021) may have appointed women who serve as *ex officio* members of the commission. However, there is no provision for mandated inclusion of women. Apart from

<sup>20</sup> Ibid.

<sup>21</sup> Sophiya Mathew (2024, 16 October). "Air quality panel members have sufficient experience, Centre tells SC." The Indian Express, <https://indianexpress.com/article/cities/delhi/air-quality-panel-members-have-sufficient-experience-centre-tells-sc-9622285/>

better coordination, regulation, enforcement, and resolution, CAQM is also responsible for research and identification of problems regarding air quality. Women members may help in identifying gender sensitive topics for research, which could lead to environmental protection policies designed with gender sensitivity.

The National Green Tribunal (NGT) primarily addresses environmental concerns. It has the power to invite women experts for cases they deem necessary. In October 2021, a three-judge bench of the Supreme Court delivered a verdict in *Municipal Corporation of Bombay v Ankita Sinha*. The bench ruled that the NGT is empowered to take *Suo Moto* action under the National Green Tribunal Act, 2010. It observed that the Tribunal's broad mandate to ensure environmental protection allows it to identify issues and intervene on its own initiative. This power cannot be restricted by procedural requirements of a complainant or a formal petition.<sup>22</sup> This reinforces that NGT can proactively protect women's environmental rights without waiting for formal petitions. In 2014, a foreign national Ms. Betty, challenged violations of the Coastal Regulation Zone in Goa. In *Ms Betty C. Alvares v. State of Goa* case, the Tribunal held that the term "person" under Section 2(j) of the NGT Act includes foreign nationals. Consequently, women, even non-citizens, have *locus standi* to bring environmental cases in the NGT framework. It can be inferred from the aforementioned cases that women can have legal access to file petitions in cases where their rights are violated due to environmental degradation. At the same time, NGT should also intervene on its own, given its *Suo Moto* power, as NGT can ensure that environmental pollution impacting women is addressed swiftly.

## 7.2. Recognition of gendered health impact and needs across different social strata

GRAP and NCAP aim to reduce levels of particulate matter in the air. While these frameworks do not explicitly address gender concerns, cleaner air directly benefits women's health. Since particulate pollution has been shown to severely affect the reproductive health of women, efforts to lower its concentration can play an important role in improving not just overall air quality, but also women's well-being and quality of life. Studies conducted on GRAP in different time periods also show a high percentage of particulate matter in Delhi NCR. A study focused upon Graded Response Action Plan (GRAP) action during 2018 in terms of PM<sub>2.5</sub> and NO<sub>2</sub> was conducted in Delhi NCR. The Environment Pollution (Prevention and Control) Authority directed the GRAP to advise local industries and other sources of pollution to suspend operations on specified dates whenever the AQI reached severe levels. Twenty-four-hour averaged AQI data for the periods September 2017–January 2018 and September 2018–January 2019 was analysed at two monitoring sites, namely Delhi Technical University and the Income Tax Office. The results indicated a significant decrease in AQI levels at both sites following each order issued by the GRAP task force. In general, the PM<sub>2.5</sub> values were always higher during the year 2017-18 as compared to 2018-19 at both sites (Singh & Kulshreshtha, 2020). A study conducted by the Council of Energy, Environment and Water in the winter of 2021 in Delhi on the implementation of GRAP found that there had been no significant improvement in Delhi's winter air quality since 2019. In winter 2021, air quality was in the 'very poor' to 'severe' category on about 75% of days (Khan et al., 2022, p. 2). The study also found fault with the technology used. While air quality forecasts picked up the pollution trends, they were not yet very accurate in predicting high pollution episodes (ibid.). Air quality spiralled back into the severe category when the restrictions were lifted, although the quality had improved with all the restrictions in place,

<sup>22</sup> Gauri Kashyap (2021, 7 October). "Suo Moto Powers of the NGT: Judgment Summary." Supreme Court Observer. <https://www.scobserver.in/reports/municipal-corporation-of-bombay-v-ankita-sinha-suo-moto-powers-of-the-national-green-tribunal/>

aided by better meteorology. Apart from Delhi NCR, it is necessary to study the implementation of GRAP in other cities as well, as about 64% of Delhi's winter pollution load comes from outside of Delhi's boundaries (ibid.). Centre for Research on Energy and Clean Air conducted a study on the implementation of GRAP in twenty-six cities, between October 1, 2022, and February 15, 2023. They found, "PM2.5 levels under the 'Severe+' category, 38 cities reported 'Severe', and 78 cities reported 'Very Poor' air quality" (CREA, 2023, p. 2). It suggested that non-attainment cities and Delhi NCR should initiate GRAP implementation as soon as air quality reaches 'Poor' levels" (ibid.). CREA also found that no city other than Delhi NCR had any "public communication or direction to the relevant stakeholders about the implementation of GRAP stages between October 1, 2022, and February 15, 2023, indicating failure of the regulation" (ibid.).

