

"Climate Change-Induced Regional Disparities in Karnataka: A Social Work Analysis of Vulnerable Communities"

¹Venkatesh C M, Ph.D., ²Dr. Chidanand Dhavaleshwar

¹Research Scholar, Department of Social work, Ranichanamma University, Belagavi

²Research Guide and Assistant Professor, Department of Social work, Rani Chanamma University, Belagavi

DOI: <https://doi.org/10.51583/IJLTEMAS.2025.1408000122>

Abstract: This study outlines regional disparities in Karnataka, India, resulting from climate change impacts on vulnerable communities. Using secondary data, the research analyzes socio-economic consequences of climate-induced changes across different regions. Key climate change manifestations include altered rainfall patterns, increased drought frequency, and rising temperatures, leading to significant regional disparities affecting agricultural productivity, water availability, and livelihood security. Coastal, northern, and eastern regions of Karnataka are disproportionately affected, with small-scale farmers, fisher folk, and tribal populations bearing the brunt of these impacts. The study highlights cascading effects on food security, health, education, and overall well-being, including gender-based vulnerabilities.

A social work perspective underscores the need for targeted interventions and policy measures. The study proposes a multi-faceted approach, including climate-resilient agricultural practices, sustainable water management, livelihood diversification, and strengthened social protection mechanisms. It emphasizes community-based adaptation strategies and integration of indigenous knowledge in climate change mitigation efforts. This research contributes to literature on sub-national climate change impacts and provides insights for policymakers, social workers, and development practitioners working towards climate resilience and social equity in Karnataka. The findings underscore the urgency of addressing climate-induced regional disparities to ensure sustainable development and social justice for vulnerable communities.

Keywords: Climate change, regional disparities, vulnerable communities, social work, adaptation strategies, policy interventions, sustainable development, climate resilience, social equity

I. Introduction

Karnataka, southern state of India postured of intertwined challenges of climate change and regional disparity. Climate change exacerbates social inequalities and affects the unified development across different regions of Karnataka.

The unequal distribution of economic growth, resources, and opportunities across different geographic areas within a nation or region is known as regional disparity. This phenomenon has been extensively researched in relation to China's swift economic expansion and development (Chen & Haynes, 2017; Fujita & Hu, 2001). Regional disparity can be observed in various aspects, such as disparities in income, industrial production, infrastructure development, and accessibility to social services (Li & Haynes, 2010; S.Hirashima, 2022). Notably, while China has experienced substantial economic growth, it has also resulted in widening regional inequalities, particularly between coastal and inland areas (Bao et al., 2002; Fujita & Hu, 2001). However, research indicates that certain elements, like the expansion of high-speed rail networks, may help reduce economic disparities between regions over time. To summarize, regional disparity is a multifaceted issue influenced by numerous factors, including governmental policies, globalization, economic liberalization, and geographic advantages (Bao et al., 2002; Fujita & Hu, 2001). Comprehending and tackling regional disparities is essential for achieving balanced and sustainable development, as well as fostering social equity and inclusive growth (S.Hirashima, 2022; Wang et al., 2022).

Abdi et al. (2013) stated that environmental justice stresses how climate change and income inequality are connected. Xue Yang, Wenliang Tang (2022) found out in their study that there was a close association between climate change and regional disparity. The eastern region of China experienced economic pressure caused by an increase in temperature levels. Economic pressure led to the greater level of income inequality among the different regions of China. The local Governments of China have executed strict taxation procedures to manage fiscal stress.

The National Human Development Report 2001 for India (2002) describes a significant difference in human development and poverty between the States of India in 1981. Regional disparity was observed in the report with respect to the increased poverty. According to UNDP's 2024 report on human development index 2024 India ranked 134 among 193 countries. This highlights the need for balanced development across the states.

A study titled "Assessment of climate change in different regions of Karnataka state" analyzed 58 years of climatic data (1964–2017). The findings revealed that annual rainfall and rainy days increased in the South Interior Karnataka and Malnad regions, while reductions were observed in the North Interior Karnataka and Coastal regions. These variations have significant implications for agriculture and food security across the state. Most of the working population in agriculture sector are vulnerable to climate change impacts. So that, regional disparity and climate change together will worsen the vulnerability.

S. Nazrul Islam and John Winkel (2017) had done a deep discussion on how climate change and income inequality are interlinked and how it has become subject matter of environmental injustice. Multidimensional inequality was caused mainly due to exposure to climate change and vulnerability to the hazards of climate change.

