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Addressing climate change through climate action

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Abstract

This editorial introduces the journal *Climate Action* to its audience and defines its aims and scope. It first calls for the need to understand climate action as the choices and behavior of international organizations, governments, civil society, businesses, and individuals. Next, it discusses both the facilitators and impacts of climate action. The editorial concludes with a research agenda for climate action to be studied from a transdisciplinary perspective with practitioners for triggering widespread societal transformation.

Keywords: Climate action, Climate change adaptation, Climate change mitigation, Research agenda

Introduction

Numerous publications in various scientific disciplines have confirmed climate change was set in motion by anthropogenic activities. Even if forecasted global temperature rises stabilize at 1.5 °C or 2 °C, as the Paris Agreement aims to achieve (Höhne et al., 2021; Hulme, 2016; Roelfsema et al., 2020; Tobin et al., 2018), there will still be serious consequences for the wellbeing of ecosystems and society.

Traditionally, climate action was understood as the measures taken by national governments to reduce their greenhouse gas (GHG) emissions. Most governmental climate action in place today aims to achieve a gradual reduction of GHG emissions. However, climate modeling shows gradual policy responses will be insufficient, and that rapid decarbonization must be sought through urgent climate action (Allen et al., 2018; Rockström et al., 2017; van Vuuren & Stehfest, 2013). In addition to urgent climate action, research has stressed the importance of durable climate action (Jordan & Moore, 2020).

To understand how urgent and durable climate action can be facilitated, we first need to unify the extensive corpus of research on climate action. This is what this journal, *Climate Action*, offers: a hub for advancing our knowledge and understanding of climate action conceptually, theoretically, and empirically. It aims to outline and develop the field of climate action, which it defines as all activities and behavior of individuals, groups, and organizations at various levels of spatial, temporal and institutional scale deliberately directed at preventing or reducing climate-related damages to society through mitigation and adaption actions.

Climate Action embraces, but does not limit itself, to three overarching themes which are presented in the remainder of this editorial, including the types, facilitators, and impacts of climate action.

Types of climate action

The notion of climate action departs from the understanding that national governments take steps (typically through public policies) for reducing GHG emissions. One type of climate action is governmental action, which can take many different forms depending on the scale of implementation. One form is international climate cooperation, which produces international agreements (e.g., Dimitrov et al., 2019; Michaelowa et al., 2018).

The most important international agreements are the Kyoto Protocol (signed: 1997/ effective: 2005) which

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operationalized the United Nations Framework Convention on Climate Change (UNFCCC) originally established at the United Nations Conference on Environment and Development, and the Paris Agreement under the UNFCCC (signed: 2016/ effective: 2016). In contrast to the top-down approach of the Kyoto Protocol (Hare et al., 2010), the Paris Agreement took a bottom-up approach to include all parties to the UNFCCC. Further, it introduced a "pledge and review" system, which puts individual Nationally Determined Contributions (NDCs) at the center. It brought also a softening of the traditional divide in the global climate change regime between industrialized (Annex I) and developing countries and emerging economies (Annex II) (Bodansky, 2016).

In this regard, *Climate Action* recognizes that following the Paris Agreement, developing countries have begun to formulate and implement climate policies based on the principle of common but differentiated responsibilities, but with respective capabilities (Voigt & Ferreira, 2016). Balancing the goals of development and climate action in an equitable and socially-just manner is particularly important, but also challenging for these countries (Sforna, 2019). Thus, this journal invites analyses of climate action especially from the perspective of developing countries (e.g., Zimmer et al., 2015) and emerging market economies (e.g., Solorio, 2021; Upadhyaya et al., 2021).

With the establishment of the NDCs, the formulation and implementation of national policies and institutions governing climate change mitigation and adaption are now mainstream (Anderton & Setzer, 2018; Averchenkova et al., 2017; Bernauer & Böhmelt, 2013; Biesbroek et al., 2018; Tobin, 2017). Consequently, the formulation and adoption of national and subnational policies and how they develop over time represent a key research interest of this journal. The purview extends beyond successful cases of policymaking and shall include failed attempts and policy blockage (Crowley, 2021; Fisher & Leifeld, 2019) as well as the dismantling of climate policies (Burns & Tobin, 2020).

Non-governmental organizations (NGOs) stimulate climate action at different levels. They employ a rich portfolio of tools and strategies for drawing the public's attention to the actions and in-action of policymakers in tackling climate change. For example, the two non-profit organizations Climate Analytics and the NewClimate Institute monitor the level of ambition of countries' climate policies compared to the goals agreed upon in the Paris Agreement. They jointly publish the monitoring tool Climate Action Tracker, which offers an independent appraisal of government policies. In this particular case, the two non-profit organizations influence climate action by tracking governmental climate action and attempting to steer governmental behavior by means of "informational governance" (Delina, 2020; Mol, 2006; Soma et al., 2016).

