Chapter 1

Chapter **1**

TRANSFORMATIVE CHANGE AND A SUSTAINABLE WORLD[1]

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Chapter **1**

TRANSFORMATIVE CHANGE AND A SUSTAINABLE WORLD

EXECUTIVE SUMMARY

Chapter 1 describes how biodiversity loss and nature's decline are occurring through multiple interacting crises and emphasizes that transformative change is now both necessary and urgent. The chapter defines transformative change and has a focus on providing a framework for deliberately pursuing transformative change towards a just and sustainable world. To achieve a just and sustainable world, addressing the underlying causes of biodiversity loss and nature's decline is vital. As the first part of the transformative change framework, the chapter therefore identifies and analyzes these underlying causes as deep rooted social and cultural patterns that influence and shape all direct and indirect drivers. In the second part of the framework, the chapter notes how the identified underlying causes are consolidated and perpetuated through the three interwoven dimensions of views, structures and practices and explains how transformative change involves shifts across the breadth of all three of these dimensions. The third and final part of the framework presents principles that the assessment has identified to guide transformative change across all three dimensions of views, structures and practices in ways that address the underlying causes and enable just and sustainable futures. Following the presentation of this framework for understanding and guiding transformative change, the chapter demonstrates how the framework can be operationalized through a rich mosaic of actions at multiple scales and levels, with roles for all. In doing so, it highlights that many existing initiatives have transformative potential that can be realized by developing transformative capacities and engaging more fully in the depth and breadth of transformative change. The chapter closes by outlining the methodology used to create inclusive approaches in this assessment and presents a typology of knowledge gaps relevant to transformative change. While **Chapter 1** synthesizes a framework for understanding and operationalizing transformative change, various visions, theories, approaches, strategies, options and pathways are elaborated in later chapters. These combine to show not only why transformative change is necessary, urgent and challenging, but also how it is still possible.

1 Biodiversity loss and nature's decline are occurring through multiple interacting crises that are amplifying one another in ways that significantly enhance and accelerate the associated impacts. Action to address these interacting crises is both necessary and urgent *(well established)* {1.1, 1.2.1}. Humanity is currently facing multiple interconnected and accelerating global environmental challenges and crises, including biodiversity loss, climate change and pollution {1.2.1}. Interlinkages between social and ecological systems, and the increased global interconnectedness of different societies and economies mean that a crisis in one system or sector can trigger or have cascading effects in others {1.2.1}. This entanglement of crises — increasingly referred to as a "polycrisis" — significantly increases the dangers to people and nature and points to the need and urgency of handling the different crises in a combined manner {1.1, 1.2.1}. The failure to halt and reverse biodiversity loss and nature's decline resulting from these multiple interacting crises is creating unacceptably high economic and non-economic costs, undermining the richness of social, cultural and spiritual life, and posing serious threats to human survival {1.2.1}. Action is not only necessary, but also increasingly urgent as several biophysical tipping points are now being rapidly approached and the current rate of biodiversity loss within both terrestrial and marine ecosystems is projected to result in the rapid decline and possible collapse of key ecosystem functions {1.2.1}. There is a closing window of opportunity to take action to halt and reverse biodiversity loss, meet global sustainability goals and secure well-being for all {1.2.1}. In terms of economic costs, delaying action to halt and reverse biodiversity loss globally by ten years is estimated to be twice as expensive as immediate action {1.2.1}. A wide range of actors spanning intergovernmental organizations, civil society, the private sector, the scientific community and citizens are emphasizing the magnitude of the situation, highlighting the urgency for action, taking various initiatives and calling for transformative change to address the multiple interacting crises {1.1, 1.2, 1.4.2}.

2 Current actions for conservation, restoration and sustainable use have not been able to halt and reverse global trends in biodiversity loss and in many cases, have further entrenched existing problems because they have not addressed the underlying causes of biodiversity loss and nature's decline *(well established)* {1.2}. Loss of biodiversity continues despite an increased number of multilateral agreements to conserve the environment, engaging almost all countries {1.2.1}. Although they create more positive outcomes than taking no action, current

measures have been insufficient to halt or reverse global trends of biodiversity loss {1.2.3}. Implementation of multilateral environmental agreements has been low and current agreements fail to address the underlying causes of biodiversity loss and nature's decline {1.2.2, 1.2.3}. For example, protected areas, which have been the cornerstone of biodiversity conservation policy, have had some successes in addressing direct drivers of biodiversity loss, but have been hindered by inadequate financing, ineffective management and by not directly targeting the underlying causes of biodiversity loss {1.2.3}. In some cases, protected areas have actually had negative effects on equity and justice, reinforcing indirect drivers of nature's decline {1.2.3}. Most other common approaches to reverse the decline of biodiversity, such as voluntary measures to stimulate sustainable consumption and production, also focus either solely on direct drivers and the mitigation of their impacts, or on technical fixes and innovations that attempt to reform rather than transform existing systems {1.2.3}. Despite calls for transformative change, powerful actors that benefit from the status quo are mobilizing resources to protect their vested interests {1.2.1, 1.2.2, 1.2.3}. Indicative of this is the use of force and violence against civilians, activists and environmental defenders fighting environmentally destructive activities related to deforestation, dam building or mining, and journalists covering such conflicts {1.2.2}. Research shows that the impact of actions and scale of resources devoted to blocking transformative change currently overshadow those devoted to the conservation and sustainable use of biodiversity {1.2.1, 1.2.2, 1.2.3}. Transformative change for a just and sustainable world will be achieved through addressing the underlying causes of the global polycrisis that are enabling the ongoing destruction and exploitation of nature {1.2.1, 1.2.2, 1.2.3}.

3 Underlying causes of biodiversity loss and nature's decline identified by this assessment are: i) disconnection from and domination over nature and people, ii) concentration of power and wealth, and iii) prioritization of short-term, individual and material gains *(well established)* {1.2, 1.3.2}.

These underlying causes have co-evolved and continue to reinforce each other to have far-reaching and systemic impacts by creating and enforcing multiple direct and indirect drivers of biodiversity loss and nature's decline {1.2.2}. Destruction of nature has been enabled by a dominant world view that views humanity as separate from and superior to nature, and considers nature as isolated entities, objects, or resources for exploitation {1.2.2, 1.3.2}. This worldview is at odds with the holistic perspectives of many Indigenous and relational world views, among others {1.2.2, 1.3.2}. It continues to justify not only the exploitation of nature, but also of people (e.g., along lines of gender, race, caste, ethnicity or ability), often to create the labour force or consumer base necessary for large-scale exploitation of nature {1.2.1, 1.2.2, 1.2.3}. This view has deep historical roots in colonialism and continues to be expressed through extractive growth-driven economies {1.2.2}. While economic activities supported by this world view have advanced economic growth and well-being in many areas, they have also resulted in biodiversity loss and nature's decline, as well as inequities and the concentration of power and wealth within and between countries {1.2.2}. A small portion of the global population has reaped the majority of the benefits of economic growth while a large and increasing portion of people has long borne many of the negative consequences {1.2.1, 1.2.2, 1.2.3}. This unequal distribution of power and wealth is kept in place by consistent prioritization of short-term, individual and material gains, particularly by dominant actors {1.2.1, 1.2.2, 1.2.3}. Short-term thinking is culturally learnt, evident in business reporting and political cycles and perpetuated through an economic and societal system that measures progress primarily as growth in Gross Domestic Product, frames satisfaction or happiness in terms of accumulation of material possessions and considers humans to primarily operate as benefit maximizing individuals {1.2.1, 1.2.2, 1.2.3}.

4 Transformative change occurs through fundamental system-wide shifts across views, structures, and practices *(well established)* {1.1, 1.3.1, 1.4}.

