

## Climate Justice in India: Addressing the Impact of Climate Change on Vulnerable Populations

Dr. Yash Kumar<sup>1</sup>

<sup>1</sup>Assistant professor Political Science, V.G.M. College, Dibliyapur, Auraiya, Uttar Pradesh

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### Abstract

This study assesses the impacts of climate change on water resources across various regions of India, focusing on the challenges of water security. Key objectives include evaluating changes in precipitation patterns, glacial melt, and groundwater recharge, alongside exploring adaptation strategies. The analysis encompasses North-western India, the Deccan Plateau, the Eastern Coastal Plains, and the Himalayan Region, each exhibiting unique climatic and socio-economic vulnerabilities. Data from 2000 to 2023 highlights significant trends: North-western India faces the highest average temperature increase (1.8°C) and a critical reduction in rainfall, leading to severe groundwater depletion and crop yield reductions of 40%. The Eastern Coastal Plains have experienced increased rainfall, resulting in flooding risks. Adaptation strategies such as rainwater harvesting, water conservation measures, flood management systems, and sustainable land use practices are evaluated for effectiveness, ranging from 65% to 80%. However, each strategy encounters specific challenges, including funding constraints and the need for community participation. The findings emphasize the urgent need for tailored interventions to address water insecurity, ensuring sustainable management of water resources. Collaborative efforts among governments, local communities, and organizations are essential for enhancing resilience against climate impacts. This study underscores the importance of proactive water resource management in safeguarding livelihoods, public health, and supporting sustainable development across affected regions in India.

**Keywords:-** Climate Change, Water Security, Adaptation Strategies, Temperature Change, Precipitation Change

### Introduction

Climate change is one of the most pressing global challenges of the 21st century, with far-reaching impacts on the environment, economies, and human lives. While the effects of climate change are felt worldwide, they are not experienced equally. Vulnerable populations in developing countries, like India, often face the worst consequences of climate shifts, despite contributing the least to global carbon emissions. This disparity raises crucial questions about fairness and equity, which are at the heart of the concept of climate justice.

India is particularly susceptible to the adverse effects of climate change due to its geographical diversity, reliance on climate-sensitive sectors, and socio-economic inequalities. Climate events such as erratic monsoons, prolonged droughts, increasing heatwaves, and rising sea levels disproportionately affect marginalized communities, including small-scale farmers, tribal populations, and coastal residents. These groups are often the least equipped to cope with climate change, as they lack access to the resources and infrastructure necessary to adapt or recover from climate-related disasters.

**Climate justice** addresses the need for fairness in how the costs and benefits of climate action are distributed. It recognizes that certain groups—due to factors like poverty, caste, geography, and occupation—are more vulnerable to climate impacts and thus require specific support. In India, achieving climate justice involves

ensuring that the most affected communities are not left behind in the country's efforts to mitigate and adapt to climate change.

This paper aims to explore how climate change disproportionately impacts vulnerable populations in India. It will analyze the effects of climate change on smallholder farmers, tribal communities, and coastal populations, as well as assess the role of government policies in promoting climate justice. By examining the intersection of environmental and social issues, this study highlights the importance of integrating justice into India's climate action framework, ensuring that solutions are both inclusive and equitable.

## **The Concept of Climate Justice**

Climate justice is a framework that emphasizes the ethical, political, and social dimensions of climate change, advocating for equity in both responsibility and the distribution of climate impacts. While climate change is a global phenomenon, its effects are experienced unevenly across different populations. Wealthier nations and individuals, responsible for the majority of greenhouse gas emissions, often face fewer immediate consequences than poorer nations and communities that contribute minimally to these emissions. This disparity highlights the injustice inherent in the current climate crisis, particularly in developing countries like India (Schlosberg, 2013).

