



Climate Change and Indigenous People in India: A Multifaceted Exploration of Vulnerability, Adaptation, and Resilience

Shashwata Sahu¹ and Ramesh Chandra Sethi²

¹ Research Scholar, School of Law, Kalinga Institute of Industrial Technology (KIIT), Deemed to be University, Bhubaneswar -751024, India

² Assistant Professor, School of Law, Kalinga Institute of Industrial Technology (KIIT), Deemed to be University, Bhubaneswar -751024, India
contactshashwata@gmail.com

Abstract. The climate change is a global phenomenon and it has been impacting both developed and developing countries across the world. India has not escaped from the unprecedented disasters caused due to climate change. It has a devastating effect on the environment that jeopardises the well-being of indigenous people by causing disruptions to their traditional livelihoods, cultural practices, and social structures. This research explores the multifaceted correlation between climate change and indigenous people in India, analysing the diverse obstacles that they encountered and the inventive adoption methods they have devised to manage the intensifying climate situation. This paper examines the complex vulnerabilities faced by indigenous groups; emphasising their dependence on biodiversity, natural resources, and preservation of their cultural heritage for their survival and sustainable development. Moreover, the study investigates the ability of indigenous people to withstand and adjust to challenges, utilizing their ancestral knowledge and customs in order to formulate successful methods of adaptation.

Keywords: Climate Change, Indigenous People, Vulnerability, Adaptation, Resilience

1 Introduction

Climate change has emerged as a severe threat to the well-being of 476 million vulnerable indigenous populations around the world. This worldwide catastrophe, marked by rising temperatures, shifting weather patterns, and extreme weather events, have upset the delicate balance of ecosystem and posed a substantial threat to marginalized groups' livelihood, cultural practices, and social structures. Indigenous people are particularly vulnerable to the effects of climate change due to their deep connection with the natural world for their livelihood, culture, and healthcare. They also closely depend and reliance on traditional land-based practices for their agricultural activities which is firmly based in ancestral knowledge and customary

The original version of this chapter has been revised. The affiliations have been modified, text in abstract has been removed, text in heading "Introduction" and "Discussion and Results" have been removed. A correction to this chapter can be found at https://doi.org/10.2991/978-2-38476-192-0_22

© The Author(s) 2023, corrected publication 2024

T. Pradhan et al. (eds.), *Proceedings of the World Anthropology Congress 2023 (WAC 2023)*, Advances in Social Science, Education and Humanities Research 821,
https://doi.org/10.2991/978-2-38476-192-0_10

practices. Worldwide, indigenous people are particularly vulnerable to the disruptions due global warming and climate change. India, a country known for its rich biodiversity and cultural diversity, is home to a thriving tapestry of indigenous people. These communities, which number over 104 million individuals, are spread across the country, inhabiting a variety of environments ranging from the snow-capped Himalayas to the lush tropical Rainforest. For decades, indigenous groups in India have had a close interaction with their natural surroundings. Their traditional knowledge systems, which include a thorough awareness of local ecosystems, have guided their sustainable agricultural, resource management, and conservation practices. Because of this intimate connection, indigenous people have been able to grow in harmony with their environment, creating a balance within ecosystem, assuring their sustenance and cultural continuity.

In this context, climate change and indigenous people research in India is critical to understanding the complicated relationship between these two entities. This investigation digs into indigenous populations' vulnerabilities, studying how climate change impacts their traditional livelihoods, cultural practices, and social system. Furthermore, the study focuses on indigenous people's resilience and flexibility, highlighting their inventive solutions for handling the challenges posed by climate change. Their traditional knowledge and practices, which are sometimes ignored and undervalued, emerge as valuable assets in their search for adaptation and resilience. This research contributes to a broader understanding of the differential impacts of climate change and the importance of recognising the diverse experiences and perspectives of vulnerable populations by understanding the unique relationship between climate change and indigenous communities in India. This knowledge is vital for guiding policy decisions and building inclusive and equitable adoption solutions for sustainable development.