Transformative change is characterized by fundamental shifts across three dimensions: views (ways of seeing, thinking and knowing), structures (ways of organizing, regulating and governing), and practices (ways of doing, behaving and relating) {1.3.1}. Each of these dimensions provides entry points for change. However, fundamental system-wide shifts occur when there are changes across all three dimensions in an integrated manner {1.3.1}. Since these three dimensions are interwoven and affect each other, significant changes in one dimension have the potential to create knock-on changes in the others {1.3.1}. Due to their interconnections, changes in one dimension can also be constrained by what is happening in the other dimensions (e.g., practices being constrained by structures) {1.3.1, 1.4}. Actively working across all three dimensions increases the likelihood of transformative change {1.3.1, 1.4}. The terms 'transitions' and 'transformations' are often used interchangeably to refer to processes of transformative change but are not necessarily the same. Transitions often refers to orderly shifts in specific sectors, systems or locations towards agreed upon ends through existing structures, whereas transformations refer to broader and deeper societal shifts taking place across multiple systems, with widespread acknowledgement of indeterminacy and emergence as key elements of change processes within complex systems. This means that complete prediction and control of fundamental system-wide shifts is not possible and therefore that ongoing evaluation, learning and adaptation of both plans and

actions are necessary to ensure that changes continue to advance agreed goals and that any unintended negative impacts are addressed {1.1}.

5 Deliberate transformative change for a just and sustainable world addresses the underlying causes of biodiversity loss and nature's decline guided by four principles: i) equity and justice, ii) pluralism and inclusion, iii) respectful and reciprocal human-nature relationships, and iv) adaptive learning and action *(well established)* {1.2, 1.2.2, 1.3.2, 1.5}.

The assessment of diverse bodies of knowledge found these four normative and procedural principles consistently emphasized as crucial for directly addressing the underlying causes of biodiversity loss and nature's decline and characteristic of deliberate transformative change in pursuit of a just and sustainable world. The interdependent relationships between sustainability and justice are widely recognized, including in many multilateral environmental agreements and commitments {1.2, 1.3.2}. Both the 2050 Vision for Biodiversity and the 2030 Agenda for Sustainable Development and its Sustainable Development Goals acknowledge a commitment to equity and justice, which is critical for effectively countering the underlying causes 'disconnection from and domination over nature and people' and 'concentration of power and wealth' {1.3.2}. The principle of pluralism and inclusion works to ensure that transformative change engages diverse actors, visions and world views in ways that respect differences and remain open to ongoing contestation and renegotiation {1.3.2}. This principle is important to counter structural barriers that continue to marginalize certain actors, world views, and types of knowledge {1.3.2, 1.2.2, 1.5}. Respectful and reciprocal human-nature relationships acknowledge human-nature connectedness and the extensive damage done by objectification, domination and exploitation {1.3.2, 1.2.2}. This principle counters the underlying causes 'prioritization of short-term, individual and material gains' and 'disconnection from and domination over nature and people' {1.3.2, 1.2.2}. Furthermore, since transformative change is a dynamic and emergent process, adaptive learning and action are necessary to respond to unfolding impacts, mitigate unintended consequences and continuously attend to the principles throughout the unfolding changes {1.3.2}.

6 There is significant potential to realize transformative change for a just and sustainable world by creating synergies between initiatives across multiple sectors, scales and levels and encouraging actions to work across views, structures and practices in ways that promote all four principles *(established but incomplete)* {1.3, 1.4.3}.

Many initiatives aim to contribute to transformative change for a just and sustainable world {1.4.3}. These can further develop and grow to realize their full transformative potential {1.4.3}. Transformative potential is a latent quality, characteristic or ability for realizing fundamental, system-wide shifts across views, structures and practices to address the underlying causes of biodiversity loss and nature's decline {1.4.3}. Realizing the potential for global scale transformative change that effectively addresses the underlying causes of biodiversity loss and nature's decline will involve diverse initiatives across all sectors, scales and levels {1.4.1}. It is particularly important to bridge the gap between initiatives that operate in specific sectors or at local levels with those that address systems-wide conditions and broader geopolitical, macroeconomic and social-cultural paradigms {1.2.1, 1.4.1, 1.5}. All initiatives can amplify and accelerate transformative change by focusing on addressing underlying causes of biodiversity loss and nature's decline and strategically working across views, structures and practices in ways that embody and promote the four principles of transformative change for a just and sustainable world {1.4.3}.

7 All actors can contribute to transformative change for a just and sustainable world in a diversity of roles, recognizing varying resources, capacities and spheres of influence as well as the need to take cooperative and coordinated action at a global scale *(well established)* {1.2.2, 1.3.2, 1.4.2}.

There are roles for all actors to contribute to transformative change for a just and sustainable world. This includes actors within local communities and broader civil society, governments at all levels, the private sector, science, education and the media. {1.4.2}. While it is crucial to recognize different national circumstances and resources, the evidence assessed also highlights the importance of taking cooperative and coordinated action at a global scale to create transformative change {1.2.2, 1.3.2, 1.4.2}. As they occupy positions of authority and power, many actors in governmental and private sectors have the potential to either block or incentivize and unlock possibilities for cascading transformative changes across different problems, sectors and levels {1.4.2}. Individuals with high levels of wealth also have significant potential and power to shift direction and create influential impacts, e.g., through directly reducing their significant environmental impacts, inspiring change in others and shifting investments away from high-impact activities {1.4.2}. Those with power and wealth have additional responsibilities for engaging in and enabling transformative change {1.2.1, 1.4.2}. However, everyone can play an important role in creating transformative change for a just and sustainable world. The transformative change assessment case study database (hereinafter referred to as "case study database"[2]) shows a broad range of actors undertaking diverse actions and initiatives to advance transformative change. Diverse roles

2. Case study database with transformative potential and pitfalls (https://doi.org/10.5281/zenodo.10260233).

include: innovating and creating change (e.g., creating social innovations); adopting and following change (e.g., changing behaviours); raising awareness about needs and possibilities for change (e.g., through outreach and education); unlocking change (changing regulations or business policies) and; influencing powerful actors to create change (e.g., campaigning or participating in social movements) {1.4.2}. Everyone can mobilize across these different roles depending on personal and professional opportunities and capacities {1.4.2}.

8 Transformative change for a just and sustainable world is necessary, urgent and challenging, but possible *(established but incomplete)* {1.2, 1.3, 1.4, 1.5}.

Many actors are already working to create transformative change for a just and sustainable world through actions and initiatives within their own spheres of influence {1.4.3}. A rich mosaic of actions at multiple scales and levels that engage with views, structures and practices, and embody the principles of transformative change for a just and sustainable world is emerging {1.3, 1.4}. Current initiatives illustrate the possibility of transformative change and can act as examples that inspire and stimulate much broader actions {1.4.3}. Change can be further supported by actors making use of those possibilities and taking responsibility to unlock changes for others at broader scales {1.2, 1.4.3}. It can also be supported by working across knowledge communities to understand visions, challenges and strategies for creating transformative change {1.5}. Realizing the full potential for transformative change will involve the cultivation of transformative capacities {1.4.3}. Transformative capacities are the knowledge, skills and attitudes necessary to realize transformative change, which are described throughout the chapters of this assessment. Through the description of relevant frameworks, visions, approaches, challenges, strategies, options and pathways, together with examples of how these can be implemented and addressed through practical initiatives and actions, this assessment describes not only why transformative change is necessary, urgent, and challenging, but also how it is still possible {1.1, 1.4.3}.

1.1 INTRODUCTION

The current magnitude of global sustainability crises has been established by a number of scientific assessments (Dasgupta, 2021; IPBES, 2019a, 2022a; IPCC, 2022; Pörtner, Scholes, *et al.*, 2021) and led to increasing calls for "transformative change" by a wide range of international organizations, both governmental and non-governmental (CBD, 2022a; Dasgupta, 2021; IPBES, 2019a, 2022a; IPCC, 2022; Pörtner, Scholes, *et al.*, 2021; The Nature Conservancy, 2020; The Ocean Panel, 2020; UN Environment, 2019; UNEP, 2021; United Nations Department of Economic and Social Affairs, 2023; WBCSD, 2021; WEF, 2020a; WWF, 2020) (see **Annex 1.1** for an expanded list of calls by intergovernmental, private and civil society actors)[3].

