

Knowing and unknowing transformative change: a reflection on epistemic inequities and epistemic justice in the IPBES Transformative Change assessment

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Abstract

Calls for transformative change towards a just and sustainable world often discuss the role of paradigms and knowledge systems as levers for transformation. Yet, current knowledge practices also form a barrier to transformation since they are dominated by prevalent paradigms and knowledge systems that reproduce the status quo and serve vested interests, with alternative forms of knowledge that are critically important for transformative change in a marginal position. This situation posed a challenge for the Transformative Change Assessment of the Intergovernmental Panel on Biodiversity and Ecosystem Services (IPBES). In this article, we, a group of experts involved in the Transformative Change Assessment, reflect on how the assessment reported on existing gaps and inequities in the knowledge that was available for the assessment and on whether and how it was able to mitigate these existing inequities and pursue epistemic justice in the assessment process. Our findings point to a general dominance of positivist and natural science literature and an underrepresentation of alternative, pluralist, critical, relational, and Indigenous paradigms and knowledge systems. We also show that the assessment process was limited in its ability to mitigate these epistemic inequities and was unable to prevent epistemic injustices from occurring. We discuss how these findings are related to a diversity of factors including limited diversity in the assessment team, rules and procedures of IPBES, and wider structural factors including scientific norms and values and specific dominant understandings of what good and credible knowledge is and of how assessments should be developed. All in all, we note a persistent unknowing of transformative change through the production of ignorance. We conclude by identifying options for transforming environmental research and global environmental assessments in IPBES and beyond.

Highlights

- We discuss epistemic inequities and epistemic injustices in the IPBES Transformative Change Assessment
- We note a marginalisation of alternative, pluralist, critical, relational, and Indigenous paradigms and knowledge systems
- This results in an unknowing of transformative change through the production of ignorance
- It is critical to improve the contribution of knowledge practices to transformative change
- This requires the transformation of research, norms of science, and assessment procedures and approaches

1 Introduction

Calls for transformative change to ensure a liveable planet for humans and other-than-humans are on the rise. To an important extent, these calls have emerged from global environmental reports and assessments, including from global science-policy platforms such the Intergovernmental Platform for Biodiversity and Ecosystem Services (IPBES) and the Intergovernmental Panel on Climate Change (IPCC). These reports and assessments highlight that current actions are insufficient to address the situation of accelerating and intersecting social and environmental crises, including biodiversity loss, climate change, and growing social inequality. They argue that addressing this polycrisis requires challenging and supplanting the status quo, and transforming not only the current policies, structures and systems that contribute to these intersecting crises but also those that are insufficiently effective in addressing them. In response to these calls, IPBES' plenary agreed in 2020 to undertake an assessment of the underlying causes of biodiversity loss, determinants of transformative change, and options for achieving the 2050 vision for biodiversity, hereafter called the

Transformative Change Assessment. The assessment report, which was approved in December 2024, defines transformative change as a fundamental shift across views, structures and practices that addresses the underlying causes of biodiversity loss in ways that respect key principles of justice, pluralism, reciprocity and adaptive learning (Gurung et al. 2024). The assessment provides a synthesis of existing knowledge on the nature of and barriers to transformative change as well as on transformative visions and strategies to realize a just and sustainable world.

As a synthesis of available knowledge, the Transformative Change Assessment inevitably reflects the knowledge that currently exists. This existing knowledge base can, however, not be taken as self-evident since underlying political, economic and social structures, norms, and institutions determine what knowledge is generated (or not), funded, accessible, or recognized as reliable or relevant. This means that the existing knowledge base is inevitably characterized by epistemic inequities, imbalances and distortions in the sense that they are biased towards specific paradigms and knowledge systems¹, themes, spaces, or methodologies while others remain underrepresented or absent (Frickel et al. 2009, The Global Hub on Indigenous Peoples' Food Systems 2021). This situation is not only the result of inequities in access to funding or other resources, but also of prevalent norms of what constitutes reliable and relevant knowledge. In science, often priority is given to quantitative and positivist forms of research (Clarke et al. 2025, Frederiksen and Poulsen 2024). And since "positivism is the one epistemology that does not acknowledge the existence or influence of epistemologies" (Hunter 2002, p 130), this leads to a marginalisation of alternative, pluralist, critical, relational, and Indigenous paradigms and knowledge systems, that have different understandings of reliable and rigorous knowledge that are, for example, not based on modernist distinctions between subjects and objects, or that do not use extractivist methodologies (Quijano 2007, Gebara et al. 2023, Massarella et al. 2022). Moreover, science tends to prioritise research on existing phenomena in pursuit of explaining patterns among singular and clearly delineated and objectively observable entities - a situation that has been referred to as "the tyranny of the empirical (Cornish et al. 2016, p 115).

