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Adaptation

Adaptation to risks and threats posed by climate change for societies and ecosystems is an urgent priority. In human systems, adaptation refers to “the process of adjustment to actual or expected climate and its effects in order to moderate harm or take advantage of beneficial opportunities” (Ara Begum et al. 2022, 134). The pressing nature of this adaptation is underlined by the two million deaths worldwide caused by extreme weather events over the past three decades, and the climate-related hunger, food insecurity, and malnutrition of millions more (FAO et al. 2018). The warming climate also has a range of other adverse effects, including risks to coastal socio-ecological systems and terrestrial and ocean ecosystems; risks associated with critical infrastructure, networks and services; risks to living standards and human health; risks to cultural heritage; and risks to peace and migration (Ara Begum et al. 2022, 144).

Adaptation responses to such climate-related risks and threats take many different forms. Managing flood risk, developing early warning systems, improving the efficiency of irrigation, providing water infrastructure for households, and more – all are examples of the myriad ways in which societies are adjusting to climate risks. A crucial enabler to enhance such responses is adaptation policy or governance, referring to the structures, processes and actions through which private and public actors interact to address societal goals (IPCC 2022, 2910).

Adaptation is a policy challenge characterized by enormous complexity. Not only are adaptation interventions linked to various policy sectors, but also governing adaptation has distributional consequences for different societal groups both within and across country borders. This borderless nature of adaptation has been increasingly recognized in the climate change regime complex in recent years (Persson 2019). To harness the knowledge and financial resources needed for successful adaptation in terms of just and effective policy solutions, governors of adaptation need to integrate adaptation challenges into the right sectors and address them at the right scales. Social scientific research has an important role to play in identifying pathways for how this can be done.

Governing adaptation

While governments have historically been the locus of power in climate policy, recent decades have seen increased governance by private sector actors, such as non-governmental organizations and profit-oriented companies, and by international actors, such as intergovernmental organizations and local-global partnerships. Efforts of these actors to step up adaptation usually meet the following barriers: knowledge uncertainty, sectoral fragmentation, transnational risks, and insufficient capacity. Each barrier is discussed in turn, before turning to an overview of open questions for policy research.

Knowledge uncertainty

Adaptation is an ambiguous concept due to its cross-cutting nature. For example, in the area of food, adaptation might be talked about in terms of crop efficiency or improved irrigation systems, but not in terms of adaptation. This conceptual ambiguity has made it challenging to evaluate the levels, patterns, and effectiveness of different adaptation policy responses and has led to considerable normative struggles over problem definitions (Hall 2017).

To understand such normative struggles, it is helpful to look at the Paris Agreement, which states agreed upon on 12 December 2015 at the 21st meeting of the Conference of the Parties (COP21) under the United Nations Framework Convention on Climate Change (UNFCCC). While adaptation has long been regarded as a technical issue that arises from biophysical processes, the Paris Agreement has framed adaptation as a transboundary policy problem. This understanding opens up various interpretations and framings of adaptation.

The ambiguity of the concept also brings about difficulties to identify adaptation challenges in different policy sectors. In some sectors, there is relatively high knowledge certainty about climate change impacts, such as in health. In other sectors, climate change has been identified as a driver that exacerbates existing vulnerabilities, but direct impacts are difficult to pinpoint, such as in peace and conflict. In turn, knowledge uncertainties can undermine the ability of the international community to jointly define problems and find solutions (Dellmuth et al. 2020).

Sectoral fragmentation

Adaptation is inextricably linked to other environmental issue areas. Particularly relevant are efforts to mitigate greenhouse gas emissions and to reduce biodiversity loss. Biodiversity loss and climate change are both essential and interlinked threats to humanity. However, previous research on adaptation responses is characterized by a lack of integration of concepts, terminology and methods between climate impacts, vulnerability, adaptation and mitigation research, which hampers knowledge progress finding integrated adaptation solutions (Berrang-Ford et al. 2021).

What is more, adaptation governance is relevant for a large number of non-environmental policy sectors. Disaster risk reduction and development are two policy sectors in which adaptation has long been integrated. Chiefly important are also health, food, agriculture, water, migration, flood risk management, and urban planning (Ara Begum et al. 2022).