Building on previous work within IPBES, this assessment works to further clarify and specify the theory and practice[3] of transformative change. This assessment defines transformative change as "fundamental system-wide shifts across views[3], structures[3] and practices". The IPBES Global Assessment of Biodiversity and Ecosystem Services defined transformative change as "a fundamental, system-wide reorganization across technological, economic and social factors, including paradigms[3], goals and values" (IPBES, 2019a), which has been captured and condensed in the current assessment's definition. The IPBES Values Assessment (IPBES, 2022a) noted the importance of depth (addressing underlying causes of environmental change), breadth (changes occurring across multiple spheres of society) and dynamics (emergent non-linear pathways and patterns of change). This assessment expands on this to specify the underlying causes[3] of environmental change **(Section 1.2)**, clarify the breadth of social dimensions across which transformative change takes place **(Section 1.3.1)**, and elaborate on principles[3] to guide transformative change in the context of emergent and non-linear dynamics **(Section 1.3.2)**. The IPBES Invasive Alien Species Assessment underlined the importance of governance approaches that promote transformative change to prevent and control biological invasions (IPBES, 2024) and governance approaches that promote transformative change are further described in this assessment. The present assessment highlights a distinction between a general definition of transformative change and the characterizing features of transformative change for achieving the 2050 Vision for Biodiversity, the 2030 Agenda for Sustainable Development and its Sustainable Development Goals[3], and related sustainability objectives[3]. While the breadth and dynamics aspects highlighted by the IPBES Values Assessment are relevant to all forms of transformative change (i.e., deliberate and emerging, intentional and unintentional), the current assessment revealed that addressing the underlying causes of environmental change as part of the fundamental reorganization is especially important for transformative change that is deliberate and in purposeful pursuit of global sustainability objectives.

The assessment covers a wide range of disciplines and ways of knowing. There are multiple perspectives through which to understand and enact transformative change and their diverse insights help explain its multi-layered and multi-dimensional nature (Bulkeley *et al.*, 2023; Loorbach *et al.*, 2017; B. Moore *et al.*, 2021; M.-L. Moore *et al.*, 2018;

3. See glossary (https://doi.org/10.5281/zenodo.11382223).

Raven *et al.*, 2012; Scoones *et al.*, 2020). While some use the labels transformations or transitions[3] explicitly (**Box 1.1** regarding this distinction), much is to be gained from fields of knowledge that may not use these specific terms. This includes understandings of Indigenous Peoples and local communities[3], research in disciplines such as economics, social psychology, political ecology, science and technology[3] studies, environmental philosophy and empirical examples combining different knowledge forms[4]. To uncover shared understandings about transformative change and how it can be deliberately pursued to achieve global sustainability objectives, the importance of and process for creating fundamental system-wide shifts were assessed across a broad range of disciplines and knowledge communities (see **Section 1.5**). To provide a roadmap of the assessment, an extended summary of **Chapter 1** and brief overviews of the following chapters are presented below, together with a roadmap in two visual forms.

Chapter 1 of this assessment presents a framework for understanding and deliberately pursuing transformative change for a just and sustainable world. The chapter starts by highlighting the necessity and urgency of transformative change to address the underlying causes of biodiversity loss and nature's decline[5] **(Section 1.2)**. The first part of the framework identifies these underlying causes as: i) disconnection from and domination over nature and people, ii) concentration of power and wealth and iii) prioritization of short-term, individual and material gains **(Section 1.2.2)**. The second part of the framework describes how transformative change involves fundamental system-wide shifts across three dimensions — views, structures, and practices[4] **(Section 1.3.1)** — and how shifts across the breadth of all these interconnected dimensions are important to effectively address the underlying causes of biodiversity loss and nature's decline. The third part of the framework presents principles identified by the assessment as important for guiding deliberate efforts towards transformative change across all three dimensions in ways that address the underlying causes of biodiversity loss and nature's decline. The identified principles to ground and guide transformative change towards just[3] and sustainable futures are: equity[3] and justice[3]; pluralism[3] and inclusion; respectful and reciprocal human-nature relationships; adaptive learning[3] and action[3] **(Section 1.3.2)**. Given the global scale of the underlying causes, **Chapter 1** underscores that deliberate transformative change for just and sustainable futures will occur through many different initiatives across multiple sectors, scales and levels[4] **(Section 1.4.1)**. This creates opportunities and roles for all to act within their own spheres of influence[3] **(Section 1.4.2)**. The chapter demonstrates that there are already many case study examples of initiatives seeking to advance transformative change for global sustainability. Often these initiatives have transformative potential[3] that can be further developed and realized by expanding the extent to which they engage all the dimensions and principles of transformative change[3] **(Section 1.4)**. The chapter closes by outlining the method used in this assessment and identifies knowledge gaps that could be addressed to further support transformative change for a just and sustainable world[6] **(Section 1.5)**.

Chapter 2: "Visions of a sustainable world – for nature and people" highlights the importance of visions[3] for achieving transformative change and explores plural visions of sustainable and just futures that can motivate and orient transformative change initiatives. The chapter identifies an imagination gap concerning just and sustainable futures and places particular emphasis on the importance of engaging multiple perspectives, voices and stakeholders[3] in collaborative visioning processes[3] as powerful enablers of transformative change.

Chapter 3: "How transformative change occurs" assesses different theories and approaches about transformative change to highlight how it can be promoted, accelerated and scaled to realize the visions described in **Chapter 2** for achieving global sustainability. It specifically analyzes how different theories approach the task of shifting views, structures and practices, and highlights both the synergies[3] and trade-offs that exist in processes of fundamental system-wide change.

Chapter 4: "Overcoming the challenges of achieving transformative change for a sustainable world" builds on insights from **Chapter 3** and examines why transformative change has not already happened. The chapter identifies five persistent and pervasive challenges[3] that impede deliberate transformative change (including political, social and economic inequalities) and outlines approaches to overcome them.

Chapter 5: "Realizing a sustainable world for nature and people: means for transformative strategies[3], actions and roles for all" operationalizes ways to overcome the challenges identified by **Chapter 4**. It identifies five key strategies and a range of options and actions available to achieve diverse visions for a just and sustainable world. This includes context-specific options[3] and actions that different actor groups[3] use to foster and catalyze change across different pathways[3] to shift views, structures and practices in ways that address underlying causes of biodiversity and nature's decline and realize global sustainability objectives.

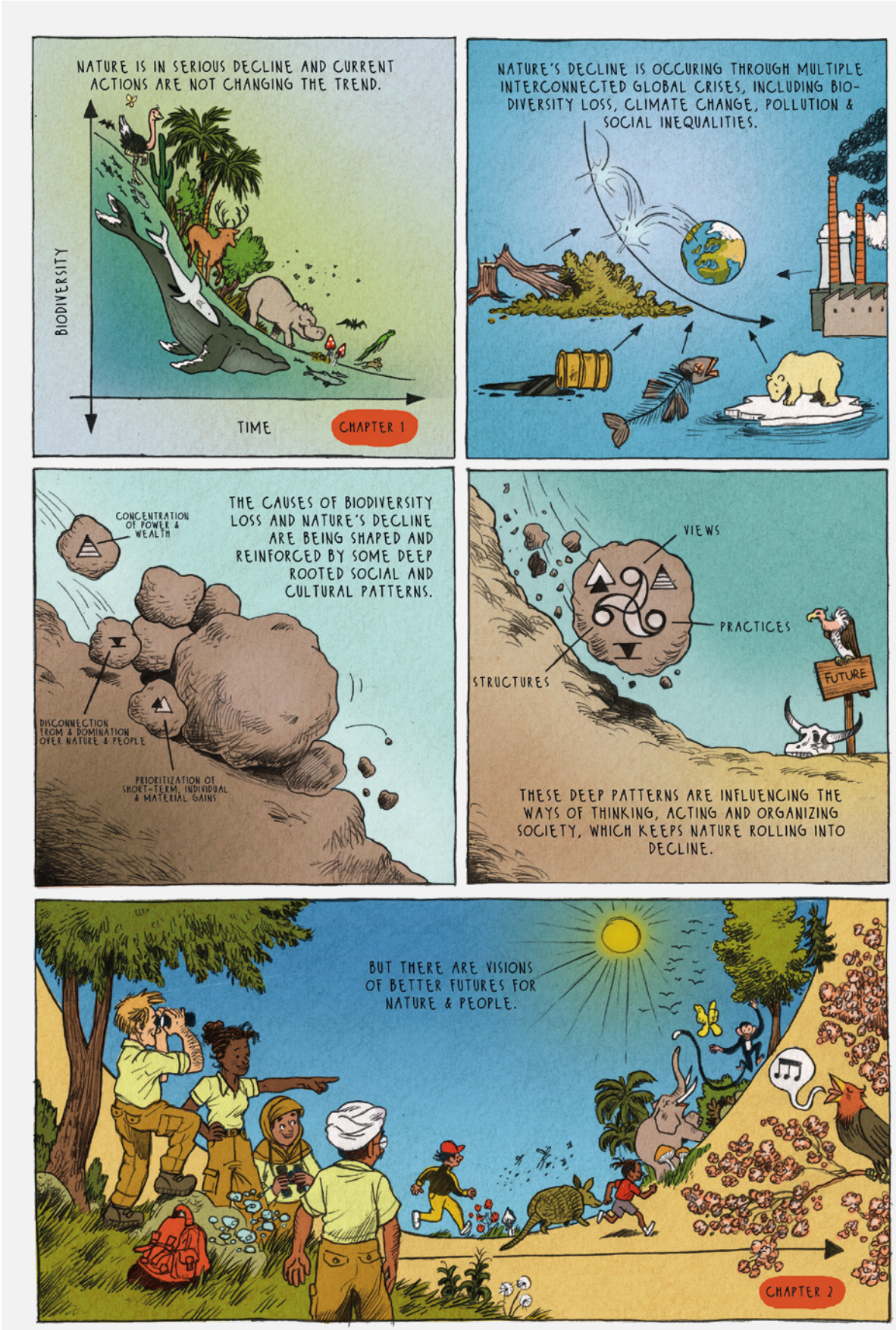
4. Analysis of contributions on what transformative change is according to different communities of knowledge (https://doi.org/10.5281/zenodo.10246572).