2 Review of Literature

The existing literature on climate change and indigenous communities in India presents a diverse range of perspectives and approaches, reflecting the complexity of the issue associated with climate change and biodiversity, and how climate change has been regarded as a threat to biodiversity and for the livelihood of local indigenous communities (Chaudhary and Bawa 2011; Shrestha et al. 2012, Uprety et al. 2017, Reyes-García et al. 2019; Thakur et al. 2020). Several studies have also examined the vulnerabilities faced by indigenous communities, highlighting the impacts of climate change on their livelihoods, cultural practices, and social structures (Hansen et al. 2006; Bordewich, 2009; Chaudhary et al. 2011; Shrestha et al. 2012; Tripathi and Singh 2013; Dasgupta and Roy, 2014; Singh and Chandola, 2016).

Whereas other studies have focused on indigenous communities' adaptation techniques, emphasising their resilience and resourcefulness in the face of climate change. Various adaptation tactics, such as changes in agricultural practices, resource management techniques, and migration patterns, have been observed in this research (Agarwal, 2009; Reddy, 2014; Pattanaik and Agarwal, 2007). These studies have

documented a variety of adaptation strategies, including changes in agricultural practices, resource management techniques, and migration patterns (Chaudhary and Bawa, 2011; Tripathi and Singh 2013; Reyes-García et al. 2016 and 2019, Sharma and Shrestha 2016; Brugnach et al. 2017; Negi et al. 2017; Savo et al. 2016). At the same time other literatures explore the significance of indigenous groups' traditional knowledge and practises in climate change adaptation (Tengnas, 2005, Berkes, 2009; Nakashima, 2014). These studies emphasise the significance of indigenous knowledge in comprehending local ecosystems, anticipating climate patterns, and devising successful adaptation methods. The extant literature on climate change and indigenous groups in India reflects a wide range of opinions and approaches, reflecting complexity of the issue and the various experiences of different populations. Several studies have explored indigenous groups' vulnerabilities, highlighting the effects of climate change on their livelihoods, cultural practices, and social structures.

Based on the some of the review of literatures stated above, the present study uncovered the impact of climate change on livelihood of indigenous population and their perception of climate change in recent times and how it has influenced the indigenous communities and their daily routine activities. The following research gaps are identified from the in-depth literature survey: (i). long -term climate change effects on indigenous communities, (ii). Indigenous knowledge's role in climate change mitigation, (iii). indigenous community policy and governance frameworks, (iv). traditional knowledge transfer between generations, (v). indigenous views on climate justice, (vi). indigenous views on climate justice: More research is needed to understand indigenous groups' perspectives on climate justice, as well as how they might be meaningfully involved in climate change policies and decision-making processes.

There is a wide range of ideas and methodologies in the extant literature on climate change and indigenous populations in India. Some studies use a more quantitative approach, analysing data on the effects of climate change and vulnerability assessments. Others adopt a more qualitative approach, employing case studies, ethnographic research, and participatory approaches to better understand indigenous cultures' lived experiences. A thorough review of the literature identifies significant knowledge gaps and topics for further investigation. The need for additional in-depth investigations of the gendered implications of climate change on indigenous populations is of special importance. Furthermore, additional research on the role of indigenous women in climate change adaptation and decision-making processes is required.

3 Methods of the Study

This research paper is based on secondary sources of data and is a qualitative study (academic literatures in the form of articles, documents and reports by both government and non-government organizations and other publications provided by the national and international agencies). It focuses on a holistic comprehension to

understand the correlation between two variables of climate change and indigenous population in India. The qualitative method focuses on analytical study of climate change and its' repercussion on indigenous people. The study also suggested a policy framework for sustainable development of indigenous communities in India.

4 Objective of the Study

The objectives of the present study are the following:

- (i) To explore the multifaceted correlation between climate change and indigenous population in India.
- (ii) To examine the complex vulnerabilities associated with climate change and mechanisms adopted for sustenance and sustainable development of indigenous communities in India.
- (iii) To investigate and study on the utilization of traditional knowledge and customs in order to formulate successful adaptation methods to deal with changing nature of climate.
- (iv) To illustrate the policy measures undertaken by the Government of India for protection of indigenous communities and preservation of rich culture and traditions to ensure sustainability of biodiversity.

