

Editorial: Future priorities for climate change research

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1. Introduction

Over the decades since the Paris Agreement, climate policy and implementation have not kept pace with accelerating climate risks. Economic losses are mounting in many high-income economies, while communities in the Global South face rising exposure to climate hazards and cascading impacts. Phenomena like heatwaves and droughts tend to lead to longer wildfire seasons, whereas, the ever rising intense hydrological extremes also intensify flooding phenomena. These phenomena could not be seen as abstract “future scenarios,” but they severely affect the global economy, especially in food systems, infrastructure and supply chains, public health and macroeconomic stability. Therefore, the literature on climate change management should be treated as a core governance and development pathway to reduce the main anthropogenic and environmental drivers of climate change through international agreements and strategies.

The current era can be described as a “polycrisis” (or *multicrisis*), because there is the simultaneous occurrence of multiple forms of crisis such as economic (like energy price volatility), social (like poverty, inequality and insecurity), geopolitical (like conflicts) and environmental (like extreme events) challenges. So future research should observe these crises not isolated but within a more holistic view. The reason is that these pressures reinforce one another and amplify systemic risk.

Initially, the inflationary pressures on energy prices can deepen household vulnerability in multiple ways, which in turn can widen inequality, energy poverty and intensify social unrest (BEIS/bre, 2022; Halkos *et al.*, 2025). In addition, geopolitical tensions and conflicts can further disrupt trade and ultimately undermine economic stability and constrain the fiscal space of governments to provide social protection and public services (Rawtani *et al.*, 2022). Taken together, these interconnected challenges illustrate why the current period is increasingly framed as a “multicrisis” era, where cascading impacts demand integrated, cross-sectoral policy responses rather than isolated interventions to protect human security within the looming impacts of climate change.

Climate risks are developing and changing in ways that are highly regional, nonlinear and increasingly shaped by the interaction among hazards, exposure and vulnerability. In this sense, research can:

- reduce uncertainty in projections;
- identify emerging hotspots; and
- clarify the mechanisms linking climate extremes to cascading impacts on climate-related poverty (Hallegatte *et al.*, 2018), inequality and insecurity especially in rural areas (Hansen *et al.*, 2019; Lankes *et al.*, 2024).

Moreover, climate research should target on green infrastructure, solutions on human development and strategies for resilient health systems in line with United Nations’ Sustainable Development Goals (SDGs).

Equally important, climate research should be supported with evidence-based policy by evaluating which adaptation and mitigation interventions work in specific contexts. As well, the exploration for whom and at what cost, will help to prioritize investments, avoid maladaptation and design locally grounded strategies that remain effective and equitable, under future climate



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variability and change. Accordingly, this call welcomes submissions on strategies for addressing climate change across social (e.g. environmental education), economic (e.g. circular economy approaches) and environmental governance dimensions (e.g. DRR plans). The editorial’s objective is to stimulate research that supports SDG implementation toward Agenda 2030, supporting also pathways to Net-Zero and climate-resilient development.

2. Research on climate change

As mentioned before, research in climate change is essential to understand and observe the natural phenomena based on accurate data and reliable technical tools to create robust empirical results. The following results, based on Scopus database, would provide plethora of policy and research insights of how climate research has evolved during the period 1980 till now and where it is concentrated geographically. Moreover, novel research would take into consideration:

- the global distribution of publications by country;
- the sharp growth in research output over time and especially around the Paris Agreement period; and
- the main subject areas driving this literature strand and highlighting the interdisciplinary nature of research.