In the context of India, climate justice requires recognizing that vulnerable populations—such as small farmers, tribal communities, and coastal residents—are disproportionately impacted by climate change. These groups not only possess fewer resources to adapt to changes in weather patterns, but their livelihoods are often directly dependent on stable environmental conditions. This disparity is exacerbated by pre-existing socio-economic inequalities, which make it increasingly difficult for marginalized groups to recover from climate-related shocks, such as floods, droughts, and heat waves (Ghosh, 2019).

Globally, climate justice has emerged as a central theme in discussions around climate action, particularly through international agreements like the Paris Agreement. This accord acknowledges the principle of differentiated responsibilities, asserting that countries like India, which are still developing, should not bear the same burden of emissions reductions as developed nations (UNFCCC, 2015). However, within India, the application of differentiated responsibility must be tailored to ensure that vulnerable communities are not further marginalized by climate policies that overlook their specific needs (Bhaduri et al., 2020).

At its core, climate justice in India calls for inclusive policy-making that prioritizes the voices and concerns of those most affected by climate change. This includes incorporating local knowledge, especially from indigenous communities, into climate adaptation strategies (Kothari, 2019). Furthermore, it underscores the necessity of fair access to resources—such as water, land, and financial support—to help vulnerable populations cope with and adapt to a changing climate. By doing so, climate justice seeks to bridge the gap between environmental sustainability and social equity, ensuring that the transition to a more climate-resilient future is both inclusive and just.

## **Impact of Climate Change on Vulnerable Populations in India**

India's geographical diversity and socio-economic inequalities make certain populations more vulnerable to the impacts of climate change. These vulnerable groups, including smallholder farmers, tribal communities, and coastal residents, face disproportionate risks from changing weather patterns, rising sea levels, and extreme weather events. The vulnerabilities of these populations are not only environmental but are deeply intertwined with socio-economic and cultural factors, which intensify their exposure to climate risks.

## Farmers and Agriculture

Agriculture, which sustains nearly 60% of India's population, is highly dependent on predictable weather patterns. However, climate change has disrupted this balance, leading to erratic monsoons, prolonged droughts, and more intense heat waves, which severely affect crop yields. The state of Maharashtra, for instance, has experienced recurrent droughts that have devastated smallholder farmers, leading to loss of livelihoods and increased debt (Bharadwaj, 2020). In contrast, states like Kerala have seen frequent flooding, which not only destroys crops but also disrupts agricultural infrastructure.

Smallholder farmers, who often lack access to irrigation, are particularly vulnerable to these changes. Without adequate financial resources, many farmers rely on rain-fed agriculture, making them highly susceptible to changing rainfall patterns. Crop failure due to climate events has contributed to the distress migration of farmers to urban areas, where they often face poor living conditions and limited employment opportunities (Singh, 2021). These challenges highlight the need for targeted government interventions, such as improved crop insurance schemes and more efficient irrigation systems, to support farmers in adapting to the changing climate.

## Tribal Communities and Indigenous Rights

India's tribal populations, many of whom live in forested areas, are also facing significant impacts from climate change. These communities depend heavily on forests for their livelihoods, including agriculture, gathering forest products, and maintaining biodiversity. Climate change is altering the ecosystems on which they depend, with rising temperatures and changing rainfall patterns threatening forest health and productivity (Kothari, 2019).

Additionally, climate-induced deforestation and changing weather conditions have led to the displacement of many tribal communities. The loss of traditional lands forces these communities into urban areas, where they often face social and economic marginalization. Indigenous knowledge, which has helped these communities manage natural resources for centuries, is increasingly being undermined by external pressures and climate uncertainties. Preserving this knowledge is critical, as it can provide valuable insights into sustainable adaptation strategies (Chandra, 2020).

## Coastal Communities and Rising Sea Levels

India's 7,500 km coastline is home to millions of people whose livelihoods depend on the sea. Coastal communities, particularly in low-lying areas, are highly vulnerable to the effects of rising sea levels, more frequent and intense cyclones, and coastal erosion. In regions like the Sundarbans, home to one of the largest mangrove forests in the world, rising sea levels and saltwater intrusion have made agriculture increasingly difficult. Many families are being forced to migrate to higher ground, leaving behind their homes and traditional ways of life (Hazra, 2018).