5. Literature review of the underlying causes of biodiversity loss (https://doi.org/10.5281/zenodo.11657981).

6. Knowledge gaps analysis (https://doi.org/10.5281/zenodo.11657377).

Figure 1 1 **Roadmap of the transformative change assessment in graphic form.**

The transformative change framework presented in **Chapter 1** and used throughout the assessment appears in the centre of the roadmap. In this image, the outer grey ring represents the underlying causes of biodiversity loss and nature's decline identified by the assessment, which is the first part of the framework. The three icons along the grey ring represent the three identified underlying causes **(Section 1.2.2)**. The second part of the framework appears in the golden spirals of the inner ring, which communicates how transformative change involves shifts across the three interconnected dimensions of views, structures and practices **(Section 1.3.1)**. The third part of the framework reflects the principles which the assessment has identified for guiding transformative change across all three dimensions in ways that can address the underlying causes and enable just and sustainable futures. These principles are represented by the icons along the middle blue ring **(Section 1.3.2)**.


NATURE IS IN SERIOUS DECLINE AND CURRENT ACTIONS ARE NOT CHANGING THE TREND.
BIODIVERSITY
TIME
CHAPTER 1
NATURE'S DECLINE IS OCCURING THROUGH MULTIPLE INTERCONNECTED GLOBAL CRISES, INCLUDING BIO-DIVERSITY LOSS, CLIMATE CHANGE, POLLUTION & SOCIAL INEQUALITIES.
THE CAUSES OF BIODIVERSITY LOSS AND NATURE'S DECLINE ARE BEING SHAPED AND REINFORCED BY SOME DEEP ROOTED SOCIAL AND CULTURAL PATTERNS.
CONCENTRATION OF POWER & WEALTH
DISCONNECTION FROM & DOMINATION OVER NATURE & PEOPLE
PRIORITIZATION OF SHORT-TERM, INDIVIDUAL & MATERIAL GAINS
VIEWS
PRACTICES
STRUCTURES
FUTURE
THESE DEEP PATTERNS ARE INFLUENCING THE WAYS OF THINKING, ACTING AND ORGANIZING SOCIETY, WHICH KEEPS NATURE ROLLING INTO DECLINE.
BUT THERE ARE VISIONS OF BETTER FUTURES FOR NATURE & PEOPLE.
CHAPTER 2

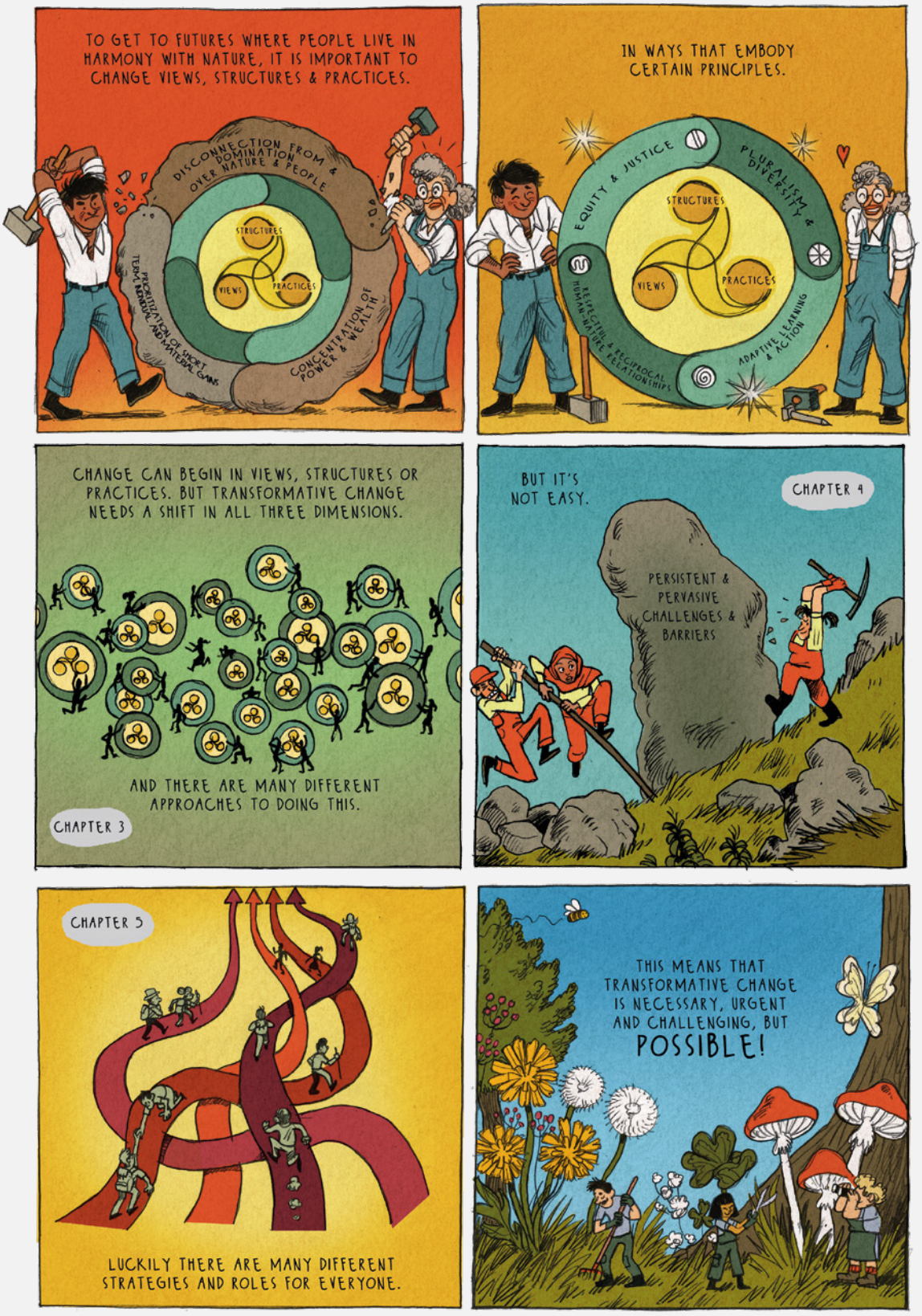


Figure 1 2 **Roadmap of the transformative change assessment in comic form.**

Developed for this assessment by Michaël Olbrechts.

Box 1 1 **Recurring questions regarding transformative change.**

Is this assessment interested in all forms of transformative change?

The mandate of this assessment is to focus on transformative change in relation to biodiversity and nature's contributions to people[3]. Specifically, it refers to how transformative change can help achieve the 2050 Vision for Biodiversity, the Sustainable Development Goals and other global sustainability objectives. Although fundamental system-wide reorganization has occurred in the past and can arise as an unintentional result of sudden shocks or breakdown, this assessment focuses on transformative change in the form of deliberate efforts to create fundamental, system-wide shifts to achieve global biodiversity and sustainability objectives that support all life on Earth.

Is transformative change a process or an outcome?

