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Deglobalisation? The case for diversified and decentralised global sustainability science

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Commentary

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Abstract

Non-technical summary. Recent geopolitical events remind us of the need for a resilient, global approach to sustainability science. This Commentary argues that a diverse, bottom-up approach is essential to ensure sustainability science progresses, even amid shifting political processes that threaten international collaboration and funding. Locally driven solutions that value diverse perspectives and knowledge systems are vital for resilience. By supporting community-led action, sharing ideas across regions, and recognising that sustainability means different things in different places, we can build a more flexible, inclusive, and resilient path toward achieving the Sustainable Development Goals in an uncertain world.

Technical summary. Recent geopolitical events provide a stark reminder of the need to build a resilient, global approach to sustainability science. Centralised, top-down models of sustainability science are likely to be vulnerable to disruptions, from pandemics to wars, that threaten progress towards the Sustainable Development Goals and jeopardise decades of collaborative advancement that are needed to support future progress. We argue that a decentralised, community-empowered model provides the foundation needed for a resilient sustainability scientific effort. By prioritising local solutions, embracing diverse knowledge systems, and fostering horizontal knowledge exchange, we can create a more resilient and adaptable framework. Sustainability science initiatives need to elevate successful local initiatives, adopt transdisciplinary approaches that include underrepresented knowledge holders, build decentralised knowledge-sharing networks, and recognise that sustainability has different meanings across cultural and geographical contexts.

Social media summary. Decentralised sustainability science: local, diverse, and resilient in a fractious and unpredictable world.

1. Sustainability in a fragmenting world

World events such as political shifts, wars, and pandemics are undeniable consequences of a *modus operandi* (a particular way or method of doing something) that has brought us into the Anthropocene (Slaughter, 2012; Steffen et al., 2011). Each of these world events has introduced new uncertainty into global efforts to promote and fund sustainability science (e.g. political movements; Jacobs & Booth, 2025).

Recently, global scientific cooperation has been disrupted with some aspects of global institutions and trade having become more decentralised and deglobalised in response (Van Bergeijk, 2024). Uncertainties brought about by COVID-19 and the war in Ukraine put further dampers on international scientific collaboration (Abramo et al., 2022; Zhang et al., 2024) and knowledge exchange across some boundaries. Conflicts in West Asia and North Africa, tensions in parts of Asia and the Pacific, and competition for resources in the Arctic and Antarctic have made it difficult for some scientists to collaborate.

Unilateral actions at a political level have had the knock-on effect of reducing the funding for many types of sustainability science. The Trump administration's actions to leave the Paris Climate Agreement are likely to further accelerate the undoing of global efforts to reduce greenhouse gases and the willingness of governments to fund sustainability science that seeks to find new ways of mitigating and adapting to climate change across boundaries.

In the United States, the global withdrawal from international sustainability initiatives has been followed by parallel cuts to funding for sustainability and environmental science programmes. The same administration is cutting staff and funding at environmental and science agencies, ordering the deletion of critical data gathered by scientists for decades (Freilich & Kesselheim, 2025), and ending international spending on sustainable development and biodiversity conservation projects. To better adapt to climate change, to protect ecosystems, to stave off the 6th great extinction, and to achieve the Sustainable Development Goals, the global sustainability community has to stand strong and re-organise themselves in different ways for the greater good (Sioen et al., 2024).

The world faces numerous interlinked challenges, including climate change, biodiversity loss, pollution, poverty, famine, and disease, which are all compounded by economic disruptions, migration, and war (Lawrence et al., 2024). The response to these many interacting global challenges faced around the globe has often been to work towards achieving consensus and finding global solutions, including global agreements and processes to solve the biggest environmental and climate challenges facing our planet (Izuchukwu et al., 2024). International Conferences of the Parties (COPs), global treaty agreements, and centralised systems of standards and certifications all represent approaches that are inherently difficult to enact or implement. The defection of one large party can lead to a cascade of other key defections that, in turn, can render the goals of a global agreement unattainable. One or a small number of holdouts can block consensus and thus delay much-needed action or water down agreed goals (Nasiritousi et al., 2024). Most global treaties, other than those involving trade and financial laws or those with specific enforcement clauses, have proven ineffective (Hoffman et al., 2022).