Another area in which NGOs have been particularly active is climate change litigation in individual countries, as well as at the transnational level (Kahl and Weller, 2021; Peel & Lin, 2019; Peel & Osofsky, 2020). The ruling of the District Court of The Hague in the Netherlands in the matter of *Milieudefensie et al. v. Shell* is considered unprecedented, and even "game changing," since it held the company accountable for its alleged contribution to climate change (Hösli, 2021). In Germany, the Federal Constitutional Court declared in 2021 that the provisions of the Federal Climate Change Act of 2019 were incompatible with fundamental rights, as they lacked sufficient specifications for further emission reductions from 2031 onwards. This ruling requires the German federal government to add specifications for GHG emissions reduction. The complaint was filed by a group of young people supported by several environmental NGOs. There exist several other examples (see, e.g., Cisneros, 2020) where courts have ruled in favor of stricter climate policies, which suggests that they will play a greater role in the future for eliciting more ambitious climate action from governments and corporations.

Climate action can also refer to the initiatives taken by civil society, with members calling on policymakers to adopt more ambitious climate policies. The concept of "active citizenship" has been studied since decades (Hoskins & Mascherini, 2009) and results in the formation of environmental movements not only in advanced market democracies, but also in transition countries such as Brazil (Hochstetler, 2021; Hochstetler & Ricardo Tranjan, 2016). The Fridays for Future movement with school strikes for climate awareness initiated by Swedish student Greta Thunberg represents a novel form of protest, since they have been able to mass-mobilize young people to place pressure on politicians (Boulianne et al., 2020; Fisher & Nasrin, 2021). Another remarkable feature of this movement is that scientists have supported student protestors and their demands for more ambitious climate policies (Hagedorn et al., 2019). There are also many other bottom-up initiatives with lower media presence, often at the local level, which deserve scholarly attention, and should be discussed in *Climate Action*.

Grassroots activities will be an important theme of this journal, but also individuals' daily routines and actions (e.g., Diederich and Goeschl 2014, 2017). Examples of climate-related behavioral change could involve active changes in traveling habits or consumption choices like purchasing electric vehicles (Ballew et al., 2019; Dubois et al., 2019). A set of psychological factors such as attitudes (Colvin & Jotzo, 2021) or emotions (Davidson & Kecinski, 2021), societal factors such as social norms

(Nolan, 2021), and exposure to sustainability education (Wu & Otsuka, 2021), must be considered to explain under which conditions individuals change their behavior.

In the psychological literature, the gap between the intention to act in a climate-friendly manner, and actual behavioral change, has received quite some attention (see, e.g., Norton et al., 2017). However, its causes (which are most certainly not only psychological, but also affected by the policy environment and monetary issues) are still not completely understood. The sociological literature is important for understanding how family and friends influence individuals' attitudes and pro-climate behavior (Goldberg et al., 2020), while the education literature has engaged in a conceptual debate of how to define "climate change education" (Stevenson et al., 2017), and which education strategies are most likely to be effective (Monroe et al., 2019).

In this context, it is important to understand how to engage individuals to participate in local-level climate action (Bamberg et al., 2015; Tosun & Schoenefeld, 2017), which entails understanding how social networks (Cunningham et al., 2016), communication, and (social) media affect motivation (Appelgren & Jönsson, 2021; Fox & Rau, 2017). Thus, *Climate Action* welcomes studies on mobilization and the role of communication and media in addressing climate change.

In many cases, citizens and local governments collaborate and form specific governance arrangements to plan and implement climate action (Hoff & Gausset, 2016; Pitt & Congreve, 2017; Tosun & Schoenefeld, 2017). One example is citizens' renewable energy cooperatives established by local communities to promote the production and consumption of renewables (Herbes et al., 2021; Park & Yun, 2021; Tosun et al., 2019; Yildiz et al., 2015). Citizens' assemblies are another example; they bring together randomly selected representatives of the population to deliberate on climate policy solutions (Devaney et al., 2020a; Devaney et al., 2020b). Such deliberative engagement mechanisms could help develop a robust social mandate for climate action and transition to low-carbon societies (Howarth et al., 2020).

Regarding corporations, this journal strives to understand which kinds of climate actions are adopted and why. One straightforward explanation for voluntary corporate climate action is to preempt stricter public regulation (Malhotra et al., 2019). However, there are additional motivations for business actors to adopt stricter private standards or to even lobby for stricter public standards such as the considerations regarding competitive advantage (Morioka et al., 2017). It is also important to recognize that corporations are part of national and transnational climate change governance regimes, participating in organizations such as the United Nations Global Compact (Berliner & Prakash, 2015; Bernhagen et al., 2013). Consequently, they will be a subject of research in this journal as individual actors, but also as members of national or transnational climate change governance arrangements (Abbott, 2012; Bäckstrand & Kuyper, 2017; Chan et al., 2015; Roger et al., 2017).