These epistemic inequities matter because the assessed knowledge affects what conclusions can be drawn in the assessment, which, in turn, also shape which options and strategies for action it will present to decision makers. This is one reason why IPBES assessment processes also identify and analyse gaps within existing knowledge. According to IPBES, knowledge gaps refer to "pieces of knowledge, information, or data that are absent or insufficient to fulfil the mandate of the assessment"². These can include research gaps and data gaps and can also refer to knowledge that can be assumed to exist but is not available to assessment experts. However, identifying such knowledge gaps is not a straightforward matter because it involves diverse understandings of knowledge and of why filling gaps matters (Hulme 2018) and this is related to the epistemic inequities we discussed earlier. The identification and analysis of knowledge gaps will inevitably be influenced by the same underlying political, economic and social structures, norms, epistemic biases and assumptions that also shape the available knowledge base. These form the frame in which knowledge gaps can become identifiable as missing pieces of the puzzle in the first place.

¹ We use the phrasing of paradigms and knowledge systems to refer to more or less coherent assemblages of understandings of epistemology, ontology, and methodology. In academic contexts, the term discipline is also commonly used for this. See Filer (2009) on the challenges of defining or categorizing knowledge systems.

² <https://www.ipbes.net/node/38259>

Consequently, the absence of forms of knowledge that do not fit with prevalent framings of what counts as relevant knowledge are less likely to be noticed as knowledge gap.

While this tendency of dominant norms and values to reproduce themselves applies to all processes of knowledge (co-)production and synthesis, the issue of epistemic inequities requires special consideration for a global assessment of transformative change. After all, the knowledge that is needed to support transformative change is knowledge that can challenge and support the supplanting of the status quo. And as the summary for policy makers of the IPBES Global Assessment of Biodiversity and Ecosystem Services already noted, this means that transformative change “can expect opposition from those with interests vested in the status quo” (IPBES 2019, p 16). This statement not only applies for public and private actors in society that have an interest in the status quo and obstruct transformative policies and measures but also applies to knowledge and research systems, institutions and actors. Research funding and priorities tend to reflect and support the interests of powerful societal actors favoured by current structures (Turnhout and Lynch 2024). Dominant actors in science themselves have themselves acted as vested interests opposing the transformation of science and research (Mervis and Pérez Ortega 2024, Lahsen and Turnhout 2021, Caniglia et al. 2021, Horcea Milcu et al. 2024, Fazey et al. 2020, Turnhout and Lahsen 2022). This means that critically important knowledge about and for transformative change including knowledge that challenges the status quo or analyses power relations and vested interests, can be expected to be in a marginalized position compared to research that supports and reproduces dominant structures.

This risk of marginalisation is further reinforced by the specific history and context of Global Environmental Assessments (GEAs). GEAs have historically focused on the natural sciences, and this also holds for the domain of biodiversity and conservation knowledge making. Indeed, despite growing multidisciplinary aspirations and practices, social sciences and humanities and Indigenous and local knowledges remain underrepresented and/or co-opted into and made subservient to dominant, often natural science, problem framings (Winkler Schor et al. 2024, Holmes et al, 2022, Reyes-Garcia and Benyei 2019, Claus 2022). Although IPBES is often claimed to stand out among global environmental science-policy interface organisations for adopting an inclusive understanding of knowledge that goes beyond science, it has struggled to ensure the equitable inclusion of diverse paradigms and knowledge systems (Diaz Reviriego et al. 2019, Stokland et al. 2022).

For these reasons, scholars have argued that developing an assessment of transformative change will require a different approach than is commonly used in global environmental assessments and will need to pay more attention to co-production and reflexivity (Beck and Forsyth 2020), and to the question how IPBES can avoid serving powerful interests that are vested in the status quo (Gustafsson and Hysing 2023). In other words, to fulfil its mandate, the TCA will need to address these epistemic inequities and become an exercise in epistemic justice (Fricker 2007). There are two parts to this. As we noted earlier, there is the challenge of identifying epistemic inequities and reporting on them as part of the assessment work on knowledge gaps. The second challenge concerns process and methodology; the manner and extent to which the process of the assessment has been able to pursue epistemic justice and address or overcome these epistemic inequities.

In this article we, a group of assessment experts³, reflect on these two challenges, to consider whether and how the assessment has been able to address epistemic inequities and has been able to adopt such a different approach. We do this to foster reflexivity and open dialogue about IPBES and the challenges, limitations and opportunities of global environmental assessments and to contribute to ongoing scientific debate about the challenges of epistemic justice in inter and transdisciplinary environmental knowledge practices. We start in section 2 by discussing what gaps and inequities have been identified and presented in the assessment. Section 3 continues with a discussion of the assessment process to examine how and to what extent the assessment has addressed epistemic inequities. By presenting this analysis, we do not wish to undermine the assessment and its conclusions, but we do aim to articulate recommendations that can support the ability of IPBES assessments and other Global Environmental Assessments to tackle epistemic inequities and injustices.