Transformative change may be both. However, it is not a singularly pre-defined outcome and involves a dynamic process of unfolding changes that people engage with and co-creatively bring into being over time. Taking place within and through complex adaptive systems, transformative change outcomes are inevitably emergent and cannot be directly determined or controlled with certainty. Processes of deliberate transformative change oriented towards visions of just and sustainable futures involve an ongoing commitment to adaptive learning and action to mitigate unintended consequences and unexpected outcomes **(Section 1.3)**.

Can incremental shifts be transformative?

It can be misleading to think of change as being either incremental or transformative in a simple binary sense. Transformative change will inevitably take place over time through various changes across multiple sectors, scales and levels, and seemingly small changes can inspire or influence more systemic shifts. Deliberate transformative change pays more attention to the type, quality and directionality of a change, rather than to its size or temporal or spatial scale alone. If a small shift works to reform existing systems but does not target underlying causes or integrate shifts across views, structures and practices, it is unlikely to be transformative. In contrast, a small change representing a radical reorientation of existing views, structures or practices that addresses underlying causes is part of the process of transformative change **(Section 1.4)**.

What is the relationship between transitions and transformations?

The terms 'transitions' and 'transformations'[3] are often used interchangeably to refer to processes of change towards sustainability (Hölscher *et al.*, 2018; B. Moore *et al.*, 2021). There is, however, considerable debate as to whether transitions and transformations are the same thing and recognition that they are not mutually exclusive. There is, for example, one framing in which transitions refers to shifts within specific sectors and systems (e.g., the energy system) or locations (city transitions), whereas transformations refers to broader societal shifts that unlock change across multiple systems (Hackmann *et al.*, 2014; IPCC, 2022). There is also a framing in which transitions describes orderly change towards an agreed upon end occurring through existing structures (often focused on technical knowledge and innovation), while transformations is used for processes of change that explicitly challenge existing structures, acknowledge uncertainty and emergence, and often include a focus on more social forms of knowledge and innovation (including tacit and embodied knowledges) (Stirling, 2015).

1.2 TRANSFORMATIVE CHANGE IS NECESSARY AND URGENT

1.2.1 Nature's decline is accelerating through multiple interacting crises

Humanity is utterly dependent on nature and yet, human activities are undermining the health and well-being of the living world at unprecedented levels (Richardson *et al.*, 2023; Rockström *et al.*, 2009; Steffen, Richardson, *et al.*, 2015). The resulting decline in nature affects human health and safety by undermining the provision of physical requirements essential for survival (e.g., food, fresh water, fuel or fiber) and disrupting regulating and material contributions vital for functional ecosystems (e.g., nutrient cycling and flood regulation) (IPBES, 2022c).

Biodiversity loss and nature's decline have also been shown to exacerbate poverty and limit development (Roe *et al.*, 2019). Over the past 50 years, biodiversity loss and nature's decline have been occurring at an increasingly rapid rate. The global rate of species extinction is already at least tens to hundreds of times higher than the average rate over the past 10 million years and is accelerating (IPBES, 2019a). The current rates of losses within both terrestrial and marine ecosystems are projected to result in the rapid decline and possible collapse of key ecosystem functions, with serious repercussions for the global economy and human well-being (IPBES, 2019a; Ripple *et al.*, 2017; Swilling *et al.*, 2018). Humans are also altering the climate at an accelerating pace and in ways that exacerbate other threats to biodiversity and risk rendering parts of the planet uninhabitable for humanity (IPCC, 2022).

Biodiversity loss and nature's decline are anticipated to continue accelerating without direct and immediate

actions to halt and reverse them (UNEP, 2021; United Nations Department of Economic and Social Affairs, 2023). In addition to posing threats to human survival and development, the loss of biodiversity and the decline in nature seriously undermine the richness of social, cultural and spiritual life (Díaz *et al.*, 2015, 2018; Kosanic & Petzold, 2020; MEA, 2005). Opportunities for inspiration, education and recreation are being lost, as well as important contributions to sense of place, cultural diversity and religious or spiritual values, all of which give a meaning to life beyond mere survival. Quantifying the provision of these types of non-material contributions from nature, or cultural ecosystem services, is difficult and has received less attention than deserved (Costanza *et al.*, 2017; Daniel *et al.*, 2012; Kosanic & Petzold, 2020; Plieninger *et al.*, 2013; Small *et al.*, 2017). This does not, however, make their loss any less significant or serious.

The high economic costs of inaction and risks associated with failure to address biodiversity loss at a global scale are recognized (Dasgupta, 2021; Green Finance Institute, 2024; World Economic Forum, 2020a). More than half of the global Gross Domestic Product (55% of global Gross Domestic Product – equivalent to about $58 trillion) is moderately to highly dependent on nature (Evison *et al.*, 2023). Humans derive more than $100 trillion of value from natural ecosystems annually (World Economic Forum, 2020b). The global biodiversity financing gap, a measure of the gap between the total annual amount of capital currently flowing towards global biodiversity conservation and the total amount of funds needed to sustainably manage biodiversity and maintain ecosystem integrity, is estimated at between $598–$824 billion per year (Deutz *et al.*, 2020). Restoration and regeneration efforts will take even greater investments, likely exceeding one trillion dollars annually considering the scale of recent country and system specific estimates (Aubert *et al.*, 2022; Brancalion *et al.*, 2019; Löf *et al.*, 2019). While large, this sum is placed in better perspective when considering global subsidies for fossil fuels. In 2015 these are estimated as being nearly $6 trillion including direct subsidies and the costs of environmental externalities generated by the sector (Coady *et al.*, 2017). Further, global public explicit subsidies to sectors directly driving nature's decline ranged within $1.4 and $3.3 trillion for 2022, depending on the source (Dasgupta, 2021) (see **Chapter 5** for elaboration on economic costs and subsidies). The restoration economy already employs more people than the coal, mining, logging and steel industries combined (BenDor *et al.*, 2015) and transformative change provides opportunities for greater revenue generation as investments in nature can yield significant returns, with recent estimates suggesting that a nature-based economy could generate over $10 trillion in business value and create 395 million jobs globally by 2030 (WEF, 2020).

The world is currently facing multiple interacting and accelerating global environmental challenges and crises, including biodiversity loss, climate change[3] and pollution (Barnosky *et al.*, 2011; Díaz *et al.*, 2018; Horton & Lo, 2015; IPBES, 2019a; IPCC, 2022; Kosanic & Petzold, 2020; Rockström *et al.*, 2009; Steffen, Broadgate, *et al.*, 2015; UNEP, 2021). The term "polycrisis"[3] emerged in the late 1990s (Morin & Kern, 1999) and is used to refer to situations of interacting crises with compounding effects across multiple systems (Homer-Dixon *et al.*, 2021; Lawrence *et al.*, 2024; Swilling, 2013; Tooze, 2022; UNEP, 2024). This term recognizes the potential for crises to amplify and accelerate one another in ways that produce harms far worse than any one in isolation. The terms polycrisis and global polycrisis are increasingly used by scholars, policymakers and international agencies as a way to advance awareness not just of the nature and significance of the challenges being faced, but also of the importance and value of addressing interacting crises as a whole (Lawrence *et al.*, 2024). Global sustainability crises have been noted to share common underlying political, economic and cultural causes (Swilling, 2013).

Many high-level scientific assessments and international organizations addressing this polycrisis or components therein have concluded that transformative change is now urgent to address the scope and scale of sustainability challenges **(Annex 1.1)** (IPBES, 2019a; IPCC, 2022; Pörtner, Scholes, *et al.*, 2021; The Ocean Panel, 2020; UNEP, 2019; UNEP, 2021). The IPBES Global Assessment (2019a) concluded that "urgent and concerted efforts fostering transformative change" are necessary in order to meet global societal goals including those related to nature. Such urgency is based on the speed at which biodiversity loss and nature's decline are occurring (Díaz *et al.*, 2018). The IPCC Sixth Assessment Report (2023) also highlights a "rapidly closing window of opportunity to secure a liveable and sustainable future for all". Importantly, surpassing thresholds in either climate change or biodiversity loss can trigger biophysical tipping points, prompting uncontrolled and sudden shifts that feedback onto one another (Pörtner, Scholes, *et al.*, 2021). Several irreversible tipping points[3] are rapidly approaching (e.g., die-off of low latitude coral reefs, Amazon rainforest destabilization, collapse of the Atlantic meridional overturning circulation and loss of the Greenland and West Antarctic ice sheets), creating possibilities of reinforcing feed-back loops and cascading negative impacts for humanity and the rest of nature (IAMC, 2023; McKay *et al.*, 2022; Richardson *et al.*, 2023; van Westen *et al.*, 2024). Taking action now is necessary to avoid such tipping points being reached and to minimize the suffering that would inevitably ensue. Additionally, delivering transformative change now, rather than waiting, results in a range of economic and well-being co-benefits (Stern, 2015) providing opportunities for businesses (WBCSD,

2021) and delivering poverty reduction and progress towards agreed goals and targets, such as the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (United Nations, 2015). In contrast, delaying action risks creating negative spillover effects. Indeed, estimates show that just ten years delay would be twice as expensive as immediate action (Vivid Economics Limited, 2021).