5 Discussion and Results

The findings of the study revealed that indigenous people in India are extremely vulnerable to the effects of global warming and climate change. The indigenous people depend on the environment and natural resources for their livelihoods and survival. Therefore, they are especially vulnerable to disruptions occurred due to the climate change. Here, given the brief description of primary vulnerabilities identified in this study.

- (i). Food insecurity: Climate change is having an impact on food production, soil erosion, crop yield, agricultural practices, fishing, resulting in lower crop yields and greater food insecurity for general population and also indigenous populations. Despite of commitments by the global leaders through the SDGs, food insecurity continues as a serious problem in India. Climate change has impacted 50 million farmers producing sugarcane alone. The World State of Food Security and Nutrition-2019 reported that about 750 million people face food insecurity problem. As a viable solution to the problem, Government of India invested USD 6.7 billion for climate resilient agriculture in 2012-2022. The Global Food Policy 2022 predicted that climate change-induced hunger may increase for nearly 17 million people in India by 2030.
- (ii). Water scarcity: Water scarcity poses a threat to the indigenous communities in India, impacting their food security, access to safe drinking water, cultural practices, and overall well-being. It disrupted traditional livelihoods of indigenous communities, hindering agriculture and fishing, leading to food insecurity and malnutrition. The

dependence on natural resources for daily needs, coupled with challenges in agriculture, creates livelihood struggles, emphasizing the urgent need to address these interconnected issues. The SDG Report-, 2022 indicates, worldwide about 2 billion people don't able to access safe drinking water. The NITI Aayog report indicates, due to climate change about 40% of Indian population will not have access to safe drinking water by 2030 that means nearly 60 million people will face water scarcity by 2030.

(iii). Displacement: Climate change-induced natural disasters, such as floods and landslides, are displacing indigenous communities in India, disrupting their traditional livelihoods, social structures, and access to natural resources. This displacement resulted in the loss of ancestral livelihoods like agriculture and fishing, deprived from forest products and leading to poverty and food insecurity. It erodes traditional social structures, causing conflicts and marginalization, while limiting access to essential resources in newly shifted areas. Additionally, forced relocation disrupts the cultural fabric, severing ties to ancestral lands and causing a loss of cultural identity. At the same time, economic hardships and social strains further underscore the challenges faced by displaced indigenous populations. The United Nations High Commission for Refugees (UNHCR) reported in India nearly 50 lakh people were displaced in 2021 due to disasters and climate change.

Water scarcity and displacement together amplify the vulnerability of indigenous communities in India to climate change, heightening risks of food insecurity, health issues, and social instability. The disruption of traditional livelihoods and cultural practices contributes to the loss of indigenous knowledge in resource management, sustainable agriculture, and ecological resilience. Additionally, these challenges can lead to social exclusion, isolating indigenous communities and increasing the likelihood of marginalization and discrimination within mainstream society.

(iv). Biodiversity loss: Climate change is having an influence on ecosystems that indigenous groups rely on for food, medicine, and cultural practices. About 22 percent of population in India belong to indigenous community depends on biodiversity for their livelihood, socio-cultural needs and sustenance. Climate change has impacted severely their deep connections with nature. The biodiversity is under threat due to climate change and caused in shifting or loss of species, their breeding patterns and increased vulnerability to different diseases. Due to rising of sea levels ocean acidification has endanger the coastal and marine biodiversity in India. Due to ice melting in the Himalayan region, the unique species have vanished from the ecosystem that has created an ecological crisis. India has 4 out of 36 biodiversity hotspots in the Himalayan, Wester Ghats and Indo-Burma region which will be under severe threat due to impact of climate change.

6 Policy Measures for Protection of Indigenous People

Numerous policy measures and provisions have been enacted by the Indian government in an effort to safeguard indigenous and tribal populations against the

detrimental consequences of climate change, biodiversity depletion, and global warming. These initiatives aim to protect lives, promote their sustainable livelihoods, and safeguard their rich cultural heritage and traditional knowledge.