Failures in the global politics of sustainability provide ample warning for the science of sustainability. In just the first few months of a new administration in the United States, we saw the fragility of an overly centralised system of environmental science in which one government can suddenly erase years of existing knowledge and expertise through mass firings, the removal of websites, and the elimination of access to centralised databases of environmental information (National Security Archives, 2025). Such data and knowledge, controlled by a single national government in a world of nearly two hundred countries, makes the case for more decentralised approaches to science and data management.

The erosion of knowledge sharing and support for science and sustainability from large and influential states and organisations, serves as a wake-up call to ensure that we do all we can to reconsider how the world can best catalyse and harness science to address these multiple crises. Just as *'addressing the sustainability crisis requires a diverse and multifaceted approach that draws upon the best knowledge of humankind'* (Sioen et al., 2024), we also need to think carefully about how to build a diverse and multifaceted bottom-up approach for the global sustainability science response globally. Fortunately, the situation is not unilaterally the same everywhere. For example, the European Union is continuing to advance its Green Transition goals aiming to reach climate-neutrality by 2050 (*Green Transition*, n.d.) and China is demonstrating emission reductions through adoption of various clean energy methods (Takahashi, 2025). Both these examples are continuing the path of sustainable development and are investing substantially in global sustainability science (Takahashi, 2025).

2. The case for local approaches

Fortunately, recent global events have also served to remind us that many of the planet's greatest environmental challenges (e.g. observed with the Planetary Boundaries research; Rockström et al., 2024) are experienced and solved locally; a vast multiplication of local solutions could go a long way towards achieving a globally sustainable planet (Masuda et al., 2021). To do so, however, will require that the global science community pursue a course of research that is fit for this purpose. Sustainability science and scientists, and especially the funders of sustainability science need to learn the language and customs of locality to serve global sustainability. This will likely require new ways of working for many scientists and scholars.

There are numerous examples of effective locally led approaches to sustainability and sustainability research (Jiménez-Aceituno et al., 2020; Bandari et al., 2024; Sahle et al., 2025). For instance, in India, a range of partners (from diverse backgrounds, including artisans, technical experts, and public sector workers, across both formal and informal sectors) came together to rethink the brick manufacturing process. In a co-designed 'action-research' intervention that lasted 10 years, a variety of solutions were created to develop and adopt a more environmentally friendly approach to brick-making that results in far fewer emissions and energy use (Heierli et al., 2008; Niazi, 2025).

Now we have to find better ways of elevating these examples and sharing knowledge horizontally across local communities and scientists. We have to develop low-cost approaches to sustainability that do not require support from major economic powers. Doing so encourages us to rethink how we collaborate and do science in ways that are most effective. The new geopolitical landscape will also require new partnerships in the funding and co-creation of sustainability science that carefully navigates power dynamics. For instance, the CEO of Volvo recently came out in strong support of keeping EU regulations planned to eliminate combustion engine automobiles (Hägler & Zacharakis, 2025). We need to find opportunities to build coalitions with those in various sectors, public and private, that are interested in sustainability and are willing to work with researchers to champion new ideas and approaches.

As a science community, we need to recognise and resolve the risks associated with overly centralised approaches to environmental science and sustainable action (Hickmann et al., 2024). We need to embrace the diversity of decentralisation. Yet, there is no roadmap for this approach, and we have to find ways to work with people through trust and guidelines for change.

We are learning new ways of working at the local level that could transform how and by whom environmental information, data and science are created. Transdisciplinary approaches such as Real World Labs or Living Labs allow us to better involve stakeholders and rights holders in sustainability science (Guittard et al., 2024; Harris et al., 2024), while Indigenous knowledge holders and Indigenous researchers with local knowledge and academic training are creating new forms of environmental understanding that weave together old and new ways of knowing as real transdisciplinarians.