2 Epistemic inequities in the assessment

Each of the chapters of the Transformative Change Assessment was tasked to identify the main knowledge gaps from the synthesis of available knowledge. These gaps are either based on collective expert judgement by the assessment experts, available literature, or specific literature searches in the catalogue OpenAlex⁴. In this section we present the findings of the work on knowledge gaps and present our analysis of epistemic inequities focusing on three main topics: conceptualizing and defining transformative change, power relations, vested interests, and barriers to transformative change, and transformative strategies, approaches, and visions.

2.1 Conceptualizing and defining transformative change

To gain an understanding of epistemic inequities in the literature on nature and environment related to social sciences and alternative paradigms and knowledge systems, we undertook a number of literature searches. Results point to a dominance of natural science concepts and approaches to biodiversity with only a small segment of the literature focusing on policy and governance, transformative change, or using concepts of nature or biodiversity that go beyond species and ecosystems, such as stewardship, mother earth, or conviviality⁵. These findings fit with broader patterns in environmental research. For example, in climate research, it has been estimated that only 0.12 % of total research funding goes to the social sciences (Overland and Savocool 2020). Similarly, research into biodiversity decline has a significant gap in exploring links to human wellbeing (Pires et

³ The authors of the article include review editors, contributing authors, lead authors and coordinating lead authors.

⁴ OpenAlex is a database with global and broad coverage of literature across disciplines, including physical and social sciences, arts and humanities, and grey literature. Assessment experts have searched this catalogue using specific search strings related to biodiversity, transformative change, and other relevant topics. Methodological details can be found in the relevant data management reports of the assessment.

⁵ We found that around 15% of the literature on nature and environment (see <https://zenodo.org/records/14734007>) relates to conservation, policy, management, or governance and around 10% refers to concepts of nature beyond natural science understandings (see <https://zenodo.org/records/12821726>). Finally, we found that around 5% of the literature on nature and environment refers to concepts related to transformative change (see <https://zenodo.org/records/11657982>)

al. 2018). This confirmed that to define transformative change, the assessment, indeed, needed to venture outside the mainstream biodiversity literature.

A second step we took is to develop an understanding of geographic patterns in literature. We noted a geographic imbalance in the literature that is accessible to the assessment via peer-reviewed journal papers. For example, this literature tends to focus on changing societies, policies and governance in the global North and draws exclusively on currently hegemonic concepts of governance and policy, and sustainability while overlooking Indigenous Peoples', and decolonial contexts, perspectives, and knowledge systems, (Jehlicka et al. 2020, Ramcilovic-Suomen et al. 2025). This imbalance was further confirmed by an analysis of six main review articles on transformative change and the articles that are cited in these six articles. The findings show that some regions, such as Africa, Eastern Europe, parts of Asia, as well as small Pacific territories and island states, do not produce any literature on the subject or are completely under the radar of these review articles⁶.

In addition to recognizing these imbalances and inequities, the assessment had the challenge dealing with diversity and fragmentation in the available literature in how transformative change is described. For example, literature on social-ecological transformations is often separate from related literature on social-technical transitions that focuses on technical solutions and specific sectors and such as energy or mobility (Hackmann et al. 2014, Van den Berg et al. 2022). In turn, these two are often disconnected from transdisciplinary or co-production research that aims to directly contribute to change, although this gap is being closed by a growing body of scholarship that connects social-ecological transformations, sustainability and co-production (Moser 2024, Mehta et al. 2025, Chambers et al. 2022). We also noted a lack of connection between local or place-based studies, for example within the social-ecological systems literature, and scholarly fields such as history, political economy or sociology that are often theoretically oriented or focus on macro-level processes of change (Salomaa and Juhola 2020). Each of these bodies of literature comes with strengths and blind spots such as limited attention to power, structural dimensions of transformative change, or context-specific practices (Whitmarsh et al. 2021, Newell et al. 2021, Penca 2023).

A further complicating factor is that the diverse forms of knowledge that are relevant for transformative change draw on different, and sometimes incommensurable paradigms and knowledge systems. They use different conceptions of change, including those that focus on individual and behaviour change, policy or institutional change, structural changes, or changes in worldviews, and values, and they also use multiple and not fully compatible definitions and conceptualizations of such terms. This means that there is no agreement in the available knowledge about when specific documented changes or processes can be considered transformative and why. This plurality of conceptions of transformative change proved to be an important point of tension and contestation during the development of the assessment.