1.2.2 Underlying causes of biodiversity loss and nature's decline are not being addressed

The IPBES conceptual framework (Díaz *et al.*, 2015) refers to both direct and indirect drivers[3] of biodiversity loss. The role of direct drivers is well established, including land use change (i.e., habitat conversion or degradation of land and aquatic habitats), overexploitation of organisms, climate change, pollution of soil, water and air, and invasive alien species (IPBES, 2019a; IRP, 2019; Jaureguiberry *et al.*, 2022; Living Planet Report, 2022). Indirect drivers have been defined as "the forces that underlie and shape the extent, severity, and combination of anthropogenic direct drivers that operate in a given place" (Pörtner, Scholes, *et al.*, 2021). The IPBES Global Assessment (2019a) identified a range of indirect drivers of biodiversity loss, including not only institutional and governance factors, but also demographic, sociocultural, economic and technological factors, as well as conflicts and epidemics. These factors are interconnected and as Diaz and Mahli (2022) explain, "quantitative ranking of indirect drivers is not possible because indirect drivers tend to be diffuse and interact with each other in complex ways". Interconnections among indirect drivers are also recognized in the IPBES Global Assessment (2019a), which has included cross-cutting factors, specifically values and behaviours, that influence and shape all the indirect drivers. Other IPBES documents have used the term underlying causes in connection with their explanations of indirect drivers (IPBES, 2016; Pörtner, Scholes, *et al.*, 2021). Building on this, the scoping report for the transformative change assessment (IPBES, 2021b) sets out a thematic assessment of the underlying causes of biodiversity loss.

This transformative change assessment report provides a description of underlying causes of biodiversity loss and nature's decline that has been synthesized from an assessment of available evidence. Underlying causes were initially identified through an expert-led review process and an analysis of 284 documents highlighted as central across diverse disciplines and knowledge communities[7]. To cross-check the quality of the underlying causes initially identified through this analysis of documents from the expert-led review, a further in-depth analysis was conducted on 61 articles extracted from the transformative change assessment corpus of literature (hereafter referred to as assessment corpus) that directly discussed underlying causes of biodiversity loss[8]. The results of these analyses revealed three key underlying causes of biodiversity loss and nature's decline: i) disconnection from and domination over nature and people, ii) concentration of power and wealth and iii) prioritization of short-term, individual and material gains. **Annex 1.2** further elaborates how these identified underlying causes relate to other indirect drivers commonly cited in the existing literature, such as growth-oriented economic systems, demographic factors and the socio-cultural norms of modernism.

The identified underlying causes of biodiversity loss and nature's decline are cross-cutting and shape and reinforce all direct and indirect drivers (see **Annex 1.2**). The relationship between direct drivers, indirect drivers and underlying causes is depicted in **Figure 1.3**, which elaborates on figure SPM.2 from the IPBES Global Assessment. As seen in **Figure 1.3**, cross-cutting factors influencing all direct and indirect drivers were labelled "values and behaviours" in the IPBES Global Assessment. These values and behaviours correspond to what has been analyzed and described in greater specificity as underlying causes in this assessment. This assessment defines underlying causes as "deep rooted interconnected social and cultural patterns that shape, influence and reinforce all drivers of biodiversity loss and nature's decline". Underlying causes (or root causes) lie beneath the surface of what is immediately obvious but nevertheless have significant links to the origin of observed problems (Conradie, 2016). Similar to the indirect drivers, underlying causes are not isolated from one another but rather act as interconnected and reinforcing patterns that have historically co-evolved and continue to influence and support each other in ways that maintain the direct and indirect drivers and entrench the status quo. It is important that the use of the word "causes" here is not interpreted in a linear sense or as a unidirectional force, since causality in a systems perspective is better understood as multifactorial, circular or spiraling (Reyers *et al.*, 2022).

The underlying causes of biodiversity loss and nature's decline have historically co-evolved, are interconnected, and currently reinforce one another in maintaining the status quo. They lie beneath the surface but deeply influence and shape the more obvious direct and indirect drivers (see **Figure 1.4**). Each of these underlying causes are further described in the sections below.

7. Analysis of contributions on what transformative change is, according to different communities of knowledge (https://doi.org/10.5281/zenodo.10246572).

8. Literature review of the underlying causes of biodiversity loss (https://doi.org/10.5281/zenodo.11657981).

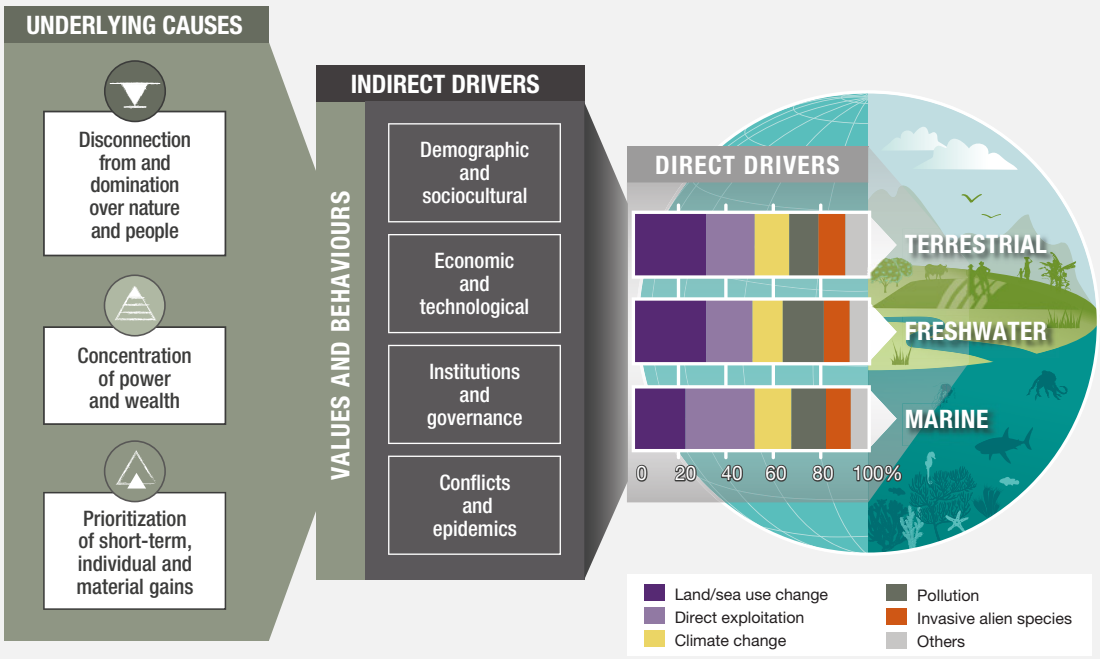


Figure 1 3 **Underlying causes, indirect drivers and direct drivers of biodiversity loss and nature's decline.**

This figure shows how the transformative change assessment specifies and synthesizes the key underlying causes that underpin, cut across, shape and reinforce all the indirect and direct drivers of biodiversity loss and nature's decline. This figure builds on Figure SPM.2 of the IPBES Global Assessment of Biodiversity and Ecosystem Services, including its identification of the most important indirect and direct drivers, with the latter represented in the bar chart showing the proportional contributions of each direct driver to biodiversity loss in terrestrial, freshwater and marine ecosystems. Further details on the analysis leading to identification of these indirect and direct drivers, and the calculation of contributions to biodiversity loss across different ecosystems can therefore be found in the IPBES Global Assessment (IPBES, 2019).