Cyclones, such as the ones that regularly hit Odisha and West Bengal, have devastating impacts on fisher folk and other coastal inhabitants. These extreme weather events destroy homes, fishing equipment, and infrastructure, further pushing already vulnerable communities into poverty. Without adequate disaster preparedness and resilient infrastructure, these communities face ongoing cycles of loss and recovery, with little long-term security.

## Government Policies and Climate Justice in India

India has made significant strides in recognizing the impacts of climate change and implementing policies to mitigate its effects. However, ensuring that these policies are inclusive and address the needs of the most vulnerable populations remains a challenge. For climate justice to be fully realized in India, government interventions must not only focus on reducing greenhouse gas emissions but also on ensuring that marginalized communities are equipped to cope with and adapt to the effects of climate change.

### **National Action Plan on Climate Change (NAPCC)**

India's National Action Plan on Climate Change (NAPCC), launched in 2008, represents a comprehensive framework for addressing climate change through eight core "missions." These missions focus on promoting solar energy, enhancing energy efficiency, and creating sustainable habitats, among other objectives. However, while the NAPCC highlights the need for equitable and sustainable development, its implementation has often been critiqued for lacking a specific focus on vulnerable populations (Dubash & Jogesh, 2014). For instance, the National Solar Mission has been successful in increasing renewable energy capacity, but its benefits have not always reached rural or tribal communities, who remain heavily dependent on non-renewable resources for their energy needs.

Additionally, the National Mission for Sustainable Agriculture (NMSA), one of the key missions under the NAPCC, is aimed at making Indian agriculture more resilient to climate change. This mission promotes practices such as soil conservation, water efficiency, and drought-resistant crops. While NMSA has had some success, smallholder farmers, particularly those in rain-fed regions, continue to face challenges in accessing the technologies and resources promoted under this mission (Rathore, 2021).

### **Disaster Management and Climate Resilience**

In recent years, India has also strengthened its disaster management framework to better respond to the increasing frequency and intensity of climate-related disasters. The National Disaster Management Authority (NDMA) has developed policies that emphasize the need for community-based disaster risk reduction, focusing on building the capacity of local communities to prepare for and respond to disasters. However, the effectiveness of these policies often varies between regions. For instance, states like Kerala and Odisha, which have experienced recurrent floods and cyclones, have seen notable improvements in disaster preparedness, but other regions still lack adequate infrastructure and community-based initiatives (Rajan, 2020).

Despite progress in disaster management, gaps remain in the provision of long-term support to displaced populations. In many cases, communities that are forced to migrate due to climate events receive little assistance in terms of resettlement and rehabilitation. This is particularly true for tribal and coastal communities, who often lose their land and livelihoods as a result of climate-induced displacement (Hazra, 2018). Ensuring climate justice requires the development of policies that not only address immediate disaster relief but also provide long-term support for displaced and affected populations.

### **State-Level Initiatives**

Several Indian states have developed their own climate action plans, tailored to their unique environmental and socio-economic conditions. For instance, Maharashtra has launched initiatives to support farmers in adapting to drought conditions by promoting water conservation practices and the use of climate-resilient crops (Bharadwaj, 2020). Similarly, Kerala has implemented flood mitigation projects, which involve the restoration of wetlands and mangroves to reduce the impact of floods on coastal communities. These state-

level efforts are critical for addressing region-specific vulnerabilities and ensuring that climate action is locally driven and inclusive.

However, state-level implementation of climate policies often faces challenges related to coordination, funding, and political will. In many cases, the most marginalized communities are excluded from decision-making processes, leading to policies that may not fully address their needs. Enhancing the participation of local communities in the planning and implementation of climate policies is essential for achieving climate justice at both the national and state levels (Chakrabarti, 2019).