The case studies that are used in the assessment and the case study database that was created are a case in point. The database pulled together evidence related to examples that experts would consider as possible cases of transformative change⁷. However, whether a case could be considered as exhibiting characteristics of transformative change depended heavily not only what theories and concepts were used to understand what constitutes societal transformations and how they unfold,

⁶ See <https://zenodo.org/records/13960959>

⁷ See <https://zenodo.org/records/17366884>

but also on whose and which perspectives are foregrounded in the analysis or documentation of the cases. This resulted in a tension that the assessment experts needed to navigate. The database was created to meet a presumed policy demand for evidence. Yet, the very idea of a database of evidence is rooted in a dominant positivist paradigm that assumes a clearcut distinction between objects and subjects and therefore does not problematize the entanglements between the objects of knowledge and the processes that produce this knowledge. This paradigm stands in tension with alternative, pluralist, critical, relational, and Indigenous paradigms and knowledge systems that are not based on such a distinction. Some assessment experts tried to raise this point and offered critical comments on the database. Drawing on alternative paradigms and knowledge systems, they emphasized the importance of recognizing pluralism, contestation, contingency, and multiplicity not only in transformative change itself (Scoones et al. 2020) but also in expert and scholarly accounts and studies of transformative change. Ultimately, however, a positivist representation prevailed and the assessment presents a database that presents cases as singular empirical phenomena, and as examples of transformative change. In so doing, it not only prioritizes one specific interpretation of these cases but also excludes the possibility that cases, and reality for that matter, are themselves inherently multiple and ambiguous. Thus, this example shows that within the assessment, it was not possible to adopt a pluralist approach that recognizes different and incommensurable paradigms and knowledge systems and the assessment does not reflect on the impossibility of disentangling the reality of transformations from the paradigms and knowledge systems that shape how we know and report on that reality in research and in practice. It, thus, not only faced challenges in representing the plurality of paradigms and knowledge systems related to transformative change but also failed to incorporate pluralism as a paradigm and knowledge system in itself.

In the end, the assessment has pieced together different themes and concepts to develop a definition of transformative change that includes attention to the common underlying root causes of intersecting social and environmental crises, the different theoretical approaches that explain how transformations takes place, the cultural, economic, and political structures, paradigms, and interests that support and justify the destruction of nature and obstruct transformation, and the importance of considerations of justice and equity. At the same time, this definition recognizes that perfect examples of transformative change that align with each of these aspects do not exist, that transformation is a process for which multiple pathways and entry points are possible, and that transformation is inevitably unpredictable and non-linear and requires constant reflection and adaptation.

2.2 Power relations, vested interests, and barriers of transformative change

Several studies demonstrate the role of specific sectors and actors in continued biodiversity loss, including the public sector, the financial sector, energy, agriculture, mining, infrastructure, and the textile industry (Reyes García et al. 2025). Yet, gaps were identified with respect to detailed information about the biodiversity impacts of specific companies and activities within these sectors and the specific biodiversity impacts of government subsidies and other financial instruments. There is agreement in the available knowledge that these sectors and actors benefit from the current system and hold considerable power and form a barrier to transformative change, but studies that demonstrate how exactly these actors and sectors leverage their power and resources to obstruct efforts and actions for sustainability are limited. While literature exists, we noted gaps in knowledge about the strategies and extent of lobbying, spreading misinformation, and greenwashing and their impacts on transformative change. While research on these topics does exist (Forchtner and Lubarda,

2023, Hall et al., 2024, Roberts et al. 2025, Stoddard et al. 2021) there is a lack of studies that explicitly link these topics to biodiversity loss.

Knowledge and value systems are considered as deep leverage points (Abson et al. 2017), which means that addressing these has high potential for catalysing transformative change. Yet, we noted a lack of knowledge about how dominant and powerful forms of knowledge and value systems act as powerful obstacles for transformative change, for example by normalizing and justifying existing power structures or by promoting siloed actions that address symptoms instead of systems. While there is growing attention to the role of science in historical and ongoing processes of colonialism, capitalism, exploitation, and oppression (Quijano 2007, Liboiron 2021, Sultana 2022), this literature remains in the margins and is poorly recognized in biodiversity research and practice.

The assessment concludes that there is convergence in the available knowledge about the underlying causes of biodiversity loss - specifically dominant paradigms and knowledge systems that separate humans from nature and that justify domination and exploitation, the concentration of power and wealth, and the prioritization of short termism and individual material gains. Yet, we noted two critical issues. First, much of the literature that uses terms like underlying causes or indirect drivers is in fact limited to a discussion of direct drivers of biodiversity loss, notably land use change⁸. This shows that the synthesis of literature requires careful engagement with the terms being used in the literature without assuming consistency in how such terms are being interpreted and applied. Second, literature that does discuss underlying causes often does not detail specific biodiversity implications and may focus on issues like climate change, pollution, and social inequities and injustices. Consequently, significant literature focussed on transformation, but from other fields was difficult to identify and include.