The NCAP operates on a much wider scale; it becomes important to understand how actions taken in other cities affect Delhi's air quality. Pollutants often travel long distances, and this movement of emissions from neighbouring areas plays a significant role in worsening the air pollution levels in Delhi NCR. In a study conducted on NCAP after the initial time limit of five years, it was found, "For 49 cities, PM2.5 data was available for all five years. Out of these, 27 cities recorded improvements in PM2.5 levels from 2019 to 2023. Similarly, for PM10, data across five years were available for 46 cities. Of these, 24 cities saw an improvement in their PM10 levels" (Respirer Living Science Private Ltd., 2024, p. 1). In a study by Urban Lab, Centre for Science and Environment, it was found,

Trends in particulate matter pollution (PM2.5) between the cities under the National Clean Air Programme (NCAP) and those outside its ambit have remained the same. Only 14 of 43 (NCAP) cities registered a 10% or more reduction in their PM2.5 level between 2019 and 2021. Out of 46 non-NCAP cities with adequate data, 21 recorded significant improvement in their annual PM2.5 value, with a 5% or more decline between 2019 and 2021. 16 NCAP cities and 15 non-NCAP cities registered significant increases in their annual PM2.5 levels, with nearly identical numbers (Somvanshi et al., 2022)

Another study was conducted in 28 cities of Uttar Pradesh, assessing the changes in PM10 using the measurements collected by CPCB for the period of 2018-2022. They found,

Most cities exhibited unhealthy air quality. Jhansi had the lowest AQI (72.73) in 2023, classified as 'moderate' by WHO standards. Gorakhpur consistently showed 'poor' AQI levels, peaking at 249.31 in 2019. Western Uttar Pradesh cities such as Ghaziabad, Noida, and Moradabad had significant pollution burdens. Predictions showed Bareilly with over a 70% reduction in PM10 levels, Raebareli 58%, Moradabad 55%, Ghaziabad 48%, Agra around 41%, and Varanasi 40%, meeting NCAP targets. However, Gorakhpur and Prayagraj predicted increases in PM10 levels by 50% and 32%, respectively. Forecasting PM10 concentrations in Uttar Pradesh's non-attainment cities offers policymakers substantial evidence to enhance current efforts. While existing measures are in place, our findings suggest that intensified provisions may be necessary for cities predicted to fall short of meeting program targets. (Bera et al., 2024, p. 1).

However, in another study, it was found that the implementation of the NCAP has contributed to a decline in PM10 levels across India and has been associated with improvements

in public health, including a reduction in pollution-related fatalities. Strengthening the enforcement of existing regulations has therefore been recommended to help achieve the programme's objectives (Gopikrishnan & Kuttippurath, 2025). While appreciating the government's efforts, CREA noted that the NCAP has helped place air quality firmly on the policy agenda through sustained action, even though significant challenges remain in meeting the programme's targets (Centre for Research on Energy and Clean Air, 2025). The government has granted ₹9631.23 crores to support its objectives (Respirer Living Science Private Ltd., 2024). The revision of the programme's initial target to a 40% reduction in particulate matter concentration by 2026, is a positive development as it demonstrates a commitment to more ambitious environmental goals (Centre for Research on Energy and Clean Air, 2025).

CAQM has a wider jurisdiction and the required mandate to fulfil policy objectives. It replaced the apex pollution control body in the NCR, i.e., the Environment Pollution (Prevention and Control) Authority. However, the UNDP said that CAQM faces jurisdictional and coordination challenges (UNDP, 2025). It highlighted the importance of expanding CAQM's mandate, strengthening its enforcement authority, and bringing in representatives from a wider range of sectors to support a more comprehensive approach to air quality management (ibid.). In the year 2022, it took into cognisance the problem of indoor pollution, which is also responsible for the poor health of women.<sup>23</sup> The need to integrate the mitigation of household air pollution with outdoor air quality management across urban and rural landscapes was stressed. CAQM recommended providing induction stoves to migrant and floating low-income populations in Delhi NCR who lack access to clean cooking fuels, as part of a broader policy framework aimed at reducing air pollution in the region. It is a significant initiative.

From the preceding discussion on policy implementation, it can be concluded that although various policy measures have been introduced to curb pollutants that adversely affect women's reproductive health, their impact remains limited. A key gap lies in the insufficient recognition of the gendered nature of health impacts and how these impacts are experienced differently across social strata. As a result, policy responses remain fragmented and fall short of achieving their intended outcomes. Moreover, addressing air pollution requires a coordinated and nationwide approach, as pollution levels in Delhi NCR are shaped by multiple factors that extend well beyond its geographical boundaries. Without such integrated efforts, region-specific interventions are unlikely to deliver sustained improvements in women's health.

