



OPEN ACCESS

EDITED AND REVIEWED BY
Daniele Conversi,
Ikerbasque Basque Foundation for
Science, Spain

*CORRESPONDENCE
Muhlis Madani
✉ muhlis.madani@unismuh.ac.id

RECEIVED 01 May 2025
ACCEPTED 14 May 2025
PUBLISHED 28 May 2025

CITATION
Madani M, Gray S, Dyussenov M and Tadjine F
(2025) Editorial: Climate change, natural
resources, and human security in governance
and society: vulnerabilities and adaptation
strategies. *Front. Polit. Sci.* 7:1621475.
doi: 10.3389/fpos.2025.1621475

COPYRIGHT
© 2025 Madani, Gray, Dyussenov and Tadjine.
This is an open-access article distributed
under the terms of the [Creative Commons
Attribution License \(CC BY\)](#). The use,
distribution or reproduction in other forums is
permitted, provided the original author(s) and
the copyright owner(s) are credited and that
the original publication in this journal is cited,
in accordance with accepted academic
practice. No use, distribution or reproduction
is permitted which does not comply with
these terms.

Editorial: Climate change, natural resources, and human security in governance and society: vulnerabilities and adaptation strategies

Muhlis Madani^{1*}, Simon Gray², Mergen Dyussenov³ and
Farida Tadjine⁴

¹Universitas Muhammadiyah Makassar, Makassar, Indonesia, ²Independent Researcher, Invercargill, New Zealand, ³Astana IT University, Astana, Kazakhstan, ⁴University of Kasdi Merbah Ouargla (UKMO), Ouargla, Algeria

KEYWORDS

climate change, natural resources, human security, vulnerabilities strategy, adaptation strategies

Editorial on the Research Topic

[Climate change, natural resources, and human security in governance and society: vulnerabilities and adaptation strategies](#)

Climate change has emerged as one of the most pressing challenges of our time, affecting every aspect of life on Earth. Among the most significant impacts of climate change is its influence on natural resources and the consequent implications for human security (IPCC, 2022; Karso et al., 2025). The articles in this Research Topic explore these complex interrelationships within a governance and societal framework, underscoring the urgency of understanding how climate change affects the availability, quality, and equitable distribution of natural resources, and how these dynamics, in turn, shape the security and wellbeing of individuals and communities, particularly in resource-rich and climate-vulnerable nations.

In recent years, the scientific community has increasingly acknowledged that climate change is not only an environmental issue but also a socio-political and economic one (Barnett and Adger, 2007). Its effects permeate the very structures that support livelihoods, governance, and social stability. For resource-rich countries, climate change presents a dual-edged dilemma. On the one hand, the abundance of natural resources offers economic opportunities and a foundation for development. On the other, climate-induced stressors threaten their sustainable management, exacerbated by climate-induced stressors. Droughts, floods, sea-level rise, and temperature fluctuations can severely disrupt agricultural production, freshwater availability, and energy systems, all intimately tied to natural resource management.

Human security is inherently linked to the impacts of climate change and natural resource management. As a multidimensional people-centric concept, human security extends beyond traditional state-centric notions of security concerning defense, sovereignty, and conflict. It encompasses access to food, water, health care, and sustainable livelihoods. When these are disrupted by climate stress, the implications for human security can be destabilizing (O'Brien et al., 2008; Ikhsan et al., 2025). Vulnerable

populations, including indigenous communities, smallholder farmers, women and the urban poor, are disproportionately affected. The interplay between climate impacts, natural resources, and existing socio-economic inequalities can exacerbate tensions, lead to displacement, and strain governance institutions. Moreover, such conditions of human insecurity may escalate into conflict or violence, especially in the Global South, where rising global demand for resources intersects with environmental fragility and governance deficits (Nandy and Majee, 2024).

This Research Topic takes a comprehensive approach to exploring how countries can navigate these challenges through adaptive strategies rooted in governance and societal resilience. The objective is not only to analyze vulnerabilities but also to identify pathways for action through policy, institutions and community engagement. This includes examining both top-down policy responses and bottom-up community-led initiatives, with a view toward integrating local knowledge, scientific research, and inclusive governance practices (Agrawal et al., 2012).