In the field of social work, tackling these issues involves advocating for environmental equity and aiding vulnerable populations. The article "Social Work Response to Climate Change: If We Are Not Already Too Late" underscores the importance of social workers in emergency planning, supporting displaced individuals, and building community resilience. It stresses the need to incorporate environmental considerations into social work practices to reduce the negative impacts of climate change on disadvantaged groups. By synthesizing findings from these research efforts, social work professionals can craft approaches to tackle the regional disparities in Karnataka resulting from climate change. This ensures that interventions are customized to meet the specific requirements of the impacted communities.

Objectives:

- To analyze the regional disparities in climate change impacts across different zones of Karnataka using secondary data.
- To identify socio-economically vulnerable communities and assess the extent of their exposure to climate change-induced risks.
- To understand the role of social work in mitigating the effects of climate change on marginalized communities and enhancing their resilience.

Research Design:

Descriptive research design was employed for the study. Detailed analysis of secondary data will be conducted under this study. Secondary data from government reports, climate databases, and academic publications provides a broad perspective on climate change impacts and regional disparities in Karnataka. This allows for a comprehensive understanding of the issue across different zones of the state. Secondary data often spans extended periods, enabling the study to examine trends in climate change and regional disparities over time. This is particularly valuable for understanding long-term climate patterns and their socio-economic impacts.

The study integrates data from various fields (climatology, economics, social sciences), allowing for a holistic analysis of the complex interplay between climate change and regional disparities.

Descriptive analysis of secondary data can provide valuable insights for policymakers, helping to inform evidence-based interventions and strategies to address climate-induced disparities.

Data Sources:

1. Government reports and databases
2. Climate data from Karnataka meteorological department
3. Socio-economic data from census reports and surveys
4. Academic publications and research papers on climate change impacts in Karnataka
5. NGO reports and assessments on vulnerable communities

Ethical Considerations:

1. Data privacy and confidentiality was ensured with respect to secondary sources.
2. Acknowledged all the data sources.
3. Done unbiased data interpretation and presentation of findings.

Limitations:

- Relied upon secondary data and may limited the depth of analysis on the themes.
- Faced challenges in establishing direct causal relationships between climate change and socio-economic outcomes.

II. Discussion**1. Makharia, G. K and Others (2023)**

Makharia, G. K and others highlight the widespread effects of climate change on susceptible groups worldwide. They note that certain individuals and communities are more prone to climate-related health issues due to various risk factors. The authors explain that vulnerability to climate hazards is influenced by a range of factors, including geographic, economic, political, biological, and demographic variables. The impact of climate-related challenges is particularly severe in low-income nations, which often have substantial youth populations and limited resources to adapt to or recover from climate events. Climate-induced

displacement is a growing concern, with projections suggesting that by 2050, up to 143 million people displaced across the different regions of the globe due to climate change. These displaced populations, especially those forced to migrate, face complex health needs and barriers to healthcare access. The authors emphasize that climate change affects multiple aspects of physical and mental well-being, including digestive health. Furthermore, they point out that inadequate sanitation remains a significant global issue, with over 1.7 billion individuals lacking basic sanitation services, leading to considerable health risks.

2. S. Nazrul Islam and John Winkel (2017)

The aforementioned authors' working paper introduced an analytical framework depicting the interplay between climate change and social inequality as a self-reinforcing cycle. This cycle functions through three primary mechanisms. Firstly, inequality heightens the exposure of underprivileged groups to climate-related hazards. Secondly, vulnerable populations are more prone to harm from these climate threats. Thirdly, inequality diminishes the capacity of disadvantaged groups to manage and bounce back from climate-induced damages. This cycle sustains and potentially exacerbates inequality, as initial disparities result in disproportionate losses for underprivileged groups, leading to greater subsequent inequality. The paper also highlights that this framework is applicable to both intra-country and inter-country inequalities. Moreover, the relationship between inequality and climate change exhibits a feedback effect, where inequality can intensify climate change, further strengthening this detrimental cycle.

3. Report on Climate Change in Karnataka (2020)

According to this report, there has been a considerable shift in rainfall patterns across Karnataka from 1960-2017. This has led to variations in rainfall quantity and distribution across different regions of the state. South Interior Karnataka and Malnad regions have seen increases in annual rainfall and rainy days North regions and Coastal regions have experienced reductions in yearly rain fall. North Interior Karnataka and South Interior Karnataka regions are more prone to severe drought compared to Malnad and Coastal regions. The frequency of drought occurrence has increased in recent years. This could disproportionately affect agricultural communities in these regions. The state has experienced an increase in both frequency and intensity of extreme weather events such as droughts, floods, hailstorms, cyclones, heatwaves, thunderstorms, and lightning strikes. Droughts have significantly affected agriculture, causing crop losses and impacting livelihoods, particularly in rural areas. Most importantly, socioeconomic consequences are resulted with extreme weather events which have led to loss of human life, livestock, critical infrastructure, and property. They have also caused increased hunger, malnutrition, vulnerability to diseases, and loss of livelihoods in affected communities. The changing rainfall patterns pose challenges to surface and groundwater recharge, threatening water security in the state.

