



OPEN ACCESS

EDITED AND REVIEWED BY
Steffen Fritz,
International Institute for Applied Systems
Analysis (IIASA), Austria

*CORRESPONDENCE
Maureen G. Reed,
✉ m.reed@usask.ca

RECEIVED 29 June 2024
ACCEPTED 08 July 2024
PUBLISHED 18 July 2024

CITATION
Reed MG and Vasseur L (2024), Editorial: Co-creating knowledge for community resilience to sustainability challenges.
Front. Environ. Sci. 12:1456992.
doi: 10.3389/fenvs.2024.1456992

COPYRIGHT
© 2024 Reed and Vasseur. This is an open-access article distributed under the terms of the [Creative Commons Attribution License \(CC BY\)](https://creativecommons.org/licenses/by/4.0/). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

Editorial: Co-creating knowledge for community resilience to sustainability challenges

Maureen G. Reed^{1*} and Liette Vasseur²

¹School of Environment and Sustainability, University of Saskatchewan, Saskatoon, SK, Canada, ²Department of Biological Sciences, UNESCO Chair on Community Sustainability, Brock University, St. Catharines, ON, Canada

KEYWORDS

knowledge co-production, climate resilience, community-engaged research, transformative learning, participatory approaches, social learning

Editorial on the Research Topic

Co-creating knowledge for community resilience to sustainability challenges

Rural communities around the world are facing critical, complex, and confounding sustainability challenges including biodiversity loss, water insecurity, pollution, and climate change. While scientists have forewarned of acute hazards and long-term change, it is people at the local level who are at the forefront of adaptation actions. Many have already suffered from significant events brought by events such as drought, fire, flood, and storm surges. Others are making transitions to new ways of appreciating or managing biological resources to sustain livelihoods and wellbeing. As local people learn from their changing conditions and contexts, the resilience of their social-ecological systems needs to be improved through effective and sustainable adaptation strategies. Local experiences, however, have not been readily translated into policies and practices on the ground, and documentation of social and transformative learning, and knowledge co-creation processes is limited.

Knowledge co-creation, sometimes referred to as co-production or co-design, is research that engages academic researchers and people of diverse experiences and expertise outside of academia. [Satterwaithe et al. \(2024\)](#) define knowledge co-production as “an interactive, participatory process that brings together diverse actors such as scientists, practitioners, and community members to collectively generate, integrate, and apply knowledge to jointly create actionable insights and solutions.” (p. 27). This definition synchronizes with some interpretations of citizen or community science as co-production of knowledge with local people. Transdisciplinary research in sustainability, as well, is built on knowledge co-creation to advance the agenda of community sustainability transitions and even transformations.

Researchers have identified several reasons for employing co-creation strategies including:

- Improved conceptualization of problems and the social-ecological systems in which they are embedded.
- Local ownership of and public trust in knowledge co-created.

- Fairness - those affected by research results are included in equitable processes for knowledge generation.
- Nurturing safe spaces for just solutions.
- Upholding the rights and integrity of Indigenous Peoples, particularly those who have customary and/or legal rights and territories, responsibilities, and duties.
- Increased uptake of knowledge leading to more effective and innovative solutions to sustainability challenges.
- Restructuring institutions and relationships for sustainable transformations.

(see Wyborn et al., 2019; Nörstrom et al., 2020; Chambers et al., 2022; Reed et al., 2023; Satterthwaite et al., 2024). All of these reasons feature in one or more of the articles of this Research Topic.

This Research Topic highlights multiple approaches and key lessons learned when researchers explicitly seek to co-produce knowledge with community partners to build resilient landscapes, communities, and social-ecological systems. Articles illustrate community-academic partnerships that have shaped practices on the ground or policy implementation across a diverse set of circumstances and locations around the world.

Sarigumba et al. illustrate the value of a co-production approach to strengthening the engagement of youth in territorial governance in an Indigenous community in Brazil. Their approach was an emergent one, with several phases of work over a 5-year period. Their article points to the need for researchers to take direction from their community partners to assure local and lasting benefits.

Conte et al. also used a staged approach, seeking to find key leverage points for advancing an agroecological transition in Western Sicily. Engaging both farmers and scientists in a participatory action research initiative enhanced understanding of local ecological and social values and helped all participants explore new ways to address mistrust that had characterized top-down scientific practice and regional management of agro-ecosystems. Hence, both farmers and scientists benefited, as farmers enhanced their awareness and capacity to share the ecological and social values of their experiences, and scientists explored how best to address historical mistrust as a consequence of former top-down approaches to structural change.

The research by Tiago et al. takes a very different approach, focusing on how citizens contribute to environmental science through Bioblitzes in urban municipalities (Lisbon, Oeiras, and Almada) within the metropolitan area of Lisbon, Portugal. Bioblitzes are community science events where people learn about conservation issues while registering species observations and academic experts gain value through greater understanding of and appreciation for both ecological change and socio-cultural context (Roger and Klistorner, 2016). Their findings demonstrate the potential to diversify participants in BioBlitzes with recommendations aimed at strengthening knowledge co-production.