Interestingly, policymakers and practitioners should consider the uneven global distribution of climate change research records, as shown in Figure 1, which is concentrated only in a small number of countries. Primarily, the USA and China dominate, followed by strong contributions from the UK, Germany, Australia, India, Canada, Italy, France and Spain, many of which fall in the highest record concentration. In contrast, large parts of Africa, Central Asia and several lower-income countries fall into the lowest categories, showing relatively low publication

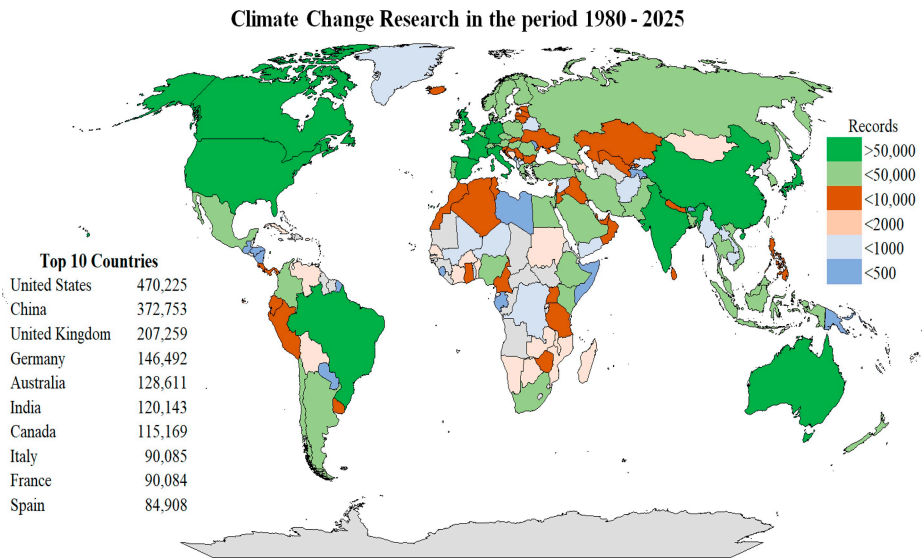


Figure 1. Research on climate change in the period 1980–2025, covering 2,037,929 documents
Source: Scopus database with Boolean search [ALL (“climate change”) AND PUBYEAR > 1979 AND PUBYEAR < 2026]

output. This is important, because many countries in the Global South face the most severe climate impacts, so stronger research capacity and higher research output are especially needed in these regions. The figure suggests that climate change research capacity and publication volume are clustered in major economies and research hubs, while many vulnerable regions contribute far fewer records.

In a similar manner, Figure 2 shows that climate change research output grew very slowly from 1980 through the 1990s, began to rise more clearly in the 2000s and then accelerated sharply in the 2010s. For instance, the shaded period marking the Paris Agreement era, from 2015 until the present, coincides with the steepest growth that led to almost three times as many documents than before this agreement. The graph clearly illustrates an expanding and increasingly urgent research focus on climate change.

In addition, Figure 3 demonstrates that climate change research is strongly concentrated in a few specific research fields. However, the last years there are more research strands that include the impacts of climate change in their frameworks. In Figure 3, the majority of papers are published in the subject of Environmental Science, followed by Agricultural and Biological Sciences and Earth and Planetary Sciences. Moreover, Social Sciences also contribute a large share, indicating strong attention to policy, governance and human dimensions. Undoubtedly, technical and solutions-oriented fields are substantial too; especially Engineering and Energy, while areas like Computer Science, Medicine, Business/Management and Economics form a meaningful middle tier, reflecting the importance of data tools in health-related, technological or economic impacts. Given the above research novelties, the following sections would present how climate change research is done in developed and developing countries, with the need to focus more on the Global South.

3. Future directions: from commitments to practices

In the question, “where should practitioners focus on climate action?” it is clear that climate change strategies require action at global, national and local levels. Specifically, the combination of mitigation (i.e. GHG emissions reduction) with adaptation (i.e. resilience measures) actions

