



Editorial: Coordinating Climate Change Adaptation as Risk Management

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Editorial on the Research Topic

Coordinating Climate Change Adaptation as Risk Management

Climate change adaptation is a form of risk management that requires coordinated governance of social, economic, and technological institutions. Risk results from the combined effect of hazards (natural and anthropogenic) and vulnerability—and climate change is already creating pervasive but varying risks in multiple societal and environmental sectors. Therefore, the need for adaptation spans many systems. Policy decisions regarding adaptation measures must be informed by reliable research in science (including the social sciences), technology, and engineering, but that research agenda also must be informed by policy goals and practical constraints.

This Research Topic gathers articles from multiple disciplines that promote research supporting coordinated adaptation strategies to effectively manage climate risk. The collection covers a broad span of topics, demonstrating how widely adaptation will affect social and environmental resources.

Climate change is rife with risks that compound and cascade over time, leading to uncertainties that challenge conventional planning. In their Policy and Practice Review, Lawrence et al. argue that this pervasive uncertainty requires an anticipatory adaptive approach tailored to such a dynamic environment. Using developments in New Zealand's adaptation policy, they show that planning using time-bound methods, such as static lines on maps and zoning, can lock in communities to exposure to risks that are changing in time and space. They identify institutional policy reforms underway moving New Zealand toward a more adaptive direction of climate risk management.

Although public governance institutions are the focus of much adaptation policy analysis, Vandenbergh and Johnson argue in their Perspective that private institutions also will play a significant role. They explain that private governance initiatives that target climate change mitigation have expanded rapidly in the last decade and have been the subject of research in multiple fields, but that private initiatives targeting adaptation have received less attention.

Three articles in the Research Topic focus on ecological risks. In their Policy Brief, Camacho and McLachlan address ways in which current regulatory regimes governing species conservation and control often use terms such as “native” or “invasive” that will not work effectively when climate change disrupts ecosystem and forces species to move. They argue that such species categorizations, as well as the patchwork pattern of public and private land ownership over large areas, were developed in a static environment and will become anachronistic and will increasingly challenge regional conservation when the dynamic forces of climate change drive species outside their historical ranges.

In their Review, Bork and Hirokawa shift to consider the ecosystem services that ecological resources provide human communities. They argue that as climate change disrupts ecosystem

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function and structure, local governance of ecosystem management to maintain desired ecosystem conditions will become increasingly important. They review 20 years of U.S. legal literature on local ecosystem governance to identify theoretical arguments for and against local governance, describe ongoing efforts to implement local ecosystem governance, and propose actionable recommendations and critical research needs.

Wildfire risk, both in frequency and scale, is a growing adaptation concern. In their Perspective, Vuorio et al. argue that better policies are needed to reduce vulnerability and fragility of ecosystems and human societies to catastrophic wildfire. They highlight the International Civil Aviation Organization protocols for safety investigations after international fatal aviation accidents, describing how its adaptation to wildfire catastrophes offers a useful framework for establishing international guidelines to reduce risk. In particular, co-operation between aviation authorities has been shown to benefit less developed countries, with the same potential benefit coming from post-wildfire investigations.

Energy transition constitutes a significant component of reducing global risks from climate change, and three articles in this collection explore the risks to and adaptation needs of the energy sector. Ziaja and Chhabra in their Policy and Practice Review investigate the California Public Utilities Commission's 2018 decision to regulate investor-owned energy utilities' climate adaptation activities. The Commission's 2020 regulations were the first of their kind in the country, but their implementation has revealed critical limitations in capacity and the need for more focus on what exactly constitutes an "adaptation measure."

In his Perspective, Monast looks more broadly at Public Utility Commissions (PUC) in the United States, arguing that they can already use their ratemaking authorities to advance climate change adaptation. Discussing how electricity ratemaking is already a form of risk management and reviewing the authorities already available, he argues that PUCs should adopt a risk governance approach, which would both incorporate climate adaptation in ratemaking and help to coordinate adaptation policy across agencies.

Moving from PUC authority to energy infrastructure, Verchick and Lyster offer a comparative Perspective on building climate-resilient power grids. Dissecting storm- and flood-based power outages and their regulatory aftermath in Texas (United States) and Queensland (Australia), they conclude that both governments could do more to build climate change

projections into grid recovery and better fund necessary adaptation measures.

Coasts are the quintessential climate change risk zones. In their Policy and Practice Review, Correll-Brown et al. examine how rising seas are already undermining shoreline management efforts. They investigate the lack of good data regarding how shorelines have already changed in the United States, arguing that the lack of documented change has promoted shoreline management based on a shifted baseline that accepts a degraded coast as normal.

Finally, rounding out the full range of risk that climate change poses, Chen offers a Policy and Practice Review from the financial sector. Specifically, he uses insights from behavioral economics to explore how the uncertainties of climate change can generate perverse decisions in environmental and resource economics, inhibiting effective adaptation strategies.

Individually, the 10 articles in this Research Topic provide a range of lenses through which to explore the concept of climate change adaptation as risk management. Together, they emphasize that much more remains to be done to incorporate a risk management perspective on climate change adaptation—but also that improvements and transitions are available to governments and sectors that wish to better confront the risks that climate change poses.

AUTHOR CONTRIBUTIONS

JR and RC equally drafted and edited this Editorial, which HB reviewed. All authors contributed to the article and approved the submitted version.

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