## 8. Recommendations

Based on the findings of the studies conducted on the policies, the following measures are suggested.

Firstly, public communication serves as the linchpin of effective GRAP implementation, transforming regulatory intent into actionable compliance across diverse stakeholders. Without clear timely directives reaching district administrations, industrial units, construction agencies, and citizens beyond Delhi's core, the graded response remains theoretical rather than operational. Transparent communication builds trust, prevents blame-shifting between states, and enables citizens to hold local authorities accountable, converting regulatory failure into collective climate action.

Secondly, jurisdiction and coordination are major hurdles in implementing these policies efficiently. According to the UNDP, the CAQM faces challenges related to jurisdiction and coordination. Addressing these gaps would require expanding the Commission's mandate

<sup>23</sup> The Print (2022, 14 July) "In a first, CAQM suggests measures to address household air pollution." <https://theprint.in/india/in-a-first-caqm-suggests-measures-to-address-household-air-pollution/1039400/>

beyond the NCR, strengthening its enforcement powers, ensuring broader representation from diverse sectors, improving implementation at the local level, and fostering stronger regional collaboration to enable a more holistic approach to air quality management (UNDP, 2025).

Thirdly, a short-term solution may not be as effective unless long-term solutions are well formulated and implemented. For example, while GRAP effectively imposes immediate restrictions during pollution episodes, it fails to address persistent sources such as stubble burning, industrial clustering, and vehicular proliferation. CAQM in August 2025 admitted that it had not conducted any study on the pollution impact of diesel vehicles older than 10 years and petrol vehicles older than 15 years, even though these vehicles constitute the primary focus of Delhi NCR's overage vehicle ban.<sup>24</sup> CAQM has yet to take the first and fundamental step in tackling air pollution, i.e., conducting comprehensive research to build a deeper and evidence-based understanding of the problem. Hence, policies should be designed to work in synergy with one another.

Fourthly, it is essential to conduct regular studies throughout the country to measure air pollutants in order to formulate effective solutions. Continuous, spatially disaggregated measurement of PM<sub>2.5</sub>, NO<sub>2</sub>, SO<sub>2</sub>, and other pollutants enables precise source apportionment. For e.g., distinguishing crop residue impacts from vehicular emissions or industrial effluents. Without such data granularity, interventions remain speculative. Regular studies across urban-rural gradients also reveal socio-economic exposure disparities, essential for gendered pollution analysis, where indoor cookstove PM<sub>2.5</sub> (30-40 µg/m<sup>3</sup>) compounds ambient risks for low-income women. This data infrastructure underpins NCAP's 131-city expansion and CAQM's GRAP refinements, converting environmental governance from reactive crisis management to proactive public health protection.

Fifthly, efficient technology needs to be used, for which a greater emphasis on research needs to be laid in order to develop new and efficient technologies to curb air pollution and implement the existing policies efficiently. Strategic R&D prioritisation is essential to bridge the technological efficacy gap in India's air quality governance.

Sixthly, in the west, there is a strong body of research on women's involvement in protecting the environment. Some interesting findings include that women are more concerned about the environment than men. It was found that women have stronger beliefs about the harmful consequences of poor environmental conditions for others, the biosphere, and self and that these beliefs predicted more pro-environmental behaviour (Stern et al., 1993). The studies have focused on their lifestyle choices; choices made at home, and their participation in organisations working on the environment. Such studies not only deepen our understanding of how women engage with and care for the environment but also provide valuable guidance for policymakers to design more gender-sensitive and inclusive environmental policies. In India, however, this area has remained under-researched. Although the government of India is also encouraging women in research through various initiatives like WISE-KIRAN (Women in Science and Engineering - Knowledge Involvement in Research Advancement through Nurturing), Amba Subba Rao Fellowship for Women Researchers, SERB-POWER (Promoting Opportunities for Women in Exploratory Research), among others. However, research focusing on curbing the impact of air pollution on the reproductive health of women needs to be encouraged, along with encouraging women researchers. Also, including women in decision-making bodies and research bodies responsible for curbing air pollution is vital. Women in the CAQM, NCAP, and NGT can strengthen efforts to promote women's participation and influence in environmental

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<sup>24</sup> Business Standard (2025, 8 August). "CAQM admits no research has been done behind overage vehicle ban". [https://www.business-standard.com/india-news/caqm-admits-no-research-has-been-done-behind-overage-vehicle-ban-125080801048\\_1.html](https://www.business-standard.com/india-news/caqm-admits-no-research-has-been-done-behind-overage-vehicle-ban-125080801048_1.html)

research and policy. It will also help in building long-term institutional capacity for gender-sensitive environmental governance.