(i). National Action Plan on Climate Change (NAPCC): This comprehensive plan, launched in 2008, includes specific initiatives to address climate change vulnerabilities among indigenous and tribal communities. It focuses on promoting sustainable livelihoods, enhancing disaster preparedness, and preserving traditional knowledge systems.

(ii). Forest Rights Act (FRA)-2006: This landmark legislation recognizes the community forest rights of indigenous and tribal people, empowering them to manage and protect their traditional forest resources. The FRA has been instrumental in safeguarding biodiversity and preserving the rich cultural heritage of these indigenous communities. This act provides legal recognition to the traditional rights of indigenous and tribal people over forest lands and resources. It has helped to protect their livelihoods and ensure their access to forest resources for sustenance and cultural practices.

(iii). Panchayats Extension to Scheduled Areas Act (PESA)-1996: Under this provision of the Panchayats Extension to Scheduled Areas Act (PESA)- 1996, the Gram Sabha, the village-level decision-making body, has the authority to manage and conserve natural resources. This has empowered indigenous and tribal communities to make informed decisions about their environment and livelihoods for sustainable development. There was a formation of Joint Forest Management (JFM) Committees who will emphasize the policy, promote participatory forest management, involving indigenous and tribal communities in planning, implementation, and monitoring of forest conservation efforts. Simultaneously, Climate change and sustainable development strategies for scheduled tribes focuses on developing and implementing climate-resilient livelihoods for indigenous and tribal communities. It supports sustainable agriculture, water management, and renewable energy projects.

(iv). National Biodiversity Action Plan (NBAP)-2008: This plan outlines strategies for conserving India's rich biodiversity, including the specific needs of indigenous and tribal communities. It promotes the integration of traditional knowledge and practices into biodiversity conservation efforts. National Mission on Forestry and Climate Change (NAPCC) -2008: This mission focuses on increasing forest cover and enhancing the carbon sink potential of forests, while also promoting sustainable forest management practices among indigenous and tribal communities. Subsequently, another policy named as National Biodiversity Action Plan (NBAP)-2008: The NBAP outlines strategies to conserve India's biodiversity, including the involvement of indigenous and tribal communities in conservation efforts and the recognition of their traditional knowledge and practices. At the same time, the National Biodiversity Authority (NBA)-2003 works towards the conservation and sustainable use of biological diversity. It recognizes the role of indigenous and local communities in

biodiversity conservation and promotes equitable sharing of benefits arising from the use of traditional knowledge.

(v). National Mission for Sustainable Agriculture (NMSA): The NMSA was launched in 2014-15 and promotes climate-resilient agricultural practices among farmers, including indigenous and tribal communities, to enhance their productivity and adapt to changing climatic conditions. The National Mission for Sustaining Himalayan Ecosystem-2014 aims to address the specific challenges faced by indigenous communities in the Himalayan region, particularly in the context of climate change and biodiversity conservation. It supports initiatives for sustainable agriculture, disaster preparedness, and infrastructure development.

(vi). National Mission for a Green India (GIM)-2014: GIM focuses on sustainable development by enhancing biodiversity and forest cover. It involves local communities, including indigenous ones, in afforestation and biodiversity conservation efforts. National Innovation on Climate-Resilient Agriculture (NICRA), 2011: Various state and central agricultural policies aim to promote climate-resilient farming practices, benefiting indigenous farmers who often rely on traditional agricultural methods. India can ensure the sustainable development of indigenous and tribal communities while effectively addressing climate change and biodiversity loss through the recognition of their distinct perspectives and contributions. The Van Dhan Vikas Yojana-2018 aims to improve tribal livelihoods by enhancing value addition in tribal products. It promotes sustainable harvesting of Non-Timber Forest Produce (NTFP) and empowers tribal communities economically.