The general picture that emerges from our analysis is that studies that address the critical issues of power, obstruction, and the underlying causes of biodiversity loss that are specific for transformative change are underrepresented in the mainstream scientific literature. This mirrors other analyses that have found that critical perspectives that challenge the status quo or address issues politics and power are underrepresented in environmental social sciences (Arora-Jonsson and Wahlström 2023, Rayner 2012, Montana et al. 2025, Theis and Light 2024, Guerrero et al. 2018). This situation constrains the ability of researchers, policy makers, businesses and societal actors to understand and frame the problem of biodiversity loss in its full scope, and their capacity to challenge dominant power relations, interests, paradigms, knowledge systems, values and worldviews.

2.3 Transformative strategies, approaches, and visions

In its work to assess the impacts of existing and possible options for action for biodiversity, the IPBES Global Assessment noted a general gap in knowledge about the biodiversity impacts of existing policies and measures (IPBES 2019). In the Transformative Change Assessment, this gap is even more pronounced when it comes to the transformative impacts and potential of actions and strategies in addressing the underlying causes of biodiversity loss towards a just and sustainable world. For

⁸ A search string in Open Alex to find results that related to underlying causes initially returned 1600 results. However, when assessment experts screened for sources that really addressed underlying causes, only 61 sources remained. See <https://zenodo.org/records/11657982> for full details

example, much of the research on transformative actions and strategies does not report on which underlying causes or barriers they address.

The potential of alternative options and strategies that can catalyse transformative change is understudied and underreported. One reason is that much of the focus of research, policy, and practice is on actions and strategies that actually exist, and these are predominantly those that do not challenge the status quo and threaten vested interests – hence the need for transformative change. For example, there is a lack of knowledge about the transformative potential of the use of legal innovations such as rights of nature and the prohibition of ecocide in international law (but see Banwell et al. 2025). There is also a significant knowledge gap in strategies that can facilitate the termination and abandonment of practices, policies and regulations that are harmful for humans and nature and block transformation, including studies that draw on notions of unmaking, de- or post-growth, hospicing, or abolition (Feola et al. 2021, Kallis et al. 2025, Machado de Oliveira 2021, Myake 2024). Indeed, many of these concepts exist as ways to push back against or refuse and escape from the status quo and, due to prevailing power inequalities and vested interests, they are currently largely being enacted as pockets of resistance rather than broad scale changes.

We also noted knowledge gaps related to the role of specific actors. For example, while there is information on the actions taken by social movements against threats to the environment, their transformative potential is less well documented⁹. Moreover, the roles of these actors were framed in inequitable ways. For example, Indigenous Peoples and local communities were often cast in passive ways, as recipients rather than leaders or agents of transformative change.

There is a lack of knowledge about approaches that can guide processes of transformations and support deep shifts on the level of paradigms, knowledge systems, worldviews and values. These can include Indigenous Peoples' approaches such as Two-Eyed Seeing and Indigenous Storywork (Bartlett et al. 2012), transformative pedagogies (Lotz-Sisitka et al. 2015), and the role of arts-based, collaborative and narrative methods (Montuori 2012, Pereira et al. 2023) and, generally, approaches that centre on justice, accountability, and collective action. While there is convergence in the available knowledge that such methods and approaches are vital, they remain underrepresented in the literature.

Gaps were also identified on the level of the visions of the future. We noted that future visions tend to reflect a simplistic and narrow understanding of justice and sustainability (Bazile and Karuri-Sebina 2025). As such, there is a risk that envisioned futures may be romanticized and ignore the potential burdens and losses involved in transformations (Blythe et al. 2018). Moreover, while it is widely recognized that transformations require the development of visions that offer alternative futures to the present, many future visions do not radically depart from, and even to a significant extent reproduce, the present (Hajer and Oomen 2025) and risk locking us further into unsustainable and colonial systems and structures (Krishnan 2022). This is the case for most quantitative modelling and scenario methodologies that project the future on the bases of trends and existing policies, but also many qualitative approaches tend to limit the exploration of the future to what is deemed plausible or desirable according to dominant paradigms and knowledge systems (Beck and Oomen 2021).

⁹ Only 12% of the literature about actors driving transformative change referred to 'local communities' and 2.1% mentioned Indigenous Peoples, while references to 'business' or 'the scientific community' were much more frequent at approximately 30% (see <https://zenodo.org/records/13862424>)

While there is a surge in effort to carve out space for pluralist, critical, relational, and Indigenous paradigms and knowledge systems in utopian and futures scholarship (Levitas 2013, Cooper 2013, Monticelli 2024, Serafini 2022, Terry et al. 2024, Chambers 2025, Ressiore et al. 2024, Harnesk and Isgren, 2021, Hedrén and Linnér 2009), much of the current work reflects the very biases that transformative change seeks to overcome.

All in all, our analysis of epistemic inequities about transformative strategies, approaches, and visions reveal a strong focus on mainstream policies, dominant actors, and visions and aspirations that reproduce the status quo and serve vested interests.