Seventhly, the policies should include targeted measures aimed at protecting the reproductive health of women. To achieve this, it is important to recognise gendered health impact, and more studies need to be conducted on women in Delhi NCR, as this is a multicultural city that encompasses a wide spectrum of socio-economic groups. Pollution sources vary across different social groups, and so does their capacity to cope with its impacts. Therefore, the state must first develop a nuanced understanding of the problem to avoid superficial policy responses. This requires a systematic collection of disaggregated data first. So far, no such study has been carried out, even though academic research has repeatedly emphasised how air pollution affects women's health. India can also learn from countries that have already taken such initiatives. For example, in Mongolia, Ulaanbaatar Gestation and Air Pollution Research was introduced, in which air filters were distributed to pregnant women during winters with extremely high PM<sub>2.5</sub> levels. It led to a reduction in in-utero exposure to pollution (Barn et al., 2018). This example demonstrates that policies which meaningfully recognise gendered health impacts and respond to women's specific needs are far more likely to generate transformative and enduring change. Hence, the same can be done in India as well. For example, air purifiers can be distributed to women from lower income section. At the same time, they should also be suggested natural methods to minimise the impact of air pollution. As discussed earlier, women working in the office also face the problem of indoor pollution, which is primarily caused by faults in the architecture and poorly maintained HVAC ducting system. The state can make it mandatory for all buildings to be well ventilated and to undergo regular monitoring of the HVAC ducting system.

Eighthly, there is an urgent need to increase awareness at a country-wide level with a special campaign targeting women. Discussing the impact of environmental hazards on pregnant women, Kim and Jeong argue, "As environmental hazards continue to increase, pregnant women should receive effective motivational education on eco-environmental protection to increase their sensitivity to environmental risk factors and to encourage active environmental health behaviours" (Kim & Jeong, 2022, p. 1). We also have many successful examples. The findings of a randomised controlled trial in Tehran, where pregnant women were subject to an educational intervention (motivational interviewing, booklet, SMS) to increase preventive behaviours toward air pollution exposure, suggest, "TTM-based educational interventions can increase preventive behaviours aimed at reducing exposure to pollution" (Araban et al., 2017). Women were more consistent and effective in adopting recommended preventive behaviours, such as limiting their exposure to hazardous outdoor air pollutants. The findings also suggest that a strong sense of self-efficacy can enable women to reduce the adverse effects of air pollution on their reproductive health (ibid.). Hence, women can be the agents of change and not just beneficiaries. TTM-based educational interventions can help them become one. Apart from spreading awareness among women, it is important that it is taught in schools to spread awareness at an early stage. Learning early in life about the current problems is a good way to prevent them.

Some countries have already taken the initiative. South Korea introduced an environmental health education program for pregnant women in the year 2022. 8-sessions of an online educational program on air pollution, endocrine disruptors, and protective behaviour were held (Jo & Kim, 2025, p. 2). As a result, awareness and intention to take preventive measures during pregnancy improved. Also, there was a significant improvement in personal and community environmental health behaviours, lifestyle adjustments, dust avoidance, recycling habits, quality of life, and e-learning satisfaction. There was no noticeable effect on participants' self-

reported health status or on levels of depression and anxiety (Jo & Kim, 2025, p. 1). The study demonstrated the feasibility and preliminary effectiveness of a mobile-based environmental health program for pregnant women (Kim, 2023).

Lastly, it is important to note that the statutory or regulatory air quality laws (ambient air quality regulation, emissions regulation) do not have legal clauses that specifically mandate protections for pregnant women or maternal health in the law text. The recognition is more in policy/program or advisory instruments. This underscores the urgent need for strong statutory laws that protect women's reproductive health from the harmful effects of air pollution and uphold their right to live, conceive, and raise families in a cleaner and healthier environment.

## 9. Conclusion

Air pollution has a profound toll on women's reproductive health, yet government responses have yet to fully acknowledge this crisis or craft targeted safeguards. While fragmented studies highlight Delhi-NCR's air quality woes, a holistic, region-wide evaluation encompassing emerging pollutants is urgently needed to shape policies attuned to women's needs across social strata.

Implementation of existing anti-pollution measures falls short, denying women their indirect benefits. This study urges robust enforcement of current frameworks nationwide, alongside long-term strategies and emergency plans explicitly protecting women's reproductive health, as seen in progressive international models. Achieving this demands a robust research ecosystem, with state incentives to deepen evidence on these intersections, coupled with mandatory women's inclusion in decision-making for truly gender-responsive policies.

Amid overlapping agencies, action plans, and mandates, jurisdictional clashes and misaligned goals undermine progress. Enhanced coordination and clarity are essential to harmonise efforts. Nationwide awareness campaigns must empower women with knowledge of air pollution's reproductive risks and broader harms. In response, mandating women's representation in Delhi-NCR air quality bodies would affirm their stakeholder role, bolster policy legitimacy while honouring India's CEDAW obligations and SDGs 5 (gender equality) and 13 (climate action).

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