These climate change impacts likely contribute to regional disparities and may disproportionately affect vulnerable communities.

4. Karnataka Human Development Report 2022:

A Climate Vulnerability Index (CVI) for Karnataka's districts is outlined in the report. Northern Karnataka districts, including Kalaburagi, Bidar, Raichur, and Yadgir, exhibit the highest susceptibility to climate change. Conversely, districts such as Kodagu and Udupi show the least vulnerability. The impact of climate change is disproportionately severe on disadvantaged groups, especially Scheduled Castes and Scheduled Tribes. These communities are particularly vulnerable due to their reliance on climate-sensitive sectors like agriculture, forests, and fisheries for their sustenance. The report also emphasizes substantial regional differences in climate change effects. The northern Karnataka region faces greater climate vulnerability because of significant fluctuations in rainfall and temperature. Coastal districts, including Dakshina Kannada, Udupi, and Uttara Kannada, are at risk from cyclones and rising sea levels. Areas in the Western Ghats, such as Kodagu, are increasingly prone to floods and landslides. A considerable portion of Karnataka's population, particularly small and marginal farmers, has experienced serious impacts on their livelihoods due to these changes.

The report suggests several policy recommendations:

- Creating a Climate Risk Atlas (CRA) to identify vulnerabilities at the district level.
- Forming a state climate-risk commission to synchronize environmental de-risking efforts.
- Implementing climate-sensitivity-led landscape restoration.
- Offering climate risk-interlinked adaptation financing.
- Incorporating gender and socio-economic aspects into climate change adaptation and mitigation policies.

These insights and suggestions are vital for social work interventions aimed at assisting vulnerable communities affected by climate change in Karnataka.

5. Dominelli L. (2011):

Dominelli asserts that social workers have significant roles and contributions in climate change policy discussions and interventions. These professionals can engage communities in conversations about potential strategies to reduce greenhouse gas emissions. They can also advocate for preventive actions at various levels - local, national, and international - pushing for policy

shifts that enhance access to green technologies and promote equitable resource distribution. Social workers have the capacity to mobilize communities for carbon emission reduction efforts. They can interact with policymakers and utilize media platforms to influence policies across different levels. Additionally, social workers can create educational curricula that address climate change and strategies to enhance individual and community resilience. As evidenced by the limited case studies in this research, social workers can facilitate initiatives by individuals, communities, and nations to decrease carbon emissions. They can bring together diverse stakeholders and resources to tackle climate change issues while addressing local concerns. In summary, social workers are having an important role in reducing carbon emissions, encouraging clean energy use, and safeguarding vulnerable populations from the adverse effects of climate change. They can achieve this by strengthening resilience and facilitating access to environmentally friendly technologies.

Social work implications:

1. Targeted interventions for vulnerable communities: Social workers need to develop and implement targeted interventions for the most vulnerable communities identified in the study, particularly those in northern Karnataka districts like Kalaburagi, Bidar, Raichur, and Yadgir. These interventions should focus on enhancing resilience to climate change impacts, addressing socio-economic vulnerabilities, and improving access to resources and opportunities.
2. Advocacy for climate-sensitive policies: Social workers have a crucial role in advocating for climate-sensitive policies at local, state, and national levels. This includes pushing for the development of a Climate Risk Atlas, establishing a state climate-risk commission, and integrating gender and socio-economic dimensions into climate change adaptation and mitigation policies. Social workers should engage with policymakers and use media platforms to influence policy decisions that address regional disparities and climate vulnerabilities.
3. Engaging communities and enhancing their capabilities: Social workers should prioritize engaging communities in efforts to decrease carbon emissions and improve their ability to withstand the effects of climate change. This entails organizing discussions among diverse stakeholders, creating climate change awareness programs, and strengthening community resilience to adapt to environmental shifts. Special emphasis should be placed on supporting disadvantaged groups, including Scheduled Castes and Scheduled Tribes, who are more severely impacted by climate change due to their reliance on climate-dependent sectors.