3 Epistemic justice and the assessment process

The previous section points to two persistent and interrelated patterns in the available knowledge: 1) pluralist, critical, relational, and Indigenous paradigms and knowledge systems are underrepresented compared to positivist paradigms and knowledge systems; and 2) knowledge about aspects that are specific for transformation, such as knowledge about the underlying causes of the biodiversity loss and how to tackle them, knowledge about power relations, and knowledge that challenges the status quo and supports alternatives, is underrepresented compared to knowledge that supports dominant power relations and vested interests and that aligns with their priorities and agendas. Where this literature exists, it often does not mention biodiversity, and this made it difficult to incorporate due to the explicit biodiversity focus in the mandate and scope of the assessment. This analysis of epistemic inequities means that it is critical that the assessment be organised to overcome inequities and pursue epistemic justice. In this section, we reflect on how and to what extent the assessment process has been able achieve this and to what extent it has reproduced or even amplified existing epistemic inequities. We discuss the following topics: the representation of diverse forms of expertise in the assessment, co-production, and the role of consensus and hierarchy.

3.1 The representation of diverse forms of expertise in the assessment team

Since the assessment's primary focus is on transformative change and its cultural, societal, political and economic dimensions, the expert team needed to include a sufficient number of social scientists representing diverse paradigms and knowledge systems. The assessment has been presented as included a comparatively high number of social scientists compared to other GEAs. But this did not mean that there was always a positive attitude towards social sciences and their value has been openly [and](#) publicly questioned. It also does not guarantee sufficient diversity in paradigms and knowledge systems. Specifically, we noted a high representation of a social ecological systems paradigm, including associated notions of common pool resources, natural resource management, ecosystem services, and complex adaptive systems in the assessment team and in the leadership of the assessment. Alternative paradigms and knowledge systems were less well represented in the assessment team and in the leadership of the assessment.

To fill gaps in expertise, IPBES assessments allow for the invitation of contributing authors. Assessment experts are able to request contributing authors to submit texts about specific topics and subsequently, they can use these to complement the assessment chapters. However, it proved to be challenging to attract scholars from smaller fields of scholarship. One reason is that increasing requests to represent their knowledge without addressing marginalisation results in overburdening, something that has often been described in equity, diversity and inclusion initiatives (Ahmed 2012).

All in all, we conclude that despite efforts to enhance diversity, we see that the assessment team reflects a dominance of social ecological systems thinking and an underrepresentation of alternative paradigms and knowledge systems, including pluralist, critical, relational, and Indigenous paradigms and knowledge systems. These patterns in authorship reflect wider structural factors. Historically, the social ecological systems paradigm has a long history in global environmental assessments (Filer 2009). This paradigm has been popularized in the Millenium Assessment and continues to serve as the framework of choice in global environmental assessments that aim to integrate knowledge of natural systems, social systems, and the diverse interactions between them, including in IPBES (Borie and Hulme 2015). This suggests the consolidation of a community of experts that are familiar with these types of assessment processes and are therefore more likely to seek nomination, get selected, and be placed in leadership positions.

3.2 Co-production

It is increasingly recognized that participatory approaches to knowledge production are essential for the uptake and impact of knowledge. These approaches are commonly referred to as co-production—although analysts sometimes differentiate between consulting with diverse stakeholders versus a deeper acknowledgement that researchers’ own tacit values and backgrounds also shape the objectives of research and who is included (Chambers et al. 2022). As was also concluded in an earlier review of IPBES, a co-production approach would be beneficial for the credibility, relevance, and impact of assessments (Stevance et al. 2020). Adopting such a co-production approach is especially relevant for an assessment that aims to support transformative change (Beck and Forsyth 2020, Gustafsson and Hysing 2023) because it can be a vehicle for addressing epistemic inequities particularly in relation to forms of knowledge that are marginalised, or not formalised or written down.

Specifically for Indigenous and local knowledge, IPBES has pioneered a dedicated approach (Hill et al. 2020, McElwee et al. 2020). Key features of this approach include the work of a dedicated taskforce that supports assessment processes and the organisation of dialogues with representatives of Indigenous and local knowledge systems. In the context of the Transformative Change assessment, three dialogues were organised to discuss the assessment and its findings and the results of these dialogues served as input for the assessment¹⁰. These efforts produced mixed results. While the reports that were produced about the dialogues were seen as helpful and they did inform the assessment via the review processes, there were challenges. For example, contributors to the assessment proposed that the process failed to distinguish sufficiently between land-management practices that enhanced biodiversity (such as tilling or forest restoration techniques) from underlying indigenous cosmologies, which could mean that IPBES tended only to include indigenous people when they were engaged in traditional livelihoods. Did this homogenize the categories of Indigenous and local knowledge? Second, contributors pointed to the challenges of including tacit and oral forms of knowledge in written form. The overriding concerns were that these diverse paradigms and knowledge systems might only be represented when co-opted into dominant frameworks (see also Filer, 2009).