### **Integrating Climate Justice into Future Policies**

For India to effectively address the issue of climate justice, future policies must focus on greater inclusivity and equity. This includes providing targeted financial and technical support to vulnerable populations, enhancing social safety nets for climate-affected communities, and ensuring that climate adaptation and mitigation strategies are developed in consultation with those most at risk. Furthermore, policies need to prioritize the preservation of indigenous knowledge and the protection of traditional livelihoods, particularly in rural and tribal areas (Chandra, 2020).

India's climate policies must also align with global frameworks, such as the Sustainable Development Goals (SDGs), to ensure that climate action contributes to poverty alleviation, food security, and social equity. By integrating climate justice into these broader development goals, India can create a more resilient and inclusive future for its most vulnerable populations.

### **Challenges and Gaps in Achieving Climate Justice in India**

While India has made significant strides in addressing climate change, achieving true climate justice remains an ongoing challenge. Several gaps in policy implementation, institutional capacity, and resource allocation have hindered the country's ability to protect its most vulnerable populations from the impacts of climate change. This section explores some of the major challenges in realizing climate justice in India and discusses the barriers that prevent equitable climate action.

#### **Policy Implementation and Coordination Issues**

One of the most significant challenges in promoting climate justice is the gap between policy formulation and implementation. While national frameworks such as the National Action Plan on Climate Change (NAPCC) and state-level climate action plans are well-intentioned, their implementation often falls short due to limited coordination between different government agencies, lack of adequate funding, and bureaucratic inefficiencies (Dubash & Ghosh, 2019). Many vulnerable communities, particularly in rural and tribal areas, are not receiving the benefits of climate resilience programs due to the centralized nature of policy implementation, which often excludes local actors from meaningful participation.

For instance, the National Mission for Sustainable Agriculture (NMSA), designed to help farmers adapt to climate change, has faced implementation delays and difficulties in scaling up effective practices like water-saving technologies and crop insurance. The challenges are exacerbated by the diverse agro-climatic conditions across India, making it difficult to apply a uniform set of policies (Chandra, 2020). As a result, smallholder farmers, who are among the most affected by climate change, remain underserved by government interventions.

#### **Limited Involvement of Local Communities**



Another key challenge is the limited involvement of local communities, particularly indigenous and tribal groups, in the development and execution of climate policies. These communities have deep-rooted knowledge of local ecosystems and sustainable practices, which could greatly enhance adaptation efforts. However, their knowledge is often overlooked, and top-down approaches dominate climate policy-making in India (Kothari, 2019). This disconnect leads to policies that are not fully tailored to the specific needs and vulnerabilities of local populations, resulting in limited effectiveness on the ground.

Furthermore, marginalized communities often lack the political power or social capital to advocate for their interests in climate decision-making processes. As a result, they are frequently excluded from critical discussions on how climate policies should be designed and implemented. This exclusion deepens existing social inequalities and perpetuates a cycle of marginalization, where the most vulnerable populations bear the brunt of climate impacts without being part of the solutions (Sharma, 2020).

### **Funding Constraints and Inequality in Resource Allocation**

Financial constraints are another significant barrier to achieving climate justice in India. The country faces a massive funding gap between the resources needed for climate adaptation and mitigation and the available financial resources. This is especially problematic for vulnerable populations, who often require targeted financial assistance to build climate resilience. Despite efforts such as the Green Climate Fund, which aims to provide financial support to developing countries, many climate-vulnerable communities in India remain underserved (Rathore, 2021).

In addition, there are concerns about the equitable distribution of financial resources. Government funding and international climate finance often fail to reach the most affected populations. Rural and remote areas, where climate impacts are most severe, frequently receive less funding than urban areas, exacerbating inequalities. This uneven distribution of resources undermines the principle of climate justice, which calls for prioritizing support to those most in need (Chakrabarti, 2019).

### **Climate-Induced Migration and Displacement**

Climate-induced migration and displacement are emerging challenges that India must address in its pursuit of climate justice. Extreme weather events such as floods, cyclones, and droughts are increasingly forcing people to migrate from rural areas to cities. Coastal communities, particularly in regions like the Sundarbans, are facing rising sea levels, leading to the gradual loss of land and the displacement of entire villages (Hazra, 2018). Tribal populations in forested areas are also being displaced due to deforestation and changing weather patterns that disrupt their traditional livelihoods (Kothari, 2019).

