

The resilience of the resilience debate

Continuing debates on resilience reflect ongoing tensions and are vital to the advancement of understanding. *Nature Sustainability* welcomes them and aspires to promote constructive and forward-looking dialogue.

The concept of resilience is critical to sustainability research, even as it continues to inspire debate. From Holling's early work and applications to socioecological systems¹, including in terms of adaptive management, and Pimm² and others' efforts to pin it down, to the ramifying strains today, it clearly captures an important zeitgeist and idea — that entities or systems can weather fortune's blows and continue in some characteristic way.

In this issue, three groups of authors grapple with resilience. In a [Perspective](#), Grafton et al. focus on its realization for decision making. Through a largely socioeconomic lens, they define resilience as a property of social–ecological systems that includes three main characteristics — resistance, recovery and robustness (three Rs). In a [Comment](#), Pimm and colleagues leverage the Oxford English Dictionary (OED) definition — resilience as rebounding — and make a strong call for the need to measure resilience in order to understand it. And in a second [Comment](#), Garmestani and co-authors consider resilience as the amount of disturbance needed for a system to cross a threshold and change profoundly, to shift regimes.

This set of views, though not exhaustive, shows significant variation within sustainability research. But variation in the sustainability discourse is just a microcosm of that beyond its borders. The OED roots of resilience are important and are reflected in historic scientific use. In 1820, physician James Carson [discussed](#) resilience in terms of a well-known property of the lungs, elasticity. Engineers have long focused on resilience's rebounding aspect, as in the case of chemical compounds [discussed](#) by Shaw in 1949. In the late 1970s, psychologist Emmy Werner [applied](#) it to children who weathered difficult upbringings. The use of resilience has exploded more recently. Though much of that explosion may stem from its embrace by ecologists and environmental scholars, the accelerating nature of change, whether environmental, cultural or economic, makes a concept that captures the ability to respond to buffeting forces particularly attractive. Indeed, this popularity transcends scholarship: resilience has experienced its own great acceleration since Carson's prescient application (<https://bit.ly/2kXeoh1>).



Reflecting on Grafton et al., Pimm and his co-authors agree about the importance of identifying ways to operationalize resilience to guide wise management of natural resources. However, without robust ways to measure it, they feel strongly that any effort to realize resilience remains incomplete and unlikely to make a difference. Yet, the emphasis of Grafton et al. on systems and their complexity remains critical for sustainability science and can illuminate management realities as we try to grapple productively with a changing globe. On the other end, Garmestani and colleagues feel that the three Rs at the core of the Grafton et al. Perspective can help to quantify the potential of a system to adjust to change, but one must assume that a social–ecological system does not shift between alternative states — an extremely simplifying assumption.

This debate reflects familiar tensions. One is between selective forces. Popular and academic terms and concepts evolve, especially if embraced by multiple communities, and, like species, are subject to both stabilizing and diversifying selection. Differently from other concepts that have strong roots in single disciplines and remain protected and relatively unchanged over time, resilience is meaningful to many fields and disciplines and so is more malleable and more contested. Indeed, within sustainability discourse, such evolution can also lead to sharp debates and turf battles as camps defend different definitions. Whether in scholarship or more broadly, there are returns to planting flags.

But this debate, which surely feels old to some, suggests resilience has continuing vitality. And that is primarily why we have decided to highlight it in our pages, at least in part. Resilience is still a useful concept both for theoretical discussions and for grappling with practical issues in management and decision making. *Nature Sustainability* launched with the overarching mission to foster debate across fields and disciplines, as much as within them, in order to advance conceptual understanding of the challenges at the interface of human society and the broader environment and to facilitate the development of solutions that can make sustainability a reality. We do not pretend to do justice to the depth and breadth of the resilience debate in this specific issue or more generally through our pages. Instead, we offer interested scholars and practitioners an opportunity to reflect and contribute, hoping that the debate will continue to evolve constructively and openly in honouring resilience's legacy and realizing its continuing potential. □

Published online: 9 October 2019
<https://doi.org/10.1038/s41893-019-0411-2>

References

- Holling, C. S., Jones, D. D. & Clark, W. C. In *Pest Management. Proc. Int. Conf.* (eds Norton, G. A. & Holling, C. S.) 13–90 (IIASA, 1976).
- Pimm, S. L. *The Balance of Nature? Ecological Issues in the Conservation of Species and Communities* (University of Chicago Press, 1991).