Disconnection and domination of nature and people

Biodiversity loss and nature's decline are being driven by political and economic structures and systems that have historical links with colonialism, slavery and growth-driven economies (Burkett, 2021; Hickel *et al.*, 2022; Hickel & Sullivan, 2023; Horne, 2018; Kallis, 2018; Macekura, 2015; Moewaka Barnes & McCreanor, 2019; Redvers *et al.*, 2022; Sultana, 2022; Yusoff, 2018). These political and economic structures and systems are rooted in a dominant worldview that: a) posits humans as separate from and superior to nature and b) views nature as being composed of objects (rather than as processes or subjects or sentient entities infused with spirit) (Beery *et al.*, 2023; Césaire, 1972; DeLanda, 2006; Descola, 2013; Escobar, 2020; Flint *et al.*, 2013; Geisinger, 1999; Hertz *et al.*, 2020; Hertz & Mancilla Garcia, 2021; IPBES, 2022b; Latour, 1993, 2004; Law & Urry, 2004; Liboiron, 2021; Merchant, 1980; Mignolo & Walsh, 2018; Redvers *et al.*, 2023; Thaman *et al.*, 2013; Walsh *et al.*, 2021; Zimmerman, 1987). This material, symbolic and perceived disconnection between nature and people continues to enable domination and destruction by allowing nature to be conceived as a resource that can be exploited without consequences or need for reciprocity[3] (Feola, 2020; Foggin *et al.*, 2021; Gudynas, 2019; Martinez-Alier *et al.*, 2016). Importantly, this way of framing nature and human-nature relations justifies not only the exploitation of nature itself, but also the exploitation of specific people and communities that are deemed lesser or inferior, typically people of colour and people from low-income countries to create the labour force necessary for nature's exploitation (Beery *et al.*, 2023; N. Smith, 1984; Yusoff, 2018). Patterns of disconnection and domination also manifest between and within communities along lines of gender, race, caste, ethnicity and ability (Kepe, 2009; Mehta *et al.*, 2021; A. Mitchell, 2023; Rudd *et al.*, 2021; Sharma, 2017). This pattern of disconnection and domination thus reinforces marginalizations[3] that push some communities into destructive relationships with nature (see **Annex 1.2**). Disconnection from nature can be understood in cognitive, philosophical and emotional terms, but also in material and experiential terms (Beery *et al.*, 2023; Ives *et al.*, 2018). Material and experiential disconnection can occur for example when urbanization erodes or limits opportunities

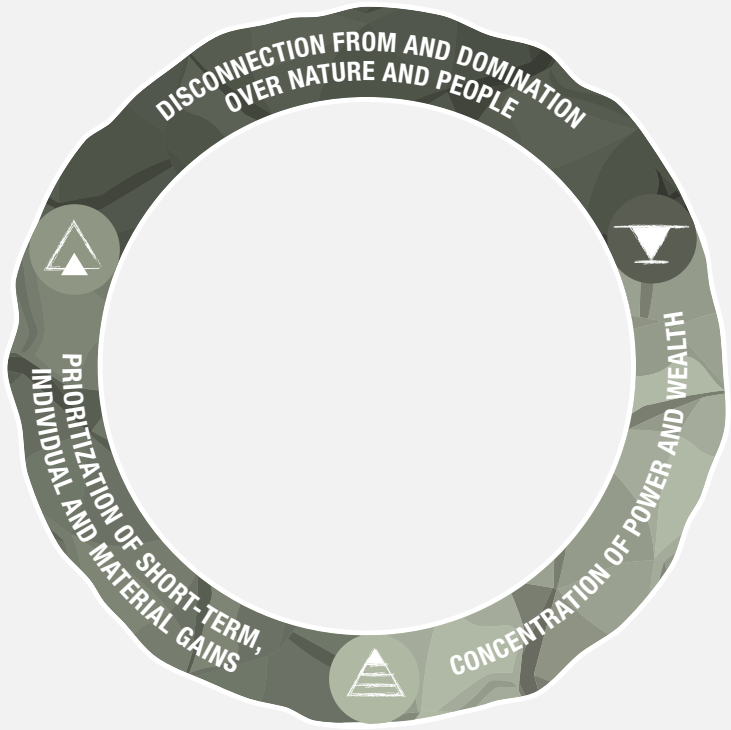


Figure 1 4 **Underlying causes of biodiversity loss and nature's decline.**

for direct interaction and engagement with nature (Lehmann, 2023; Soga *et al.*, 2018). Physical forms of disconnection and domination can also occur when people are forcefully displaced to allow for extractive projects that damage and degrade nature (Dunlap, 2021; Tran & Hanaček, 2023). They can, however, also manifest in current conservation efforts that aim to protect nature by keeping people out, resulting in social injustices (Fairhead *et al.*, 2012; Martin *et al.*, 2013; Martinez-Alier, 2012; Siamanta, 2021; Svarstad & Benjaminsen, 2020).

While there has long been an argument that religion, particularly Christianity and other Abrahamic religions, have significant responsibility for promoting mindsets of disconnection and domination over nature (White, 1967), this assessment noted evidence of diverse ways to interpret religious teachings and their implications for human-nature relations, including examples emphasizing stewardship, care for sacred creation and unity rather than narratives of dominion (Conradie, 2016; Darlington, 1998; Dorje, 2011; Harris, 1991; Moseley & Feldman, 2003; Safdar & Shams-ur-Rehmam, 2021). Patterns of disconnection and domination do, however, continue to be nurtured and upheld in a range of social and business norms (e.g., the conceptualization of nature solely in terms of natural resources justifying exploitation) (Burch & Di Bella, 2021) as well as in scientific research and education (e.g., through a focus on maintaining a firm distinction between subjects and objects in knowledge creation) (Turnhout, 2024).

While disconnection and domination is a deep rooted social and cultural pattern in modernity, it is fundamentally at odds with many Indigenous, relational and spiritual worldviews that emphasize interdependence, unity, holism and relations of care (Atwood *et al.*, 2023; IPBES, 2022b; Macy, 2007; Næss, 2005; Posey, 1999; Scharmer, 2018). These holistic views can support shifting away from disconnection and domination. However, such a shift cannot remain at the level of ideas and only comes to life when embodied and enacted through everyday structures and practices – including those related to production and consumption – and when social relationships do not reinforce disconnection and domination in specific given contexts but rather shift towards embodying relations and ethics of care[3] (Braidotti, 2019; Gilligan, 1982; Haraway, 2016; IPBES, 2019a; Noddings, 2013; Pulcini, 2013; Schoeller & Thorgeirsdottir, 2019; Watson, 2020).

Concentration of power and wealth

Power and wealth are being increasingly concentrated to the benefit of a few. Human activities have contributed positively to economic growth and well-being in many parts of the world. However, the majority of the benefits of economic growth are reaped

by a small proportion of the global population, while a large proportion of the world's population bears its negative consequences (Hickel, 2017; IPBES, 2019a; Lenton *et al.*, 2023; McElwee *et al.*, 2020; Otero *et al.*, 2020; Raworth, 2017; Sultana, 2022; Turnhout *et al.*, 2021). Historical patterns of colonialism are reproduced in current economic structures that stimulate mobility of natural resources from low-income to high-income countries and represent one of the key factors maintaining substantial parts of the global population in a state of poverty (D. Sullivan & Hickel, 2023). The accumulated wealth is channeled to and enjoyed by an increasingly small number of people, with a growing gap between increasing privately-held wealth and decreasing public wealth in rich countries (Chancel *et al.*, 2022) (see **Chapter 4**). Wealth inequality[3] within countries is at an historic high, while wealth inequality between countries remains high despite gains made by some in recent decades (Chancel *et al.*, 2022). Wealth inequalities also became worse as a result of the COVID-19 pandemic (Christensen *et al.*, 2023; Credit Suisse, 2021). Such wealth inequalities within and between countries intersect with inequities in power and processes of marginalization across race, gender, age, disability, place, class and other groups (Kaijser & Kronsell, 2014; Malin & Ryder, 2018; Ryder, 2017). The concentration of power and wealth thus helps reinforce patterns of domination of people.