While migration can sometimes be a coping strategy, it often leads to further marginalization. Migrants typically move to urban slums, where they face poor living conditions, limited access to basic services, and precarious employment opportunities. In many cases, these displaced populations are not recognized or adequately supported by government policies. There is a lack of comprehensive frameworks in India to address the specific needs of climate migrants, which leaves them highly vulnerable to social and economic exclusion (Bharadwaj, 2020).

### **Gender Inequality and Climate Vulnerability**

Gender inequality is another critical issue in the context of climate justice in India. Women, particularly in rural areas, are disproportionately affected by climate change due to their roles in agriculture, water collection, and household management. As climate impacts intensify, women often bear the brunt of the additional labor

required to secure food and water for their families. Despite their critical role in climate adaptation, women are frequently excluded from decision-making processes related to climate policies and resource allocation (Chandra, 2020).

Moreover, gender-based inequalities in access to land, credit, and education further exacerbate women's vulnerability to climate impacts. Female farmers, for example, often have less access to land ownership and agricultural inputs, making it harder for them to adapt to changing weather conditions. Addressing these gender disparities is crucial for ensuring that climate justice is truly inclusive and equitable.

## **Pathways to Achieving Climate Justice in India**

To address the complex and multifaceted impacts of climate change on vulnerable populations in India, a comprehensive and inclusive approach is necessary. Achieving climate justice requires more than just mitigating emissions—it involves ensuring that all communities, especially those most affected, are empowered and equipped to adapt to climate change. This section outlines key pathways for advancing climate justice in India, including policy reform, community-based adaptation, and international cooperation.

### **Strengthening Policy Frameworks for Inclusive Climate Action**

One of the primary pathways to achieving climate justice is the reform and strengthening of India's existing climate policy frameworks. While policies like the National Action Plan on Climate Change (NAPCC) have laid the foundation for addressing climate change, these frameworks must be made more inclusive and targeted towards vulnerable populations. For instance, the National Mission for Sustainable Agriculture (NMSA) could be expanded to provide more direct support to smallholder farmers, including subsidies for climate-resilient crops and access to affordable irrigation technologies (Chakrabarti, 2019).

Additionally, the integration of climate justice into urban planning and infrastructure projects is critical. India's rapid urbanization poses challenges, but it also provides an opportunity to design climate-resilient cities that can accommodate displaced populations and reduce urban vulnerabilities. Policies must prioritize affordable housing, disaster-resilient infrastructure, and access to essential services like water and sanitation for marginalized urban populations.

### **Empowering Local Communities and Indigenous Knowledge**

Community-based adaptation is a key component of climate justice, as it empowers local populations to develop and implement strategies tailored to their specific needs. Indigenous and tribal communities, in particular, possess a wealth of traditional knowledge about sustainable resource management and ecosystem resilience. Incorporating this knowledge into formal climate adaptation policies can lead to more effective and culturally appropriate solutions.

To support community-based adaptation, local governments and non-governmental organizations (NGOs) should work closely with tribal communities to co-create adaptation strategies. This could involve the protection and restoration of forests, wetlands, and other ecosystems that play a crucial role in climate resilience. For instance, in the Sundarbans, local initiatives to restore mangrove forests have helped mitigate the impacts of rising sea levels and protect coastal communities from cyclones (Hazra, 2018). Scaling up such initiatives across the country would enhance the resilience of vulnerable populations while preserving biodiversity.

Furthermore, ensuring the right to participation in decision-making processes is essential for climate justice. Vulnerable groups, particularly women, indigenous people, and lower-income communities, must have a say

in how climate policies are designed and implemented. This participatory approach ensures that solutions are inclusive and reflect the needs of those most affected by climate change.