In addition to the above, there are different Committees formed by the National and State Governments for protection of tribal lives, livelihood and culture. The Tribal Advisory Councils (TACs) are consultative bodies at the state and district levels, providing a platform for indigenous and tribal communities to voice their concerns and participate in decision-making processes related to forest management and development projects. Similarly, the Tribal Sub-Plan (TSP) are schemes within the central government's budget that allocate specific funds for the development of scheduled castes and tribes, respectively, including initiatives to address climate change and biodiversity concerns. And support for traditional knowledge and practices: The government supports the preservation and documentation of traditional knowledge and practices of indigenous and tribal communities, recognizing their value in climate change adaptation and biodiversity conservation. The Traditional Knowledge Digital Library (TKDL)- 2001 also tries to prevent the misappropriation of traditional knowledge and protect biodiversity.

7 The adaptation strategies practiced by indigenous people for sustainable development

Despite the obstacles, indigenous groups in India are actively implementing adaptation techniques to deal with the effects of climate change. These solutions rely on traditional knowledge and practises, exhibiting their adaptability and resourcefulness. Traditional knowledge and innovative practices are critical in improving the efficacy of adaptation techniques. Indigenous people have established time-tested practices for managing natural resources and adjusting to changing environmental conditions, and they have a deep grasp of their particular ecosystems. The efficiency of indigenous groups' adaptation tactics is based on the individual situation and availability of resources. Local environmental circumstances, access to technology and financial resources, and political support all have a substantial impact on the viability of adaptation initiatives.

In the context of climate change adaptation, traditional knowledge is a valuable asset. Over decades, indigenous groups have amassed a vast knowledge base that includes an awareness of local ecosystems, weather patterns, and sustainable resource management practises. In mainstream climate change debate, this ancient knowledge is frequently neglected or underestimated. The research findings, on the other hand, emphasise the necessity of incorporating traditional knowledge into climate change adaptation efforts, as it provides a valuable foundation for effective and culturally acceptable adaptation approaches.

The following are the some of the adoption strategies practiced by the indigenous communities in India:

- (i). Agroforestry: Indigenous people are using trees into their agricultural systems to provide shade, improve soil fertility, and decrease soil erosion.
- (ii). Water conservation practises: Indigenous groups are implementing water-saving practices such as rainwater collecting, traditional irrigation methods, and water-efficient agriculture practices.
- (iii). Diversification of livelihoods: Indigenous communities are expanding their economic opportunities beyond traditional agriculture by engaging in activities such as ecotourism, handicrafts, and non-timber forest product collection.
- (iv). Community-based resource management: Indigenous groups actively participate in community-based resource management practises to ensure the long-term usage of their natural resources.

8 Collaboration and partnership for sustainable development

Effective climate change adaptation necessitates collaboration and information co-creation among indigenous populations, researchers, and policymakers. Indigenous people have invaluable information and insights that can be used to inform adaptation plans, while researchers and politicians can give access to scientific expertise and help implement effective adaptation measures. This collaborative approach values traditional knowledge and promotes mutual learning and understanding among

indigenous people and other stakeholders, resulting in more inclusive and culturally sensitive adaptation plans. The findings of the study emphasise the complicated interaction between climate change and indigenous communities in India, stressing their vulnerabilities, adaptation techniques, and the importance of traditional knowledge. Despite tremendous hurdles, indigenous communities are exhibiting resilience and resourcefulness in handling the effects of climate change. The study emphasises the importance of a collaborative approach to climate change adaptation strategies and frameworks that incorporate traditional knowledge and practises. By recognising indigenous people's unique perspectives and experiences, we may develop more effective and fair policies for building resilience and protecting the well-being of these vulnerable groups.

9 Policy Suggestions

The following suggestions are developed based on the research analysis: (a). There is need for adoption and transmission of traditional indigenous knowledge in climate change mitigation strategies such as afforestation, sustainable agriculture, and resource conservation, (b). It is call of the hour to design a policy and governance framework on evaluation of existing policy and governance frameworks in assisting indigenous communities in their climate change adaptation activities, (d). It is pertinent to investigate indigenous perspectives on climate justice and how they might be involved in climate change policies and decision-making processes in a meaningful way. The following specific suggestions are given for the development of indigenous people across India.

