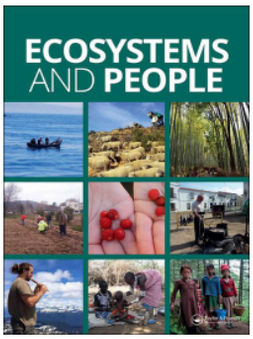

Ecosystems and People

ISSN: (Print) (Online) Journal homepage: www.tandfonline.com/journals/tbsm22

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Aleksandra Kosanic, Jan Petzold & Berta Martín-López

To cite this article: Aleksandra Kosanic, Jan Petzold & Berta Martín-López (2023) Pathways towards sustainable and just futures with and for disabled populations: a leverage points perspective, Ecosystems and People, 19:1, 2274590, DOI: 10.1080/26395916.2023.2274590

To link to this article: https://doi.org/10.1080/26395916.2023.2274590

Published online: 05 Nov 2023.

ECOSYSTEMS AND PEOPLE
2023, VOL. 19, NO. 1, 2274590
https://doi.org/10.1080/26395916.2023.2274590

Taylor & Francis
Taylor & Francis Group

PERSPECTIVE

Pathways towards sustainable and just futures with and for disabled populations: a leverage points perspective

Aleksandra Kosanic [a], Jan Petzold [b] and Berta Martín-López [c]

[a]School of Biological and Environmental Sciences, Liverpool John Moores University, Liverpool, UK; [b]Department of Geography, Ludwig-Maximilians-Universität München, München, Germany; [c]Faculty of Sustainability, Social-Ecological Systems Institute, Leuphana University, Lüneburg, Germany

ABSTRACT

Disabled populations are disproportionally affected by the current climate and environmental crises. However, they are hardly included and their knowledge is neglected in processes addressing these challenges. To achieve the UN Agenda 2030, societies should actively engage with the values, experiences and knowledge held by people with disabilities in science and policy contexts. In this paper, we suggest that addressing 'deep' leverage points by 1) recognising diverse valuations of and connections to nature by different social groups (i.e. *re-connecting* to nature), 2) including disabled populations in decision-making and knowledge creation (i.e. *re-structuring* institutions), and 3) promoting inclusive education and knowledge generation (i.e. *re-thinking* knowledge production) can facilitate the development of inclusive transformation pathways and foster sustainable human-nature relationships.

ARTICLE HISTORY
Received 2 February 2023
Accepted 18 October 2023

EDITED BY
Zuzana V. Harmackova

KEYWORDS
Climate change; environmental justice; transformation; sustainability; inclusion; disability

Introduction

Disabled populations are disproportionally affected by the current climate and environmental crises (Morchen et al. 2020; Jodoin et al. 2023). To secure and build sustainable and just futures for humanity, societies need pathways that are inclusive and allow for transformational change for facing current and future environmental challenges, given the continuous lack of progress in vulnerability reduction (Diaz et al. 2019). However, among the most vulnerable populations (i.e. marginalised within marginalised populations), people with disabilities have been broadly overlooked in climate and environmental change research and at the science-policy interface (Kosanic et al. 2019, 2022; Jodoin et al. 2023). Thus, inclusive approaches call out attention to research on disabled populations, particularly as they comprise such a large proportion of the global population.

About 16% of the global population has some form of disability, and this number is expected to grow due to an increase in noncommunicable diseases and longer lifespans (WHO 2022). There are many definitions of 'disability'. For example, according to the UN Convention on the Rights of Persons with Disabilities (United Nations 2006, p. 1), disability is an 'evolving concept and it results from the interaction between persons with impairments and attitudinal and environmental barriers that hinder their full and effective participation in society on an equal basis with others'. Disability is complex; therefore, we use the term 'disability' as the umbrella term for all different kinds of disabilities (e.g. physical, intellectual, sensory, neurodiversity, long-term illnesses, mental health, chronic conditions).