A key contribution of this Research Topic is its focus on governance. Good governance is a cornerstone of effective climate resilience, yet in many countries, institutional frameworks remain fragmented or under-resourced (Lockwood et al., 2010). Coordinated and transparent decision-making, equitable resource allocation, and participatory processes are essential for building trust and ensuring that adaptation efforts are responsive to the needs of diverse stakeholders. Several articles in this volume highlight how governance reforms, decentralization, and the empowerment of local authorities can enhance the effectiveness of climate adaptation policies.

Equally important is the role of policy coherence and integration. Climate change, natural resource management, and human security are often addressed in silos, leading to fragmented interventions that fail to capture the interconnectedness of these issues. This Research Topic advocates for a holistic approach that bridges sectoral boundaries and promotes policy integration. For instance, national climate adaptation plans should be closely aligned with natural resource governance strategies, disaster risk reduction frameworks, and development planning processes (Nilsson et al., 2012). Such integration can help identify synergies, avoid duplication of efforts, and ensure that resources are allocated efficiently. For example, Hardi et al. explore smart city interoperability in Indonesia, demonstrating how integrated digital infrastructure supports human security and governance efficiency. Similarly, Burhanuddin et al. stress the importance of regional human resource capacity in enabling adaptive governance in Indonesia. Harakan et al. illustrate the value of inter-agency collaboration in urban fire resilience—an example of institutional synergy that supports both community and environmental security.

In the legal domain, Anbarasi and Sankar analyze how artificial intelligence could enhance environmental sustainability through judicial processes, offering a novel perspective on legal frameworks and climate governance. Additionally, Mazzega explores how state actors use ratification strategies as part of their climate diplomacy, underscoring the importance of political negotiation in environmental governance. Ginzky and Oschlies add to this discussion by examining the London Protocol's control mechanisms over climate engineering research, advocating

for transparent global regulation frameworks that serve the public good.

Equally important is the role of policy coherence and integration. Climate change, natural resource management, and human security are often addressed in silos, leading to fragmented interventions that fail to capture the interlinks of these issues. This Research Topic advocates for a holistic approach that bridges sectoral boundaries and promotes policy integration. For instance, national climate adaptation plans should be closely aligned with natural resource governance strategies, disaster risk reduction frameworks, and development planning processes (Nilsson et al., 2012). Agustino et al. and Yenita and Soegiarso provide case studies of Indonesia's new capital development, revealing the tension between ambitious infrastructure plans and sustainability goals. Banda and Du Plessis also highlight that the success of e-government for sustainability depends significantly on state capacity.

The contributions in this volume also delve into the socio-economic dimensions of vulnerability. Understanding who is most affected by climate change and why is critical for designing effective interventions. Case studies presented here illustrate how socio-economic factors such as poverty, gender inequality, land tenure insecurity, and lack of education compound the risks associated with climate change (Eriksen et al., 2007). Addressing these underlying vulnerabilities requires targeted social protection measures, capacity-building programmes, and inclusive development strategies that prioritize equity and justice. Satriawan et al., for example, discuss the intersection of media, politics, and public awareness in shaping sustainable policy support in Indonesia's presidential election context.

Community resilience emerges as a recurring theme throughout the Research Topic. Resilient communities are those that can anticipate, absorb, adapt to, and recover from climate-related shocks. Building such resilience involves more than just infrastructure development or financial investments—it requires strengthening social capital, fostering adaptive capacities, and supporting local leadership (Cutter et al., 2008). Yan et al. present a dynamic assessment of community resilience across three Chinese provinces, while Ito et al. document how food partnerships in Japan supported recovery after disaster. In coastal zones, Swarnokar et al. show how comparative community-based adaptation can guide more nuanced responses to climate-stressed environments. Vutoiu et al. remind us that global environmental action requires a shared sense of planetary stewardship, i.e. “Seven continents. One sky.” Finally, Putra et al. contribute to this discourse by exploring how climate change reshapes the relationship between environmental stressors and food security in Indonesia's coastal zones.

Moreover, the Research Topic emphasizes knowledge generation and exchange. Reliable, context-specific information enables evidence-based decision-making in adaptation. Alongside scientific data, indigenous knowledge provides critical insights (Ford et al., 2016). Collaboration among researchers, policymakers, and communities enhances innovation.

The editorial team also recognizes the value of interdisciplinary and transdisciplinary research. Contributions span empirical analysis, theory, policy, and comparative case studies. Such a

diversity reflects the multifaceted nature of climate-security-resource challenges.