(i). Land rights and resource governance: It recognise and safeguard indigenous communities' rights to their lands, territories, and resources, as well as ensure their control over natural resources and decision-making processes connected to land use and management. Traditional knowledge and practises help preserve, document, and transmit traditional knowledge and practises by financing community-based initiatives and incorporating traditional knowledge into formal education systems.

(ii). Capacity building and technology access: Give indigenous communities access to technology, financial resources, and capacity-building opportunities so that they can create and implement successful adaptation strategies. Indigenous people Create culturally sensitive and inclusive adaptation plans that take into account indigenous knowledge and perspectives. Collaborative decision-making creates systems for meaningful collaboration and knowledge co-creation among indigenous communities, researchers, and policymakers involved in climate change adaptation programmes.

Community-based research partnerships focuses on indigenous groups participate actively in the research process, from identifying research questions to evaluating findings. Indigenous-led research initiatives provides the financing and training opportunities for indigenous researchers to support indigenous-led research initiatives that address their specific needs and goals. Knowledge sharing platforms enhance the exchange of indigenous communities' and researchers' traditional knowledge and scientific competence. Collaborative knowledge creation Encourage

projects that blend traditional knowledge with scientific methodologies to generate creative adaptation solutions. Ensure that indigenous groups have a significant role in climate change policy-making at the local, national, and international levels.

10 Conclusion

The scholarly investigation of the effects of climate change on indigenous people in India offers a compelling account of their susceptibility, ability to recover, and capacity to adjust. Indigenous communities, characterised by their profound interconnectedness with the natural environment, experience a disproportionate impact from climate change, encountering a multitude of obstacles such as inadequate access to food, scarcity of water resources, forced migration, and the depletion of biodiversity. Notwithstanding these obstacles, indigenous cultures have exhibited exceptional fortitude, leveraging their ancestral wisdom and customs to formulate inventive methods of adaptation. The aforementioned techniques, which include agroforestry, water conservation practices, livelihood diversification, and community-based resource management, exemplify the remarkable adaptability and resourcefulness displayed by indigenous groups in response to the challenges posed by climate change. The study highlights the significance of acknowledging the distinct susceptibilities and adaptive measures of indigenous populations. The indigenous communities possess a wealth of traditional knowledge and practices that are sometimes disregarded or underestimated. However, these resources offer significant contributions in the development of efficient strategies for climate change adaptation. The crisis of India's biodiversity needs comprehensive and expedite action both at the community level and policy level to reverse the ongoing trend that poses a danger to its diverse biodiversity ecosystem and endangered species. There is need of a multi-faceted approach with combination of scientific, planned policy action, technology-based climate adoption, and local community efforts to bring change, protect and preserve the biodiversity.

References

1. Chung, Kim, Ke (1994.). *Biodiversity and Landscapes: A Paradox of Humanity*. New York: Cambridge University Press.
2. Douglas, Nakashima; Igor, Krupnik and T. Rubis, Jennifer. (2018). *Indigenous Knowledge, For Climate Change Assessment and Adaptation*. UNESCO.
3. Gupta, Akhilesh and Pathak H. (2016). *Climate Change and Agriculture in India*. New Delhi: Department of Science and Technology, Ministry of Science and Technology, Govt. of India.
4. Lovejoy, Thomas E, Lee Hannah, et.al (2019). *Biodiversity and Climate Change: Transforming the Biosphere*. UK: Yale University Press.
5. Plutynski, Anya, Garson Sahotra Justin (2016), *Routledge Handbook of Philosophy of Biodiversity*. USA: Routledge.
6. Rai, Suresh Chand, and Mishra Prabuddh Kumar. (2023). *Traditional Ecological Knowledge of Resource Management in Asia*. Springer International Publishing AG.

7. Rani, Seema and Kumar Rajesh. (2022). Climate Change Impacts Responses And Sustainability in the Indian Himalaya. UK: Springer.
8. Tandon, Usha. (2016). Climate Change, Law, Policy and Governance. India: Eastern Book Company.
9. Author, F.: Contribution title. In: 9th International Proceedings on Proceedings, pp. 1–2. Publisher, Location (2010).
10. LNCS Homepage, <http://www.springer.com/lncs>, last accessed 2016/11/21.

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