There are no comparable processes within IPBES to engage other knowledge holders, such as non-indigenous smallholder farmers, practitioners, artists, and social or youth movements. While these

¹⁰ The reports of these dialogues can be found here: <https://www.ipbes.net/ilk-dialogue-reports>

groups have knowledge or insights into alternative ways of knowing, valuing, and living with biodiversity, they could engage with the transformative change assessment only through the stakeholder dialogues and the external review process. Following the recommendations from the review of IPBES (Stevance et al. 2020), a group of assessment experts took the initiative to explore possibilities, including structured dialogues and co-learning cycles, to facilitate broader and deeper interactions with these knowledge holders from an early stage, and in so doing, stimulate public dialogue, coproduce the assessment, and enhance its legitimacy and impact. However, there were challenges in implementing such approaches and the initiatives were ultimately prohibited and judged to be incompatible with established IPBES procedures.

Finally, aspects of co-production can be identified in the negotiation of the summary for policy makers. However, access to this process is unequal, with government delegations having much stronger rights than other stakeholders. This is an important issue since, as we noted earlier, transformative change by its very nature threatens dominant vested interests. The current power inequalities in the co-production of the summary for policy makers in favour of governments risks the reproduction of these vested interests while marginalising stakeholders that engage in struggle to challenge the status quo and the development of alternatives.

Thus, the Transformative Change Assessment illustrates that significant challenges remain regarding how to centre diverse paradigms and knowledge systems, including those from Indigenous and local knowledge and from societal stakeholders and how to prevent the reproduction of existing power relations between different paradigms and knowledge systems.

3.3 Hierarchy and consensus

The processes of producing the assessment and the summary for policy makers are structured in a hierarchical way. For example, contributing authors contribute to assessment by submitting texts, but they have no direct access to or control over the way in which these inputs are used. A second example is that while lead authors and coordinating lead authors write the chapters of the assessment, only the coordinating lead authors, together with the co-chairs of the assessment, are authors of the summary for policy makers that is derived from the assessment. While the latter is, as far as we know, not a formal rule of IPBES, it is a strong informal rule and practice and in the Transformative Change assessment it was included in the scoping document and strictly implemented.

These hierarchical lines not only define divisions of labour but can also distribute access to information and power. While in itself, this hierarchical process has raised ethical concerns among contributing and lead authors in the Transformative Change assessment, there is also the risk that certain findings from the assessment chapter are filtered out from the summary for policy makers and that certain - in our case positivist and social ecological systems - paradigms and knowledge systems influence what knowledge is and is not included in the summary and how.

These dynamics are also related the role of consensus in the assessment and the lack of space to foreground pluralism and contestation. One example we mentioned earlier is the process of developing the case study database. Despite tensions and various attempts to properly discuss these, the assessment presents a database that presents cases as singular empirical phenomena. Another example we mentioned earlier related to the discussions and contestations about Indigenous and local knowledge where the assessment also ended up privileging specific interpretations while

excluding others. The importance of consensus was also clear in how assessment experts have been discouraged from including an extensive discussion of methodological limitations in the assessment because this was seen as potentially undermining the assessment.

As a result, the assessment has struggled to include knowledge from pluralist, critical, relational, and Indigenous paradigms and knowledge systems included in the assessment and in the summary for policy makers. Especially knowledge that would question the very possibility of singular consensus-based definitions and descriptions of important phenomena related to transformative change - and the singularity of phenomena themselves – proved very challenging to accommodate.

4 Conclusion

As we have discussed in this article, an assessment of transformative change faced the challenge of addressing epistemic inequities and pursuing epistemic justice. We first demonstrated that the available knowledge on which the assessment is based is characterized by stark inequities between dominant natural science and positivist framings, and a general and persistent marginalization of knowledge derived from alternative, pluralist, critical, relational, and Indigenous, paradigms and knowledge systems. As this knowledge is fundamental for transformative change, we also discussed how the assessment has sought to address these epistemic inequities. In terms of representation of diverse paradigms and knowledge systems, we noted that the assessment team partly mirrored the epistemic inequities in the available knowledge. Efforts to enhance diversity through the invitation of contributing authors or enhance legitimacy and relevance by means of co-production have gone some way to address these inequities, especially for the inclusion of Indigenous and local knowledge. However, a prevalence of a positivist systems paradigm, combined with structural features of the assessment process have resulted in the marginalisation of alternative paradigms and knowledge systems and have restricted possibilities for reflexivity and pluralism.