Overlooking the concerns and the knowledge of disabled populations is not only problematic from an environmental justice perspective but also misses out on vast reservoirs of values, experiences, and strategies for inclusive and transformative responses to environmental risks. Therefore, in this Perspective paper, we propose to build on the leverage points perspective (Meadows 1999) to address these shortcomings and facilitate the development of inclusive transformation pathways involving actors across social groups (Diaz et al. 2019). Especially the 'deep leverage points' are crucial and comprise three realms that can enable inclusive, just and sustainable transformations (Abson et al. 2017). Deep leverage points refer to changes in the underpinning values and worldviews of actors that shape the direction in which a system is oriented, as well as the social structures that manage the system (Abson et al. 2017). Key points of interventions based on the realms of deep leverage embrace the realms of *re-connecting*, *re-structuring*, and *re-thinking* (Abson et al. 2017). To enable inclusive, transformative change, these points of intervention need to be approached by actors across all social groups,

CONTACT Jan Petzold jan.petzold@lmu.de

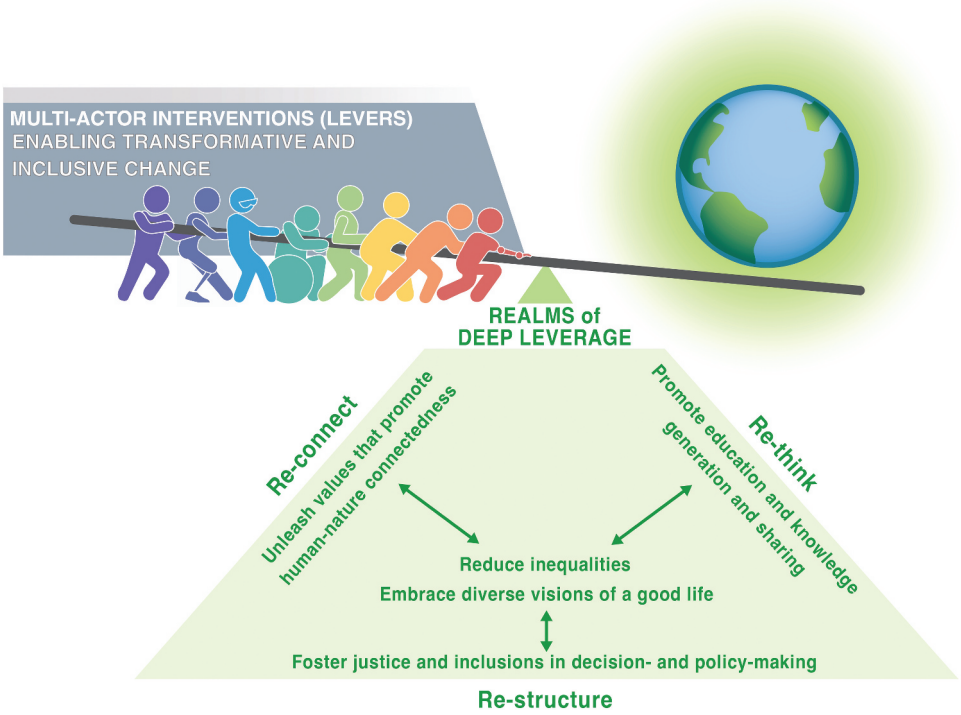

Figure 1. Enabling transformative and inclusive change by considering multi-actor interventions where disabled populations are also included to mobilise the three realms of deep leverage: *re-connect, re-structure* and *re-think* (after Abson et al. (2017); visualisation adapted from Díaz et al. (2019)).

including marginalised actors, especially the disabled populations (Figure 1).

The following sections of this paper provide examples for pathways towards inclusive, transformative change through a lens of the three realms of deep leverage and disabled populations, as this marginalised group has been overlooked, for instance, when studying how they relate to and value nature (i.e. *re-connect*) (Martin-Lopez 2021), in environmental governance (i.e. *re-structure*) (United Nations 2018), and when producing knowledge for sustainability transformations (i.e. *re-think*) (Acker-Verney 2016). We foresee that recommendations from this Perspective paper could be integrated into environmental research and the science-policy interface.

Re-connect: unleash values that promote human-nature connectedness

Re-connect focuses on how people interact with nature (Ives et al. 2018) and how sustainability outcomes are influenced by the different ways humans value nature (Diaz et al. 2019). To reach sustainable and just transformations, it is essential to explore the various ways by which disabled populations are connected or can relate to nature. To do so, research needs to investigate how disabled populations interact with nature, how they can progress in reconnecting with nature, and the limitations people with disabilities face when accessing nature.

According to the Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services (IPBES), three types of values reflect the way people connect to nature: instrumental, intrinsic and relational values (Pascual et al. 2017; Martin-Lopez 2021). While intrinsic values refer to the value of nature as an end in itself, some scientists argue that intrinsic values are not independent of human perception as they depend on human morality (Martin-Lopez 2021). Regardless of any human experience, instrumental and relational values are human-driven (Pascual et al. 2017; Martin-Lopez 2021). Instrumental values refer to the direct and indirect benefits people obtain from nature, representing the means to satisfy human needs and preferences (Pascual et al. 2017). Relational values refer to those concerns related to the meaningfulness of relationships, such as those between nature and people and among people within nature or promoted by nature (Chan et al. 2016).