Facilitators of climate action

Scientific knowledge and the emergence of scientific consensus laid the foundation for placing climate change on the political agenda. While scientists identified some early indications of climate change already in the 1960s and 1970s, it was only in the mid-1980s that climate change began to receive political attention. In this regard, the conclusions of the 1985 Villach Conference of the United Nations Environment Program (UNEP) and the World Meteorological Organization (WMO) are important, as they stated there is a high probability of significant climate change and that the states should consider developing a global climate convention (Bodansky, 2001).

In 1988, UNEP and WMO created the Intergovernmental Panel on Climate Change (IPCC) to organize scientific cooperation on climate change. The IPCC reports of 1990 and 1995 flagged the seriousness of climate change, and the 1996 report put forth the statement in the summary for policymakers that "the balance of evidence suggests that there is a discernible human influence on global climate" (cited in Luterbacher & Sprinz, 2001, p. 4). Since then, scientific knowledge has mounted to confirm anthropogenic climate change and to uncover how GHG emissions other than carbon dioxide (CO_2), such as methane (CH_4), contribute to the global rise in temperature (e.g., Turner et al., 2016).

Scientific breakthroughs have the potential to change current climate knowledge, as well as the perception of climate change. For example, global maps of carbon dioxide emissions as taken by satellites (see, e.g., Crisp et al., 2004) have attracted attention to the role of cities and metropolitan areas in climate change. Local CO_2 maps from sensor networks and high-resolution modeling efforts have the potential to pinpoint emitters and identify local actors with key responsibilities (see, e.g., Turner et al., 2020).

While scientific knowledge itself is a critical facilitator of climate action, it needs to be made accessible to have political and societal impact. Therefore, when discussing the importance of scientific knowledge or evidence on climate action, "knowledge brokers" (Meyer, 2010) and "policy entrepreneurs" (Mintrom, 2019) are assigned a key role. Any actor can be a knowledge broker or a policy entrepreneur, including scientists. Following Bodansky (2001), a small group of scientists worked actively to place climate change on the international political

agenda from 1985 to 1989. Today, groups of scientists, such as the *Scientists for Future*, present themselves as activists, who sympathize with other activists, and call for more ambitious climate action (Hagedorn et al., 2019). The question of whether scientists should be activists at all is widely debated and poses an interesting research perspective in itself.

Given that climate change is a global problem, it is necessary to address it at the global level. Therefore, research traditionally focused on the international level (Bang & Underdal, 2015; Keohane & Victor, 2016; Tavoni & Winkler, 2020) and then broadened its perspective to include transnational governance (Bäckstrand & Kuyper, 2017; Bulkeley et al., 2014; Roger et al., 2017) and polycentric governance (Abbott, 2012; Cole, 2011; Jordan et al., 2015; Jordan et al., 2018; Ostrom, 2010). This literature has investigated both how domestic factors, including the existence of climate policy experiments (Hildén et al., 2017; Kivimaa et al., 2017) shape climate action at the international and transnational levels (scaling-up perspective), as well as how international and transnational factors affect governmental climate action in states (trickle-down perspective) (Clare et al., 2017; Dubash et al., 2013; Lachapelle & Paterson, 2013). Therefore, both international and domestic factors can be facilitators of climate action (Tosun & Peters, 2020), and thus deserve scholarly attention.

While financial support and investment generally facilitates climate action, especially actions by governments and business, they are critical for climate action in developing countries (see, e.g., Pauw et al., 2020). This is one of many reasons why *Climate Action* is committed to achieving a broad geographical coverage of research and insights for developed, developing, and transition countries. Of further interest is the question of which political regime types (democracies, anocracies, or autocracies), and within the regime types, which concrete political systems (e.g., in democracies parliamentary vs. presidential systems), facilitate climate action (Böhmelt et al., 2016; Clulow, 2019; Escher & Walter-Rogg, 2018; Hanusch, 2018). This journal is eager to further develop our understanding on the relationship between (different types of) democracy and autocracy, and climate action.

Another important facilitator of climate action is the emergence of innovations. Potential innovations do not have to be technical, but can include social innovations, which Broto and Bulkeley (2013) define as policy tools, financial mechanisms, and changes to cultural norms. Noteworthy examples of social innovations include citizens' renewable energy cooperatives and participatory or deliberate engagement mechanisms such as Ireland's citizens' assembly on climate change (Devaney et al., 2020a; Devaney et al., 2020b).