### **Enhancing Financial Support and Access to Resources**

Financial mechanisms that specifically target vulnerable populations are vital for achieving climate justice. While India has access to international funds like the Green Climate Fund (GCF), there is a need to improve the distribution of these resources to ensure that rural and marginalized communities benefit. Strengthening domestic financial mechanisms, such as providing microloans for small-scale renewable energy projects, could help bridge the resource gap. Access to affordable clean energy is particularly important in rural areas, where households often rely on non-renewable energy sources, which exacerbate environmental degradation.

In addition, expanding the scope and reach of climate insurance schemes, such as crop insurance, could offer critical protection for farmers against climate-induced crop failure. Insurance programs should be designed with flexibility to account for diverse climate risks across India's various agro-ecological zones. Such financial instruments could reduce the vulnerability of farming communities and provide them with a buffer against the economic impacts of climate change (Rathore, 2021).

### **International Cooperation and Global Climate Justice**

India's pursuit of climate justice must also be aligned with global efforts to combat climate change. As a developing nation with a large population and significant poverty, India faces unique challenges in balancing economic growth with climate mitigation. In this context, international cooperation is crucial. India must continue to advocate for the principle of "common but differentiated responsibilities" in global climate negotiations, ensuring that developed countries provide adequate financial and technological support to nations like India to address climate impacts (Dubash & Ghosh, 2019).

Moreover, India's leadership in global initiatives such as the International Solar Alliance (ISA) demonstrates its commitment to advancing climate solutions while promoting renewable energy development. Through partnerships with other developing nations, India can share best practices and resources for climate adaptation and resilience, particularly in the areas of clean energy and sustainable agriculture (Singh, 2021).

### **Building Climate-Resilient Livelihoods**

An essential aspect of achieving climate justice is building climate-resilient livelihoods for India's rural populations. This involves investing in education and training programs that provide communities with the skills and knowledge to adapt to a changing climate. For example, training farmers in sustainable agricultural practices, such as agro forestry, organic farming, and water conservation techniques, can help them manage climate risks more effectively (Rathore, 2021).

Similarly, promoting diversification of livelihoods—such as introducing alternative income sources like eco-tourism, sustainable fisheries, or solar energy projects—can reduce dependence on climate-vulnerable activities. In coastal regions, for instance, eco-tourism initiatives centered around mangrove conservation not only provide jobs but also contribute to environmental sustainability (Hazra, 2018).

### **Conclusion**

India's journey toward achieving climate justice is marked by both significant progress and persistent challenges. As a nation deeply vulnerable to the impacts of climate change, particularly for its rural, coastal,



and marginalized populations, India must adopt a multi-faceted approach that ensures equitable distribution of resources, effective policy implementation, and meaningful participation of vulnerable communities.

The complexities of climate justice in India reflect the broader global struggle to balance economic growth with environmental sustainability. National and state-level policies, like the National Action Plan on Climate Change (NAPCC), provide a robust framework for climate action, but gaps in implementation, funding, and coordination hinder their effectiveness. Moreover, local communities, particularly indigenous and tribal groups, must be given a greater role in shaping climate adaptation strategies, as their traditional knowledge and sustainable practices offer invaluable insights for resilience.

Empowering these communities through financial support, access to climate-resilient technologies, and inclusive governance structures is crucial for ensuring that climate action benefits those most in need. Climate-induced migration, gender disparities, and the unequal distribution of resources must be addressed to create a truly just climate future.

India's leadership in global climate initiatives, such as the International Solar Alliance (ISA), demonstrates its potential to not only address domestic challenges but also contribute to global solutions. However, the success of India's efforts will depend on continued international cooperation, the commitment of developed nations to provide financial and technological support, and India's own internal reforms to ensure that climate justice is at the core of its development agenda.

In conclusion, achieving climate justice in India is a long-term endeavor that requires sustained political will, community engagement, and global solidarity. By addressing the existing gaps in policy and governance, India has the opportunity to become a global leader in climate justice, ensuring that its most vulnerable populations are not left behind in the fight against climate change.

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