To articulate and unleash the diversity of values that underpin how people relate, experience and interact with nature, valuation approaches need to involve different actors, including those often marginalised because of their ethnicity, gender, or physical and psychological abilities (Martin-Lopez 2021). Yet, including disabled populations in valuation processes remains an exceptional challenge since equitable access to nature is a prerequisite for the encounter and ability to articulate the 'importance' of the natural world. The unequal and inequitable access to

nature faced by disabled populations has relevant implications for nurturing human-nature connections and, therefore, articulating relational values. For example, if a forest has accessible paths for wheelchair users, people with physical disabilities might be able to use some of its products (i.e. instrumental values), build a relationship with nature (i.e. relational values) and build ethical considerations towards the forest (i.e. intrinsic value). Without accessibility, people with disabilities cannot experience nature as a means to an end (i.e. instrumental values), for example, as a means to collect food; build meaningful relationships with nature and with other people in nature (i.e. relational values), being deprived of experiences that nurture, for example, sense of belonging, social cohesion, individual and collective identity, or stewardship; and might not be able to recognise the right of nature to exist (i.e. intrinsic values). Although there have been attempts to show that 'virtual access' to nature can give us a form of nature experience, such access is not allowing people to establish real connection and attentiveness to nature (Li et al. 2021).

Experiences of and with nature are essential for human-nature connectedness and, ultimately, human wellbeing. The ability to connect with nature can shape positive attitudes regarding the environment (Wells and Lekies 2006) and promote willingness to protect it (Abson et al. 2017). Furthermore, it develops capacities of awareness and evaluation, that is, to help persons with disabilities to evaluate the state of the environment and current environmental change and to think about ecological, social and cultural conservational measures (Salvatore and Wolbring 2022).

Besides providing equitable access to nature to allow people with disabilities to nurture instrumental, relational and intrinsic values, here we want to emphasise the need to strengthen the power of *reconnect* as a lever for pathways leading to sustainability and equity outcomes. It is essential to allow marginalised groups, including disabled populations, to play an active role in decision-making and knowledge creation (see *re-structure* and *re-think* below).

Re-structure: foster justice and inclusion in decision- and policy-making

Re-structure focuses on understanding the role of institutions in guiding humans towards goals of sustainability and justice (Abson et al. 2017). Restructuring institutions is urgently needed when these have been historically based on inequalities regarding gender, race, ethnicity, (dis)ability and sexual orientation. However, institutions tend to be self-reinforcing and self-reproducing, and, in the short term, they follow the existing inertia and thus tend towards stability (Newig et al. 2019). Because institutions can promote or constrain actions, institutional change becomes a crucial leverage point for sustainable and just transformations (Abson et al. 2017). Moreover, a radical change of academic institutions towards inclusivity could be the pre-condition for other leverage points, such as knowledge co-production (see *re-think*).

In this context, we suggest three pathways to leverage structural changes that foster the inclusion of disabled populations in decision- and policy-making regarding sustainability. First, a critical reflection on the institutional failures that lead to marginalising disabled populations is an essential step. Students with disabilities face many obstacles throughout the educational system due to systematic historical stigmatisation and exclusion; many people with disabilities feel that they are not seen as equal citizens (Barton 1993; Lillywhite and Wolbring 2022). Hence, having the courage to accept previous failures and foster reflective practice can improve institutional functioning and bring historically marginalised actors into institutions (Care et al. 2021). For example, Worth (2008) suggests challenging ableist practices in academia to promote and value disabled researchers. Challenging existing structures in academia implies addressing institutional inertia for change and questioning historically set privileges beyond mere commitments that claim to have already reached a point of inclusivity and diversity (Ahmed 2012). Second, it is crucial to acknowledge that the voices of disabled populations have not been extensively included and listened to when knowledge regarding sustainability is created or decisions are taken. For example, even though the impacts of climate and global environmental change disproportionately affect disabled populations, so far, neither the Intergovernmental Panel on Climate Change (IPCC) nor IPBES specifically consider them as a stakeholder group in their assessments (Kosanic et al. 2022). Third, disabled populations need to be able to engage as agents in sustainability decision-making. Intergovernmental bodies, such as the above-mentioned IPCC and IPBES, can be exemplary in engaging the disabled community in international science-policy interface processes actively.