Looking forward, this Research Topic generates actionable policy insights. These include participatory governance, resilient infrastructure, climate risk integration in planning, and the empowerment of vulnerable groups. International cooperation and finance remain vital, especially in the Global South (Persson et al., 2009). A final recommendation is institutional capacity-building at all levels. Adaptive leadership, institutional learning, and flexible governance structures are key for navigating uncertainty (Gupta et al., 2010).

In conclusion, this Research Topic offers a timely and integrative analysis of the links between climate change, natural resources, and human security. It highlights the need for innovative, inclusive, and forward-looking governance that can support resilience and sustainability amid growing climate risks. We hope the insights presented here will guide policy, inspire scholarship, and empower communities globally.

Author contributions

MM: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. SG: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration,

Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. MD: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. FT: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

References

- Agrawal, A., McSweeney, C., and Perrin, N. (2012). "Local institutions and climate change adaptation," in *Social Dimensions of Climate Change: Equity and Vulnerability in a Warming World*, eds. R. Mearns and A. Norton (Washington: World Bank), 173–198.
- Barnett, J., and Adger, W. N. (2007). Climate change, human security and violent conflict. *Pol. Geogr.* 26, 639–655. doi: 10.1016/j.polgeo.2007.03.003
- Cutter, S. L., Burton, C. G., and Emrich, C. T. (2008). Disaster resilience indicators for benchmarking baseline conditions. *J. Homeland Secur. Emerg. Manage.* 5, 1–22. doi: 10.2202/1547-7355.1732
- Eriksen, S., Aldunce, P., Bahinipati, C. S., Martins, R. D. A., Molefe, J. I., Nhemachena, C., et al. (2007). When not every response to climate change is a good one: identifying principles for sustainable adaptation. *Clim. Dev.* 3, 7–20. doi: 10.3763/cdev.2010.0060
- Ford, J. D., Cameron, L., Rubis, J., Maillet, M., Nakashima, D., Willox, A. C., et al. (2016). Including indigenous knowledge and experience in IPCC assessment reports. *Nat. Clim. Change* 6, 349–353. doi: 10.1038/nclimate2954
- Gupta, J., Termeer, C., Klostermann, J., Meijerink, S., van den Brink, M., Jong, P., et al. (2010). The adaptive capacity wheel: a method to assess the inherent characteristics of institutions to enable the adaptive capacity of society. *Environ. Sci. Policy* 13, 459–471. doi: 10.1016/j.envsci.2010.05.006
- Ikhsan, I., Hajad, V., Saputra, I. M., Herizal, H., and Latif, I. R. (2025). Governance-driven solutions for women's empowerment in the mining sector: tackling gender inequality through inclusive policies. *J. Contemp. Govern. Public Policy* 6, 1–22. doi: 10.46507/jcgpp.v6i1.647
- IPCC (2022). *Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.
- Karso, A. J., Hardi, R., and Baryalai, A. S. (2025). Transforming social capital to strengthen local government resilience in hazard-prone areas. *J. Contemp. Govern. Public Policy* 6, 55–80. doi: 10.46507/jcgpp.v6i1.677
- Lockwood, M., Davidson, J., Curtis, A., Stratford, E., and Griffith, R. (2010). Governance principles for natural resource management. *Soc. Nat. Resour.* 23, 986–1001. doi: 10.1080/08941920802178214
- Nandy, D., and Majee, D. (Eds.). (2024). *Human security in Asia: Integrating state, society and policy*. London: Palgrave Macmillan.
- Nilsson, M., Zamparutti, T., Petersen, J. E., Nykvist, B., Rudberg, P., McGuinn, J., et al. (2012). Understanding policy coherence: analytical framework and examples of sector–environment policy interactions in the EU. *Environ. Policy Govern.* 22, 395–423. doi: 10.1002/eet.1589
- O'Brien, K., Eriksen, S., Nygaard, L. P., and Schjolden, A. (2008). Why different interpretations of vulnerability matter in climate change discourses. *Clim. Policy* 7, 73–88. doi: 10.1080/14693062.2007.9685639
- Persson, Å., Klein, R. J., and Siebert, C. K. (2009). Mainstreaming adaptation to climate change into official development assistance: a case of international policy integration. *Environ. Manage.* 43, 733–744.