3. Rethinking science and knowledge sharing

Sharing all this new and possibly disparate knowledge will be key. Transferring knowledge and creating redundant repositories

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of information are important to ensure effective ways of moving forward. We need to continue to push the boundaries of knowledge sharing to better facilitate shared experiences along more horizontal dimensions: within regions, bilaterally between countries, city-to-city, community-to-community, and Indigenous peer-to-peer knowledge sharing. New, decentralised digital platforms can help create more agile ways of coordinating and bottom-up approaches to the creation and distribution of environmental data and information.

A more decentralised approach to sustainability science will also force us to recognise and celebrate the huge diversity of visions about what sustainability means, how knowledge is created, and where society and humanity should be headed. This will require dealing with large global imbalances in the distribution of funds, power, and capacity, as well as a recognition that institutions and bureaucracies have been built around the status quo and may require significant changes in institutional logics to support the changes that are needed. It also means turning away from paradigms of scaling up and replication that envision a small number of solutions that can be extrapolated globally (Hickmann et al., 2024).

We need to take great care to ensure that an embrace of diversity in ways of knowing does not become an invitation for misinformation and disinformation. Not managing this well would make it difficult for the public and decision-makers to discern what is real and what is not and could lead to a general rise in mistrust in science and institutions. How can peer review evolve to determine the validity and usefulness of new ways of knowing? Already, AI has been shown to be effective at countering disinformation at large scales by identifying, analysing, and mitigating disinformation (Saeidnia et al., 2025).

We envision a future in which the intellectual life of sustainability science also becomes more decentralised. As sustainability becomes part of the fabric of local governance, cities, states, and provinces will become hotspots for applied sustainability research and innovation. As the centre of gravity for sustainability science shifts, we will need to pay particular attention to the need to respect the rights of local data producers and knowledge holders and especially the sovereignty of Indigenous knowledge holders and their data rights. The CARE and FAIR principles have created basic ground rules for Indigenous data (Carroll et al., 2021), but we may need new frameworks for sharing data that are created and owned by cities, states, and provinces that are not required to share their data more broadly. New ways of computing and managing data (including the use of blockchain and AI) could allow us to have more and better integrated, decentralised nodes for environmental data without giving up data sovereignty (Mackey et al., 2022; Pendleton et al., 2019).

4. Diverse and redundant

All this comes together as an opportunity for the scientific community and science funders to create networked platforms and partnerships with credible, non-hierarchical knowledge generation at local and regional levels that are available globally. Future Earth is one example of such an organisation that has built diversity and redundancy into its global network. It has a distributed secretariat, hosted in different countries and regions around the world and hosted by different, independently run institutions. Its distributed staff work together on shared activities to pursue its overall mission and vision. The number of funders reported in the latest Future Earth Annual Report (Future Earth, 2024) is 56, of which some are governments, institutions, private sector organisations, and philanthropies. Furthermore, many of its networks are independent and thus rely on other funding organisations. This setup allows the organisation to move forward on a broad agenda and yet have strong regional and local representation and input. Furthermore, if one of the offices were to close, thanks to its built-in redundancy, the advancements on its mission and vision would continue.

GEO Blue Planet (GEO Blue Planet, 2023) and the Global Ocean Observing System (Global Ocean Observing System, 2023) are other examples of redundant international organisations that both focus on ocean observations but with different funders and delegates and sometimes overlapping missions.

5. Globally decentralised science for a sustainable future

Recent geo-political events serve as an important reminder of the need for sustainable sources of science to guide us towards a sustainable future. By continuing to build diverse, decentralised, redundant approaches to science and science funding, we can continue to enjoy a global scientific enterprise that is resilient to changing political winds and shifts in the world order and well-adapted to the economic and cultural realities of the thousands of local communities that are striving for a more sustainable future.

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