Climate Change Research and the Paris Agreement

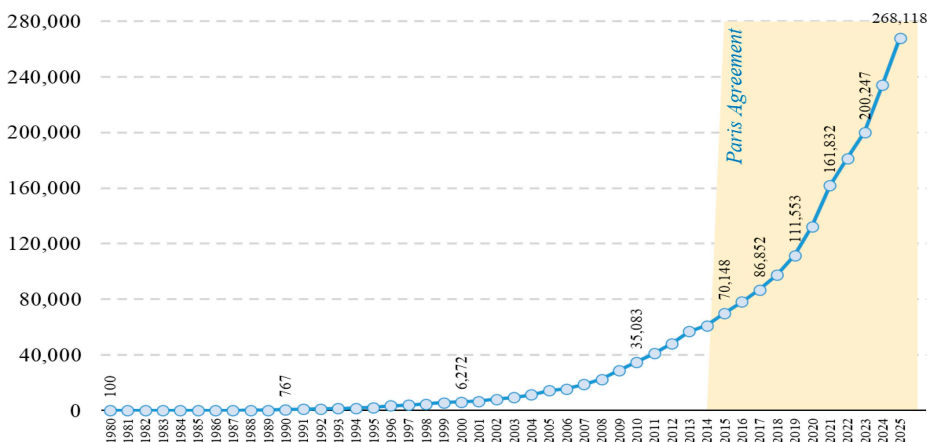


Figure 2. The impact of Paris Agreement on climate change research

Source: Scopus database with Boolean search [ALL (“climate change”) AND PUBYEAR > 1979 AND PUBYEAR < 2026]

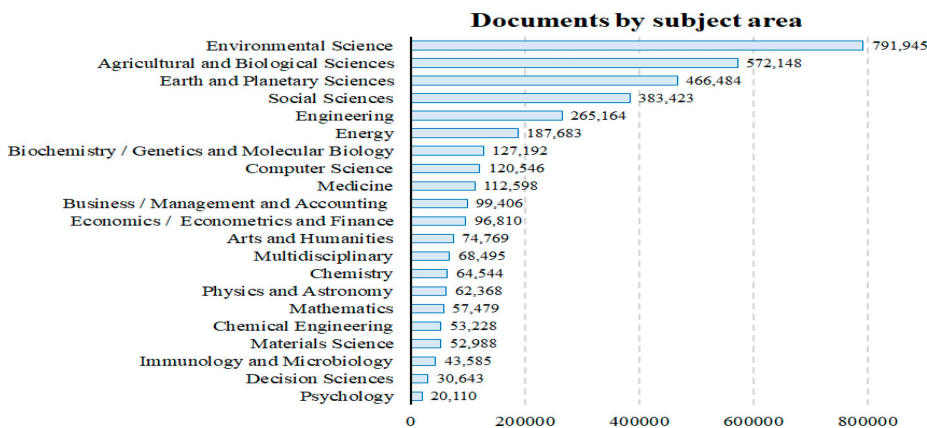


Figure 3. Documents on climate change research by subject area

Source: Scopus database with Boolean search [ALL (“climate change”) AND PUBYEAR > 1979 AND PUBYEAR < 2026]

should be supported by strong governance. However, it is also necessary to understand the main drivers of emissions, which helps to apply more effective policies on mitigation.

3.1 Development and degradation

Initially, international cooperation is a prerequisite of climate action. In environmental economics, optimization can identify the most cost-effective control strategies under different pollution levels. Such analyses are typically based on abatement costs, emissions and environmental constraints and also empirical income-pollution patterns that monitor the validity of the Environmental Kuznets Curve hypothesis. The integration of climate action into key sectors like energy, transport, land use, buildings and waste with the application of advanced panel data methods tackling cross-sectional dependence, slope heterogeneity, stationarity and cointegration are encouraged. Also the shift from static to dynamic modeling as for instance in [Halkos \(2003\)](#) with the application of Arellano–Bond generalized method of moments (GMM) method and the use of partial adjustment model for calculating the speed with which emissions adjust to their equilibrium values are worthy expanding.