When researching the linkages of adaptation across sectors, previous research has adopted a mainstreaming or a policy integration lens. Policy integration is an important mode to govern cross-cutting policy problems in general, and in the context of adaptation, it is crucial for ensuring successful adaptation (Biesbroek 2021). A growing literature on policy integration has, since the release of the Brundtland Report in 1987, made significant advances in understanding how adaptation has been integrated into a range of policy sectors. However, most research on adaptation policy tends to have a single-sector focus (Ara Begum et al. 2022).

Transnational risks

Long viewed as a local issue, adaptation was catapulted to the top of the international climate agenda in 2007 when states agreed on the Bali Action Plan under the auspices of the UNFCCC. In this plan, an adaptation fund was created, and adaptation was framed as one of the four pillars of climate action, along with mitigation, technology, and financing.

In the 2015 Paris Agreement, adaptation was finally recognized as a global goal and policy challenge. While climate risks often appear local, such as droughts and floodings, adaptation typically has spillover effects to distant places, for example through trade connections in global food systems, or by way of impact on human security, which can lead to migration and displacement. While such transnational challenges require substantial global governance, this governance is generally nonbinding and rules tend to be imprecise (Persson 2019).

Indeed, adaptation is only incrementally integrated in the activities of global governance institutions. The most powerful actors in the global climate change regime complex, intergovernmental organizations, have over the past two decades increasingly engaged with adaptation, but engagement varies across sectors and is negligible in the areas of trade and peace and conflict (Kural et al. 2021). Increasingly in the mix are also private actors, but private sector adaptation tends to be insufficient and there are considerable adaptation blindspots (Goldstein et al. 2019).

Insufficient capacity

Just and effective adaptation interventions require institutional capacity at different levels of government. Key to strengthening capacity is the allocation of adaptation finance. However, adaptation finance is generally insufficient and it has proven difficult to adequately measure what counts as adaptation funding (Weikmans et al. 2020).

Moreover, the governance of adaptation finance itself suffers from severe injustices, as current governance relies on voluntary action rather than liability for any historical debt. The debate on what may constitute a “fair share” of adaptation finance is ongoing, and scholars are debating financing responsibilities and debts (Dellink et al. 2009).

Capacity can also be enhanced when local communities provide knowledge. When the knowledge and experiences of communities shape national and global adaptation governance this also strengthens participatory justice. In this respect, Indigenous Peoples play a key role in providing knowledge in adaptation governance and to foster “community-based adaptation” (Ford et al. 2018). Lacking capacity also highlights the value of inclusive research approaches such as citizen science, which shows potential for an inclusive documentation of adaptation responses not readily captured in the published literature, as well as focus groups and surveys to uncover citizen perceptions of adaptation. The governance of adaptation finance would also yield fairer outcomes when giving cities greater agency (Colenbrander, Dodlan, and Mitlin 2021).

When capacity is low, there is an increased risk for maladaptation. Maladaptation arises when adaptation interventions increase vulnerabilities instead of reducing them (Schipper 2020). The need to increase capacity has inspired a line of research on the mobilization of adaptation finance. The green bond market is one potential source of climate finance for developing countries, whereby multilateral and national development banks are crucial for managing green bonds. Private equity is another source, which institutions such as the Green Climate Fund (GCF) have increasingly sought to engage (Stoll, Pauw, and Grüning 2021). However, adaptation governance needs to provide private sector actors with incentives to provide capital for adaptation finance.

Issues for policy research

This brief survey has underlined that adaptation policy research has significantly enhanced understanding of the barriers and opportunities to successful adaptation. This literature has

firmly established that adaptation is a political issue with deep distributional implications. Yet we need to better understand when, how, and with what consequences adaptation challenges are governed, and under what circumstances this governance is just, legitimate, equitable, and effective (Ara Begum et al. 2022).

Social science research on the patterns, causes, and consequences of adaptation policy is thus a priority. Future research could usefully address the following research questions:

- How, when and why is adaptation fair, legitimate, equitable, and effective in the eyes of citizens and elites? Do gaps exist, and if so, why?
- How are transnational climate risks understood and addressed in different sectors and by actors at different levels of government?
- How can actors across the public-private sector work together to enhance adaptation?
- How can local, subnational, national and international governance better cooperate to enhance adaptation?
- How can integrated approaches be designed to enhance adaptation?
- How can adaptation finance be appropriately measured and scaled up?

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