Elliott et al.'s contribution offers quite a different strategy for knowledge co-production. They apply feminist theory as a methodology to support a knowledge co-production process with rural residents who have experienced wildfire. They demonstrate how a researcher can become a "collaborator" along with rural participants while creating new knowledge about local change and adaptation. Researchers and community members learned together who and how different social groups were affected by the wildfire,

offered concrete strategies for sharing knowledge, designed a framework and a guidebook that can help community members create local adaptation solutions for today and the future.

Rosenberg et al.'s paper illustrates that attention to, and demonstration of, relational factors are critical for successful collaborations when university-based scientists and local people work together to monitor and manage environmental change. Focusing on a project that was deemed successful in achieving collaborative sustainable natural resource management in the Tsitsa region of the Eastern Cape Province of South Africa, the authors point to several relational factors that characterized success. Relational factors such as care, respect, and trust were evident in practices such as addressing local people in their own language, ensuring scientists followed-up with local people, and paying local environmental monitors for their work. Efforts to strengthen relationships between scientists and local monitors also revealed that all participants shared key values such as family, stimulating work, and stewardship of the environment. While relational considerations have historically been overlooked by natural scientists, Rosenberg et al. point out that attention to relationships is necessary for successful collaborations, particularly in regions where mistrust and societal divisions have characterized landscape management in the past.

Finally, the reflection by Leguia-Cruz et al. explains how co-productive reflection processes sought to enhance participatory governance in La Campana-Peñuelas Biosphere Reserve in Central Chile. They focused on reflections of young participants (youth) and Indigenous Peoples who participated in an Open Academy between 2019–2023. They employed Participatory Geographic Information Systems to visualize governance challenges and opportunities. They applied both traditional metrics of assessment with principles of transdisciplinary and intergenerational knowledge co-creation to reveal gaps in the governance performance and make recommendations. Following severe wildfires in 2024, they noted that the Biosphere Reserve Management Committee had been reactivated with representatives from civil society and Indigenous communities, suggesting the beginning of a new era for participatory governance in the region.

In different ways, the articles tell us overlapping stories about how to create knowledge with one another. Key lessons include taking the time to build trust, engaging diverse knowledge holders and knowledge systems, sharing power, and facilitating learning among researchers and community partners. These lessons are easy to summarize but challenging to put into practice. Participatory co-production projects demand that we spend more time building and nurturing research relationships, tailoring engagement efforts over time and to different contexts, being mindful that researchers must share power in co-production research relationships, and allowing researchers to be guided by the needs, interests, responsibilities, and rights of community partners. These practices require patience and humility to facilitate learning among all research participants—including researchers themselves (see also Reed et al., 2023; Satterthwaite et al., 2024). Applying these strategies offers the possibility of robust, innovative, creative, and impactful research results strengthened by a diversity of actors, knowledge systems, perspectives and approaches. Knowledge co-creation also offers practical benefits that enhance sustainability by building capacity

through improved relational skills, offering outputs that are meaningful to community partners, and empowering Indigenous and local people to take action for sustainability by enhancing skills and knowledge necessary for decision making and leadership. In this Research Topic, we hope you will find practical examples that inspire your own journeys in knowledge co-production for a sustainable, resilient, and just future.

Author contributions

MR: Writing—original draft. LV: Writing—review and editing.

Funding

The author(s) declare that no financial support was received for the research, authorship, and/or publication of this article.

References

- Chambers, J. M., Wyborn, C., Klenk, N., Ryan, M., Serban, A., Bennett, N. J., et al. (2022). Co-productive agility and four collaborative pathways to sustainability transformations. *Glob. Environ. Change* 72, 102422. doi:10.1016/j.gloenvcha.2021.102422
- Norström, A. V., Cvitanovic, C., Löf, M. F., West, S., Wyborn, C., Balvanera, P., et al. (2020). Principles for knowledge co-production in sustainability research. *Nat. Sustain.* 3 (3), 182–190. doi:10.1038/s41893-019-0448-2
- Reed, M. G., Robson, J., Campos Rivera, M., Chapela, F., Davidson-Hunt, I., Friedrichsen, P., et al. (2023). Guiding principles for transdisciplinary sustainability research and practice. *People Nat.* 5 (4), 1194–1109. doi:10.1002/pan3.10496
- Roger, E., and Klistorner, S. (2016). BioBlitzes help science communicators engage local communities in environmental research. *J. Sci. Commun.* 15, A06. doi:10.22323/2.15030206
- Satterthwaite, E. V., McQuain, L., Almada, A. A., Rudnick, J. M., Eberhardt, A. L., Doerr, A. N., et al. (2024). Centering knowledge co-production in sustainability science: why, how, and when. *Oceanography* 37 (1), 26–37. doi:10.5670/oceanog.2024.217
- Wyborn, C., Datta, A., Montana, J., Ryan, M., Leith, P., Chaffin, B., et al. (2019). Co-producing sustainability: reordering the governance of science, policy, and practice. *Annu. Rev. Environ. Resour.* 44 (1), 319–346. doi:10.1146/annurev-environ-101718-033103

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

The author(s) declared that they were an editorial board member of Frontiers, at the time of submission. This had no impact on the peer review process and the final decision.

Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.