Technological advances allow for efficient climate action. In the literature, renewable energy technologies have received the most attention. Technological advances in renewables have reduced costs and created new opportunities for the clean energy transition (Goeschl & Perino, 2017; Meckling et al., 2017). However, governmental action may also be needed in areas which are indirectly concerned with climate change to harness the full potential of these technological advances. For example, power systems must be adjusted accordingly when increasing the share of renewables in traditional energy mixes (Tetteh et al., 2021), which requires governmental action for upgrading energy infrastructure. Collaboration in larger international organizations, such as the International Renewable Energy Agency (Urpelainen & van de Graaf, 2015), and smaller ones such as the Clean Energy Ministerial, or the Mission Innovation (see, e.g., Tosun & Rinscheid, 2020, 2021b; Tosun & Shyrokykh, 2021) may be instrumental for more quickly integrating renewables into existing energy mixes.

Both technological and social aspects are critical components of transition pathways and must be understood to implement more effective climate action (Hof et al., 2020). Likewise, climate action provides a societally relevant case for research on transition pathways, microfoundations, and the behavior of individuals and collective actors. After all, decisions taken by individuals and organizations at various levels in diverse regions will influence potential further temperature rise, as well as our ability to live with climate change. Therefore, all contributions to this journal will provide insights into the overarching concept of climate action and its societal relevance.

Impacts of climate action

A central question to reflect on is the impact of climate action, which can be addressed in several ways. First, an overarching question is whether and under which conditions climate action is effective in bringing about behavioral change and/or GHG emission reductions. In a way, this question reflects on the complementary perspective of the facilitators of climate action, since answers could focus on barriers to climate action (see, e.g., Rayner et al., 2021). And thus barriers for climate should also be addressed in this journal.

A convergence point of the various literature strands is that climate action becomes more likely if the various sectors concerned manage to coordinate their activities and cooperate with each other (Dupont, 2015; Fleig et al., 2017; von Lüpke and Well, 2020; Schmidt, 2020; van Asselt et al., 2015). This connects to the literature which reflects on how policy mixes should be designed

for effective responses to climate change (Schmidt & Sewerin, 2019; Schoenefeld et al., 2021).

The economic literature, in particular, pays attention not only to the effectiveness of climate policies, but also their efficiency. Research has shown carbon-pricing creates costs to both industry and citizens, which may impede the adoption of this instrument (Jenkins, 2014). On the other hand, subsidies promoting renewable energy can also raise energy prices, and produce negative effects on welfare (Kalkuhl et al., 2013; Zhao et al., 2014). In addition to efficiency considerations, the economic literature has also paid attention to the important aspect of distributional consequences of climate policies and whether they create cost disparities across societal groups, industries, or regions (Rausch & Karplus, 2014). More broadly speaking, this perspective calls for paying increased attention to the costs of climate policies and the population segments affected.

A further consideration is the potential trade-offs between implementing climate action and achieving other dimensions of sustainable development. In this context, one of the questions asked in the literature is whether environmental NGOs have started to pay less attention to environmental concerns, because climate change has become (overly) salient (Boscarino, 2015). Building on the same notion of salience, and how it directs political attention to certain issues at the expense of others, Legagneux et al. (2018) showed in their study of scientific literature and press articles addressing climate change and biodiversity in Canada, the UK, and the USA, that media coverage of climate change was up to eight times higher than for biodiversity. This suggests that climate change has become a more salient topic and could potentially—albeit not necessarily—take away attention from other pressing global issues such as biodiversity loss and the degradation of water quality.

To fully understand the impacts of climate action, we need to position the study of climate action within the broader context of issues deserving attention from political and societal actors. This journal does not want to limit itself to the study of intended consequences of climate action but rather provide space to study also its *unintended* effects, especially social effects, for different groups. The unintended social effects of climate action tend to receive scant attention in the literature, but are indispensable for an unbiased assessment of societal transformations.

Climate action through dialogue

Climate Action strives to establish dialogue among different disciplines held together by a shared focus on all aspects of actions addressing climate change. Clearly, the above reflections cannot be regarded as exhaustive, but rather as illustrations of this dynamic, and continuously growing field of societal and scientific inquiry.

Equally important for *Climate Action* is to establish a constructive exchange between academics and practitioners for anticipating upcoming topics, developing a sense of differing problem perceptions, and offering an intellectually stimulating, and scientifically sound analysis of climate action. To facilitate sustained dialogue between academics of different disciplines on the one side, and academics and practitioners on the other, this journal offers a range of publication formats, from theoretically informed, full-length research articles to shorter case studies on empirical climate action and impacts. It is only through dialogue and a transdisciplinary approach (see, e.g., Knutti, 2019) that we can advance knowledge on climate action, and seize the full potential of this transformative research field.

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Author's contributions

The author conceived of this editorial and carried out the writing. The author read and approved the final manuscript.

Declarations

Competing interests

The author declares that she has no competing interests.

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