Re-think: promote education and knowledge generation and sharing

Re-think focuses on understanding how knowledge production, use and sharing can influence transformational processes (Abson et al. 2017). Re-thinking knowledge for sustainability transformation entails reflecting on aspects concerning (i) the methods and processes by which knowledge is produced and shared among people; (ii) the identification of what

knowledge is needed in a particular context; or (iii) whose knowledge is legitimised and by whom (Abson et al. 2017). Producing, exchanging, using and sharing knowledge is a powerful way by which people can influence social narratives, foster sustainability transformation and fulfil their role in societies as agents of change (Norström et al. 2020). However, processes of knowledge generation and sharing that do not account for the inclusiveness of and power relations between multiple actors, including marginalised groups, can end up reproducing power dynamics and, therefore, perpetuating injustices (Norström et al. 2020). This most often applies to disabled communities.

In this context, we propose three measures for pathways promoting inclusive education and knowledge generation across disciplines (e.g. ecology, geography, disability studies) and sharing that accounts for different knowledge systems, including those of disabled populations, and therefore promoting epistemic pluralism. First, inclusive education can only become a deep leverage point if it involves all stakeholder groups, including those representing disabled populations, and therefore avoiding epistemic injustice and epistemic exclusion (i.e. silencing and exclusion of the knowledge for people with disabilities) (Cureton and Wasserman 2020). Furthermore, disabled populations continue to face many systemic challenges in education, such as lack of access to facilities and transportation, lack of mentorship and role models and, therefore, feel overlooked and disempowered (Lillywhite and Wolbring 2022). Instead, they should be given the equitable opportunity of being welcomed by institutions in higher education. Second, processes of knowledge production and sharing should account for the challenges posed by the different disabilities and adapt the methods accordingly. Moreover, knowledge production processes should allow for 'slow' participatory processes. 'Slow scholarship' or 'slow-things-down' processes where researchers should aim to 'resist the compressed temporal regimes of the neoliberal university' are examples of 'slow' processes of knowledge creation (Mountz et al. 2015; Fudge Schormans et al. 2019). Furthermore, as stated by Martell (2014), 'slow' in slow scholarship does not refer to time only but also to power and inequality, and therefore, encourages different paces and creates supportive care practices, enabling everyone, including marginalised groups to thrive (Mountz et al. 2015; Staffa et al. 2022). Third, processes of knowledge co-production for sustainability transformations should respect and value the knowledge of people with disabilities (Acker-Verney 2016; Fudge Schormans et al. 2019). Disabled populations should be considered experts and knowledge producers of their own experiences, including those experiences related to accessing nature and interacting with nature (*re-connect*) and those related to participation in decision-making (*re-structure*).

To strengthen the potential of *re-think* as a lever that leads to sustainability and equity outcomes, research communities need to use expert knowledge of people with disabilities, as without this knowledge, they will not be able to create new knowledge and equitable transformative processes in academia (i.e. making decisions about future research agendas and academic programs in sustainability science).

Conclusion

Including disabled populations in plans, strategies, and decision-making processes is a crucial element for progress towards more just and sustainable futures, given the increasing climate and environmental crises. The three realms of deep leverage (i.e. *re-connect, re-structure* and *re-think*) offer pathways to engage with the values, visions and knowledge held by people with disabilities in scientific and policy contexts to reduce inequalities and foster sustainability. More research is needed to better understand the values of nature and their importance for people with disabilities in order to make nature more accessible to all. The pathways and recommendations for including disabled populations described in this paper can promote the conceptualisation and realisation of inclusive and transformative pathways in sustainability science. For this to happen, inter- and transdisciplinary alliances, collaborations, and platforms are required that connect research on environmental and climate change with critical disability scholars, who hold valuable and inspiring expertise on transformative change at the intersection of activism and research. Such initiatives can allow for novel knowledge production and sharing processes and nudge inclusive academic institutional change. The future IPBES thematic assessment of transformative change (IPBES 2020) provides an excellent opportunity not only to understand the role of disabled populations to leverage transformative change for sustainable development but also to engage, empower, and learn from this marginalised group in the assessment process.

Acknowledgements

We thank Trevor Fristoe for his graphic support on Figure 1 and the three reviewers for their valuable feedback constructive comments on our manuscript.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the Bundesministerium für Bildung und Forschung [01LN1710A1].

ORCID

Aleksandra Kosanic http://orcid.org/0000-0002-6403-7801
Jan Petzold http://orcid.org/0000-0003-0508-3362
Berta Martín-López http://orcid.org/0000-0003-2622-0135

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