Effective plans build leadership and capacity, integrate climate risk into development decisions, mobilize society and improve over time through monitoring and learning. Meanwhile, foreign direct investment (FDI) had no clear effect, whereas energy efficiency and renewable energy consistently reduce emissions, making them the strongest opportunities for climate policy in every development stage. In line with this, researchers worldwide discussed progress in renewable energy, climate change, economic optimization with a focus on reducing environmental damage from fossil fuel use, with emphasis on efficient low-impact energy conversion, policies to scale up renewable energy sources (RES), limiting greenhouse gases (GHGs) emissions and recent advances in CO₂ capture ([Olabi and Abdelkareem, 2022](#)).

3.2 Disaster risk reduction strategies

Future DRR, especially in the Global South, should shift from reactive response to anticipatory, multihazard risk management that is embedded in strategic planning. Hence, the combination of

multistage management requires not only hazard monitoring but also effective early warning with exposure reduction (e.g. land-use planning, safer infrastructure) and vulnerability reduction (e.g. social protection, health preparedness), while improving institutional coordination across national-local levels.

In more detail, first, it is recommended that strategic planning in DRR should be based on risk-informed spatial planning that avoids high-risk expansion (floodplains, steep slopes) and upgrade informal settlements through safer drainage, slope stabilization and basic services (Froude and Petley, 2018; Halkos and Zisiadou, 2019; Gómez *et al.*, 2023). Second, it is pivotal that multi-hazard early warning systems integrate big data, remote sensing, local observation networks and impact-based forecasts, paired with last-mile communication and evacuation readiness (Aguirre-Ayerbe *et al.*, 2020). Third, resilient infrastructure and services are required to offer climate-proof roads, bridges, hospitals, water and energy systems and ensure redundancy for critical lifelines (Hallegatte *et al.*, 2019). Bearing in mind the above strategies for climate action, DRR priorities should be clearly incorporated into policymaking.

3.3 Circular economy strategies for risk reduction

Recent advances have made circular economy a key driver for sustainable development. Circularity contributes to climate change mitigation and adaptation by reducing resource extraction, minimizing waste and promoting regenerative practices that restore natural systems. When circular strategies incorporate nature-based solutions, they can enhance ecosystem services such as flood risk reduction, land stabilization, water retention and pollutant filtration, functions conventionally addressed through old infrastructure. Lowering environmental pressures on soil, water and air pollution and by improving resource efficiency, circular economy approaches are able to support disaster risk reduction and strengthen urban resilience. In doing so, circular approaches can help policy makers to deal with natural hazards (e.g. flooding) providing a framework that copes with public health risks through improvement of supply systems resilience (Halkos and Aslanidis, 2024).

Future work should therefore treat the circular economy not only as an environmental agenda, but also as a risk-management tool that can strengthen prevention, preparedness and recovery. Policymakers should adopt circular strategies that support repair, refurbishment and remanufacturing to reduce supply-chain vulnerability in clean-energy and critical infrastructure systems (Stahel, 2019). Therefore, circular economy interventions may help as a substantial policy tool for reducing climate-related vulnerability.

3.4 Socio-cultural factors for climate resilience

Future research should highly prioritize environmental education and climate literacy, as they are significant factors that can effectively strengthen community's training for disaster response. Behavioral and psychological drivers are important for the formulation of risk perception, norms, stress and coping capacity. These actions should be complemented by participatory governance and the integration of local knowledge, ensuring that DRR plans are co-developed with communities and are widely accepted. In doing so, policies can better incorporate equity and inclusion criteria, addressing the needs of groups such as people with disabilities, older adults and women (Pertiwi *et al.*, 2019; Gartrell *et al.*, 2020; Gkargkavouzi and Halkos, 2025). Overall, policymaking should place social capital and trust at the center of climate resilience, because trust is linked to quick response to early-warning systems, compliance and long-term recovery (Bonfanti *et al.*, 2023).