All in all, we see important parallels between the power relations, patterns of marginalisation, and the reinforcement of dominant paradigms and knowledge systems in the knowledge base of the assessment and in the assessment process itself. This is ironic in view of one of the key messages of the Transformative Change Assessment itself. The assessment notes that one of the underlying causes of biodiversity loss is a dominant paradigm that is based on the distinction between people and nature and between subjects and objects. Yet, this same paradigm is also dominant in research and underlies most of the knowledge that has been assessed and that formed the framework for the assessment. Further, while the IPBES Global Assessment (Visseren et al. 2021) concluded that processes of co-production are essential for transformative change, the Transformative Change Assessment was limited in adopting such an approach, its ability to engage a diversity of actors in such efforts, and it ended up privileging existing power relations and interests¹¹. In other words, the assessment has not been able to adopt a truly transformative approach and has itself reproduced a key underlying cause of biodiversity loss.

The issues raised here go beyond this specific assessment and point to the common structural factors that underlie not only the epistemic inequities in the available knowledge used in the assessment

¹¹ Mervis and Pérez Ortega 2024 offer a comparable example of a study about coproduction that did not adopt a co-production approach, resulting in controversy and the termination of the study.

but also the limitations in overcoming them in the assessment process and achieving epistemic justice. As we noted earlier, the wider environmental knowledge landscape that GEAs are situated in and form part of, has been fundamentally shaped by natural science and positivist paradigms that determine what knowledge is and is not produced, what knowledge is seen as relevant and credible, and how knowledge is produced, assessed and synthesized. Particularly relevant here is the belief in the possibility and desirability of the integration of diverse knowledges, and the creation of a singular narrative that presents the scientific consensus that can be identified in GEAs and in many other interdisciplinary and transdisciplinary research projects. Such logics of consensus and integration are known to result in the reduction and co-optation of diversity and the silencing or dismissal of paradigms that challenge dominant positivist paradigms and associated logics (Deutsch et al. 2023, Hulme 2011, Tadaki et al. 2015, Montana et al., 2025) and they stand in tension with pluralism and the acknowledgement of difference and incommensurability (Turnhout and Lahsen 2021, Klenk and Meehan 2015).

The epistemic inequities and injustices discussed in this article result in a persistent unknowing of transformative change through the production of ignorance (Rayner 2012, McGoey 2019). Changing these patterns will need to involve the transformation of funding structures, vested interests, and the norms and values that guide research and shape science policy relations (Maas et al. 2025). Creating an equitable knowledge base is a critical priority and will have to involve fundamental changes in research priorities, funding, and evaluation. Biodiversity focused research funding will need to take steps to enhance the representation of alternative paradigms and knowledge systems, for example by setting quota for participation in inter and transdisciplinary projects and by prioritizing research projects led by alternative, pluralist, critical, relational, and Indigenous paradigms and knowledge systems. More generally, inter- and transdisciplinary collaborations, in research projects as well as in Global Environmental Assessments will need to become more attentive to power inequalities and knowledge hierarchies and prevent the marginalisation, silencing, or coopting of alternative paradigms and knowledge systems.

Specifically for IPBES, the question is what would be needed to transform IPBES into a “transformative agent” (Gustafsson and Hysing 2023). If we would follow the analysis that the assessment itself presents, IPBES would need to address the common underlying causes of epistemic inequities and injustices by challenging dominant paradigms and overcoming the concentration of power and vested interests. What this would imply is that it undertakes further efforts to pursue justice and pluralism by actively dismantling dominant paradigms and knowledge systems, increasing space for reflexivity and pluralism - including plural understandings of biodiversity, knowledge and evidence, and transformative change, and fostering the equitable and just participation of diverse societal actors.

Taking steps in this direction would require changes in several of the informal and formal rules and procedures in IPBES. For one, IPBES can take steps to expand their stakeholder engagement strategy (Stevance et al. 2020) as a way to challenge the concentration of the power. For example, it could grant stronger rights to diverse societal stakeholders in negotiating the scoping document and the summary for policy makers. It could also reconsider the role of hierarchy in the assessment process to ensure fair authorship practices. And it will need to rethink the principle of consensus in the development as well as the negotiation of the assessment and find ways to accommodate difference and incommensurability. While often authority is attributed to global science policy platforms speaking with one voice, the actual contribution of consensus to impact and uptake is questionable

and its role in marginalising paradigms and knowledge systems is difficult to justify. A pluralist approach can potentially enhance the impact of assessments by empowering a diversity of stakeholders (Maas et al. 2021). More generally, assessment processes will benefit from more space for reflexivity and care (Borie et al. 2020, Ressorio et al. 2025). Interdisciplinary and transdisciplinary processes demand considerable time investment and dialogue (Caniglia et al. 2023) and the inclusion of critical social sciences will require dedicated effort and training (Deutsch et al. 2023, Montana et al. 2025). Making progress in this area will mean that the organisation, timing, and pace of the assessment process will need to be reconsidered. While, as we discussed in this section, improving the contribution of knowledge practices to transformative change require changes in the wider research and assessment landscape. Yet, we suggest that IPBES can use its prominent position to show leadership and take significant steps towards the transformation of environmental knowledge.

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Add when accepted: Bennett et al, Stokland et al

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