III. Conclusion

Key findings indicate that climate change exacerbates existing socio-economic inequalities, particularly affecting marginalized groups such as Scheduled Castes and Scheduled Tribes. Northern Karnataka districts, including Kalaburagi, Bidar, Raichur, and Yadgir, show the highest vulnerability to climate change, while coastal and Western Ghats regions face unique challenges like sea-level rise and increased flood risks.

The study emphasizes the critical role of social work in addressing these challenges. Social workers can contribute by developing targeted interventions for vulnerable communities, advocating for climate-sensitive policies, and mobilizing communities to enhance resilience and reduce carbon emissions. The research underscores the need for a multifaceted approach that integrates environmental justice, disaster preparedness, and community empowerment.

In conclusion, this research provides valuable insights for social work practice in the context of climate change and regional disparities. It calls for a proactive and collaborative approach involving policymakers, communities, and social workers to mitigate the impacts of climate change on vulnerable populations and promote sustainable development across all regions of Karnataka.

References

1. Abdi, O. A., Glover, E. K., & Luukkanen, O. (2013). Causes and impacts of land degradation and desertification: Case study of the Sudan. *International Journal of Agriculture and Forestry*, 3(2), 40-51.
2. Bakshi, S., Chawla, A., & Shah, M. (2015). Regional disparities in India: A moving frontier. *Economic and Political Weekly*, 50(1), 44-52. <http://www.jstor.org/stable/24481240>
3. Bao, S., Chang, G. H., Sachs, J. D., & Woo, W. T. (2002). Geographic factors and China's regional development under market reforms, 1978–1998. *China Economic Review*, 13(1), 89–111. [https://doi.org/10.1016/s1043-951x\(02\)00055-x](https://doi.org/10.1016/s1043-951x(02)00055-x)
4. Chen, Z., & Haynes, K. E. (2017). Impact of high-speed rail on regional economic disparity in China. *Journal of Transport Geography*, 65, 80–91. <https://doi.org/10.1016/j.jtrangeo.2017.08.003>
5. Dominelli, L. (2011). Climate change: Social workers' roles and contributions to policy debates and interventions. *International Journal of Social Welfare*, 20(4), 430-438.
6. Fujita, M., & Hu, D. (2001). Regional disparity in China 1985-1994: The effects of globalization and economic liberalization. *The Annals of Regional Science*, 35(1), 3–37. <https://doi.org/10.1007/s001680000020>
7. Hawkins, R. (2023). Social work response to climate change: If we are not already too late. *Social Work Research*, 47(4), 231-235. <https://doi.org/10.1093/swr/svad020>
8. Hirashima, S. (2022). Growth-Poverty Linkage and Income-Asset Relation in Regional Disparity: Evidence from Pakistan and India (The Allama Iqbal Memorial Lecture). *The Pakistan Development Review*, 48(4I).

9. Islam, S. N., & Winkel, J. (2017). Climate change and social inequality. Department of Economic & Social Affairs Working Paper No. 152. United Nations. https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf
10. Makharia, G. K., Sadeghi, A., Leddin, D., & Costello, A. (2023). Impact of climate change on vulnerable populations. *Gut*, 72(12), 2201-2204. <https://doi.org/10.1136/gutjnl-2023-331195>
11. Planning, Programme Monitoring and Statistics Department, Government of Karnataka. (2022). Karnataka Human Development Report 2022. <https://planning.karnataka.gov.in/storage/pdf-files/Reports/HumanDevelopmentReport-2022FullBook.pdf>
12. Reddy, G. S. S., Challa, O., Naidu, L. G. K., Prabhu, C. N., & Keerthy, N. G. (2020). Climate change scenario in Karnataka: A detailed parametric assessment. Karnataka State Natural Disaster Monitoring Centre. https://revenue.karnataka.gov.in/uploads/media_to_upload1687368270.pdf
13. United Nations Development Programme. (n.d.). India shows progress on Human Development Index, ranks 134 out of 193 countries. <https://www.undp.org/india/press-releases/india-shows-progress-human-development-index-ranks-134-out-193-countries>
14. Yang, X., & Tang, W. (2022). Climate change and regional inequality: The effect of high temperatures on fiscal stress. *Urban Climate*, 43, 101167. <https://doi.org/10.1016/j.uclim.2022.101167>
15. Bao, S., Chang, G. H., Sachs, J. D., & Woo, W. T. (2002). Geographic factors and China's regional development under market reforms, 1978–1998. *China Economic Review* 13(1), 89–111. [https://doi.org/10.1016/s1043-951x\(02\)00055-x](https://doi.org/10.1016/s1043-951x(02)00055-x)