3.5 Land use and climate change

Climate change and land use are locked in a complex “feedback loop.” Land is both a source of carbon emissions and one of our most powerful sinks for absorbing them. Issues of deforestation, agriculture, desertification and wildfire cycles are problems requiring attention. Deforestation by burning or clearing forests for grazing or timber create losses in the trees that absorb CO₂, releasing the carbon stored in their biomass. Industrial farming releases methane (from livestock and rice paddies) and nitrous oxide (from synthetic fertilizers), both of which are far more forceful than CO₂. Peat lands are massive carbon storehouses and when drained for palm oil or agriculture, they dry out and release stored carbon back into the air. At the same time, rising temperatures and shifting rainfall patterns turn once-fertile grasslands into dust bowls, threatening food security. In the Arctic, frozen ground is melting, releasing trapped methane and collapsing infrastructure like roads and buildings. Longer, hotter summers dry out vegetation, leading to more frequent and intense fires that release massive pulses of carbon, accelerating the warming further (IPCC, 2019).

4. Concluding remarks

Unambiguously, climate change is now a frontline governance and development challenge, and within a “polycrisis” context, climate hazards cascade into poverty, inequality and insecurity especially in vulnerable regions. At the same time, the global research landscape remains uneven, as many high-risk areas contribute relatively little to the evidence base, highlighting the need to strengthen research capacity where impacts are greatest. It is vital that policy makers set in climate mitigation and adaptation into cross-sector and multi-level governance. Strategies that focus on risk-informed spatial planning and target the upgrade of high-risk settlements and infrastructure can further reduce exposure.

Future directions should emphasize:

- integrating risk into everyday development decisions;
- scaling interventions that are proven locally effective within circular economy principles for material and energy resource efficiency; and
- strengthening people’s resilience through education and by respecting socio-cultural factors so policies can adapt as hazards, exposure and vulnerability evolve.

In essence, success also depends on coordination across levels of government and real involvement of civil society and the private sector, because plans often fail when they stay on paper or ignore local needs.

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References

- Aguirre-Ayerbe, I., Merino, M., Aye, S.L., Dissanayake, R., Shadiya, F. and Lopez, C.M. (2020), “An evaluation of availability and adequacy of multi-hazard early warning systems in Asian countries: a baseline study”, *International Journal of Disaster Risk Reduction*, Vol. 49, p. 101749, doi: [10.1016/j.ijdr.2020.101749](https://doi.org/10.1016/j.ijdr.2020.101749).
- BEIS/bre (2022), *Fuel Poverty Methodology Handbook: Low Income Low Energy Efficiency (LILEE)*, Department for Business and Energy and Industrial Strategy, No. February 2022.
- Bonfanti, R.C., Oberti, B., Ravazzoli, E., Rinaldi, A., Ruggieri, S. and Schimmenti, A. (2023), “The role of trust in disaster risk reduction: a critical review”, *International Journal of Environmental Research and Public Health*, Vol. 21 No. 1, p. 29, doi: [10.3390/ijerph21010029](https://doi.org/10.3390/ijerph21010029).

- Froude, M.J. and Petley, D.N. (2018), "Global fatal landslide occurrence from 2004 to 2016", *Natural Hazards and Earth System Sciences*, Vol. 18 No. 8, pp. 2161-2181, doi: [10.5194/nhess-18-2161-2018](https://doi.org/10.5194/nhess-18-2161-2018).
- Gartrell, A., Calgaro, E., Goddard, G. and Saorath, N. (2020), "Disaster experiences of women with disabilities: barriers and opportunities for disability inclusive disaster risk reduction in Cambodia", *Global Environmental Change*, Vol. 64, p. 102134, doi: [10.1016/j.gloenvcha.2020.102134](https://doi.org/10.1016/j.gloenvcha.2020.102134).
- Gkargkavouzi, A. and Halkos, G. (2025), "The psychology of non-market environmental valuation: an integrative review of research evidence, theoretical insights, and policy considerations", *Journal of Environmental Psychology*, Vol. 101, p. 102510, doi: [10.1016/j.jenvp.2024.102510](https://doi.org/10.1016/j.jenvp.2024.102510).
- Gómez, D., García, E.F. and Aristizábal, E. (2023), "Spatial and temporal landslide distributions using global and open landslide databases", *Natural Hazards*, Vol. 117 No. 1, pp. 25-55, doi: [10.1007/s11069-023-05848-8](https://doi.org/10.1007/s11069-023-05848-8).
- Halkos, G.E. (2003), "Environmental kuznets curve for sulfur: evidence using GMM estimation and random coefficient panel data models", *Environment and Development Economics*, Vol. 8 No. 4, pp. 581-601, doi: [10.1017/S1355770X0300317](https://doi.org/10.1017/S1355770X0300317).
- Halkos, G.E. and Aslanidis, P.S.C. (2024), "How waste crisis altered the common understanding: from fordism to circular economy and sustainable development", *Circular Economy and Sustainability*, Vol. 4 No. 2, pp. 1513-1537, doi: [10.1007/s43615-023-00337-3](https://doi.org/10.1007/s43615-023-00337-3).
- Halkos, G. and Zisiadou, A. (2019), "Examining the natural environmental hazards over the last century", *Economics of Disasters and Climate Change*, Vol. 3 No. 2, pp. 119-150, doi: [10.1007/s41885-018-0037-2](https://doi.org/10.1007/s41885-018-0037-2).
- Halkos, G.E., Bampatsou, C. and Aslanidis, P.-S. (2025), "Assessing energy poverty indicators towards club convergence in Europe", *Energy Efficiency*, Vol. 18 No. 5, p. 38, doi: [10.1007/s12053-025-10328-y](https://doi.org/10.1007/s12053-025-10328-y).
- Hallegatte, S., Fay, M. and Barbier, E.B. (2018), "Poverty and climate change: introduction", *Environment and Development Economics*, Vol. 23 No. 3, pp. 217-233, doi: [10.1017/S1355770X18000141](https://doi.org/10.1017/S1355770X18000141).
- Hallegatte, S., Rentschler, J. and Rozenberg, J. (2019), *Lifelines: The Resilient Infrastructure Opportunity*, World Bank.
- Hansen, J., Hellin, J., Rosenstock, T., Fisher, E., Cairns, J., Stirling, C., Lamanna, C., et al. (2019), "Climate risk management and rural poverty reduction", *Agricultural Systems*, Vol. 172, pp. 28-46, doi: [10.1016/j.agsy.2018.01.019](https://doi.org/10.1016/j.agsy.2018.01.019).
- IPCC (2019), "Climate change and land: Special report", available at: www.ipcc.ch/site/assets/uploads/2019/08/Fullreport.pdf
- Lankes, H.P., Macquarie, R., Soubeyran, É. and Stern, N. (2024), "The relationship between climate action and poverty reduction", *The World Bank Research Observer*, Vol. 39 No. 1, pp. 1-46, doi: [10.1093/wbro/lkad011](https://doi.org/10.1093/wbro/lkad011).
- Olabi, A.G. and Abdelkareem, M.A. (2022), "Renewable energy and climate change", *Renewable and Sustainable Energy Reviews*, Vol. 158, p. 112111, doi: [10.1016/j.rser.2022.112111](https://doi.org/10.1016/j.rser.2022.112111).
- Pertiwi, P., Llewellyn, G. and Villeneuve, M. (2019), "People with disabilities as key actors in community-based disaster risk reduction", *Disability and Society*, Vol. 34 Nos 9-10, pp. 1419-1444, doi: [10.1080/09687599.2019.1584092](https://doi.org/10.1080/09687599.2019.1584092).
- Rawtani, D., Gupta, G., Khatri, N., Rao, P.K. and Hussain, C.M. (2022), "Environmental damages due to war in Ukraine: a perspective", *Science of the Total Environment*, Elsevier B.V, Vol. 850 No. August, p. 157932, doi: [10.1016/j.scitotenv.2022.157932](https://doi.org/10.1016/j.scitotenv.2022.157932).
- Stahel, W.R. (2019), "The circular economy: a user's guide", Routledge, Taylor and Francis Group, London and New York, NY.