This concentration of power and wealth matters because the wealthy are responsible for a disproportionate use of natural resources (Kartha *et al.*, 2020; UNICEF Office of Research, 2022), unsustainable levels of consumption and associated environmental impacts (IRP, 2021; Kenner, 2015). Despite this, the way of life of the wealthy is often promoted as an aspirational goal. Wealthy countries are currently driving biodiversity loss in other parts of the world through their level of consumption and the patterns of resource extraction this demands **(Annex 1.2)** (Fanning *et al.*, 2020; Kitzes *et al.*, 2017; Lenzen *et al.*, 2012). High-income countries represent one-third of the global population but have material consumption footprints 60 per cent higher than middle-income countries, and thirteen times the level of low-income countries (IRP, 2019, 2021). The production and consumption activities occurring in wealthy countries are also generating unhealthy and dangerous conditions for populations in other parts of the world (UNICEF Office of Research, 2022). Simultaneously, wealthy countries and people are more likely to be able to access the benefits of biodiversity (Leong *et al.*, 2018) and be better placed to face the consequences of nature's decline (Christensen *et al.*, 2023). Meanwhile indebted countries and people find it extremely challenging to implement initiatives that would make them more resilient (Tubiana & Fox, 2023).

The concentration of power and wealth also creates differential access to decision-making processes. Marginalized people have less access to education, participatory processes and decision-making (Agyeman *et al.*, 2016; J. K. Clark, 2018). This lack of access closes down opportunities to connect with, learn about and make decisions to protect biodiversity. Conversely, individuals, corporations and other organizations that benefit from current systems often wield their power and resources to protect their interests (Brulle, 2014; Büscher & Fletcher, 2019; Franta, 2022; Green & Healy, 2022; Klein, 2015). They do this by means of direct political influence and lobbying, or by funding think tanks, media and other channels of influence that spread disinformation and promote narratives[3] serving vested interests[3]. This includes downplaying the effects of environmental degradation, overstating the benefits of short-term solutions, presenting infinite economic growth as necessary and beneficial for everybody, or overstating the negative consequences of environmental measures and regulations for people and well-being (Brulle *et al.*, 2021; Brulle & Downie, 2022; Djelic & Mousavi, 2020; Edwards *et al.*, 2023; Forchtner & Lubarda, 2022; Oreskes & Conway, 2023; Rigal, 2022; Vallone & Lambin, 2023).

Power directed at obstructing change can also target social movements[3] and individuals that speak out for transformative change, as well as efforts by civil society and smaller non-governmental organizations (Holmes, 2011; MacDonald, 2010; Spash, 2022). Indigenous Peoples and local communities, as well as citizen groups and social movements, often face discreditation and even direct physical violence for resisting the drivers of destruction (see also **Chapter 5**). Indicative of this is the ongoing use of force and violence against civilians and environmental defenders (e.g., those fighting environmentally destructive activities related to deforestation, dam building or mining and journalists covering such conflicts). At least 1,734 environment and land defenders were killed between 2002 and 2018, of which around one third were Indigenous Peoples (Le Billon & Lujala, 2020). Another source reports that at least 2,000 individuals were killed between 2012 and 2022, with the majority being in Latin America (Global Witness, 2023). Violence linked to extractive industries is often gendered, i.e., the violence is often perpetrated by men against women. Although violence against women environmental defenders is often overlooked and likely underreported, evidence indicates a concentration of violence against women among mining, agribusiness and industrial conflicts, with hotspots for violence in Latin America and Southeast Asia (Tran & Hanaček, 2023). In addition to the extreme of assassination, defenders are also subject to displacement, repression, criminalization, harassment and digital attacks (Global Witness, 2023; Le Billon & Lujala, 2020; Tran & Hanaček, 2023).

Prioritization of short-term, individual and material gains

Unequal distributions of power and wealth coincide with and are kept in place by prioritization of short-term, individual and material gains. A belief that human concerns can be treated as isolated from those of nature[3] and that individual interests are primary, has come at the expense of values of community, care, solidarity and the maintenance of the social and ecological fabric (Bauman, 2000; IPBES, 2019c, 2022a; Naess, 1990; Putnam, 2001). The view of human beings as isolated, self-interested, utility maximizing individuals, also known as the *Homo economicus* model (Hardin, 1968; Raworth, 2017) is deeply embedded in many policies and societies. This view has, for example, informed numerous policies that primarily target individuals and/or use economic incentives ranging from the introduction of performance measurement and indicators in health, education, science and environment, to the privatization of public services and to assigning exposure to risk as individual responsibility rather than a systemic failure (Liebenberg *et al.*, 2015; Thiel & Leeuw, 2002; Turnhout *et al.*, 2014). The materialist idea that the happiness or wellbeing of individuals is obtainable through material wealth and possessions (extending far beyond the satisfaction of basic needs) (Kasser, 2016; Richins & Dawson, 1992), has stimulated overproduction and overconsumption (Liu, 2024; Wilk, 2022). In the environmental domain, the prioritization of the individual has resulted in a preference for measures that target individual behaviour and that distract attention and responsibility away from the structural and institutional dimensions of the multiple intersecting sustainability crises (Shove, 2010). Example of this are carbon footprint calculators that allow individuals to calculate their carbon footprint without acknowledging the massive footprint of industry or the fact that the freedom of choice of many individuals is limited by structural conditions (Solnit, 2021).

Compounding the impacts arising from a focus on the individual and the material is the primary focus of several policies and measures on short-term agendas and the satisfaction of immediate interests and gains at the expense of, or willfully ignoring, long-term impacts and needs (IPBES, 2022a). While it is acknowledged that all people have the right to have their basic needs met and that immediate action to address an unfolding polycrisis is urgent, global sustainability objectives cannot be achieved unless visions, decisions and actions take into account timeframes longer than the present moment and beyond immediate individual interests (Arbuthnott, 2010; Klauer *et al.*, 2013; Sjöblom *et al.*, 2012). Short-term thinking, including in business reporting and political cycles, poses significant challenges to advancing sustainability agendas and risks the well-being of future generations (Ansell, 2023; Bansal & DesJardine, 2014; Böhme, 2023; Di Bartolomeo *et al.*, 2021; Klauer *et al.*, 2013; Slawinski *et al.*, 2017; Von Weizsäcker & Wijkman, 2018). Indigenous world views and cultures emphasize that sustainable ways of living involve considering both future generations and historical wisdom/ancestors (IPBES, 2019c, 2021a; Thaman *et al.*, 2013). Allowing the voices of youth to have greater influence on policy-making could challenge both short-term thinking and the concentration of power, with the potential for transformative effects (O'Brien *et al.*, 2018; Sloam *et al.*, 2022; Sloam & Henn, 2024).

1.2.3 Insufficiency of current environmental policies and widespread failures in implementation

Drawing on data across the Living Planet Index, the World Database on Protected Areas, the assessment corpus and a range of reports on the progress in achieving targets within multilateral environmental agreements[9], this assessment shows that current policies and actions have not been able to halt global trends in biodiversity loss and nature's decline (see **Figure 1.5**). Multilateral environmental agreements have increased in number since 1970, with 21 new global and several regional multilateral treaties adopted. The participation of countries in these treaties has also increased; while the number of parties varies depending on the environmental treaty, participation in some key conventions (e.g., CBD, UNFCCC, UNCCD and the Vienna Convention on the Protection of the Ozone Layer) has reached near universal participation (up to 198 States in some cases). Environmental assessments and scientific publications on nature have also been on the rise since the 1990s and continue pointing to nature's decline.

The high level of participation in multilateral environmental agreements and increasing scientific knowledge of nature can be harnessed to promote transformative change towards a just and sustainable world if there is a focus on both enhancing implementation and addressing underlying causes. Governments and international bodies have set a range of targets for biodiversity, the environment and society, which they have consistently failed to fully achieve (see **Figure 1.5**). None of the Aichi Biodiversity Targets, to be accomplished by 2020, was fully met (CBD, 2022; Maney *et al.*, 2024; Xu *et al.*, 2021) and the evidence to date indicates limited impacts of the Sustainable Development Goals (SDGs) (Biermann *et al.*, 2022; United Nations Department of Economic and Social Affairs, 2023). Furthermore, the outbreak of COVID-19 pandemic dramatically hampered progress towards sustainability and biodiversity targets (United Nations, Interagency Task-force on Financing for Development United Nations, 2021).

9. Analysis of effectiveness of environmental governance (https://doi.org/10.5281/zenodo.10245399)

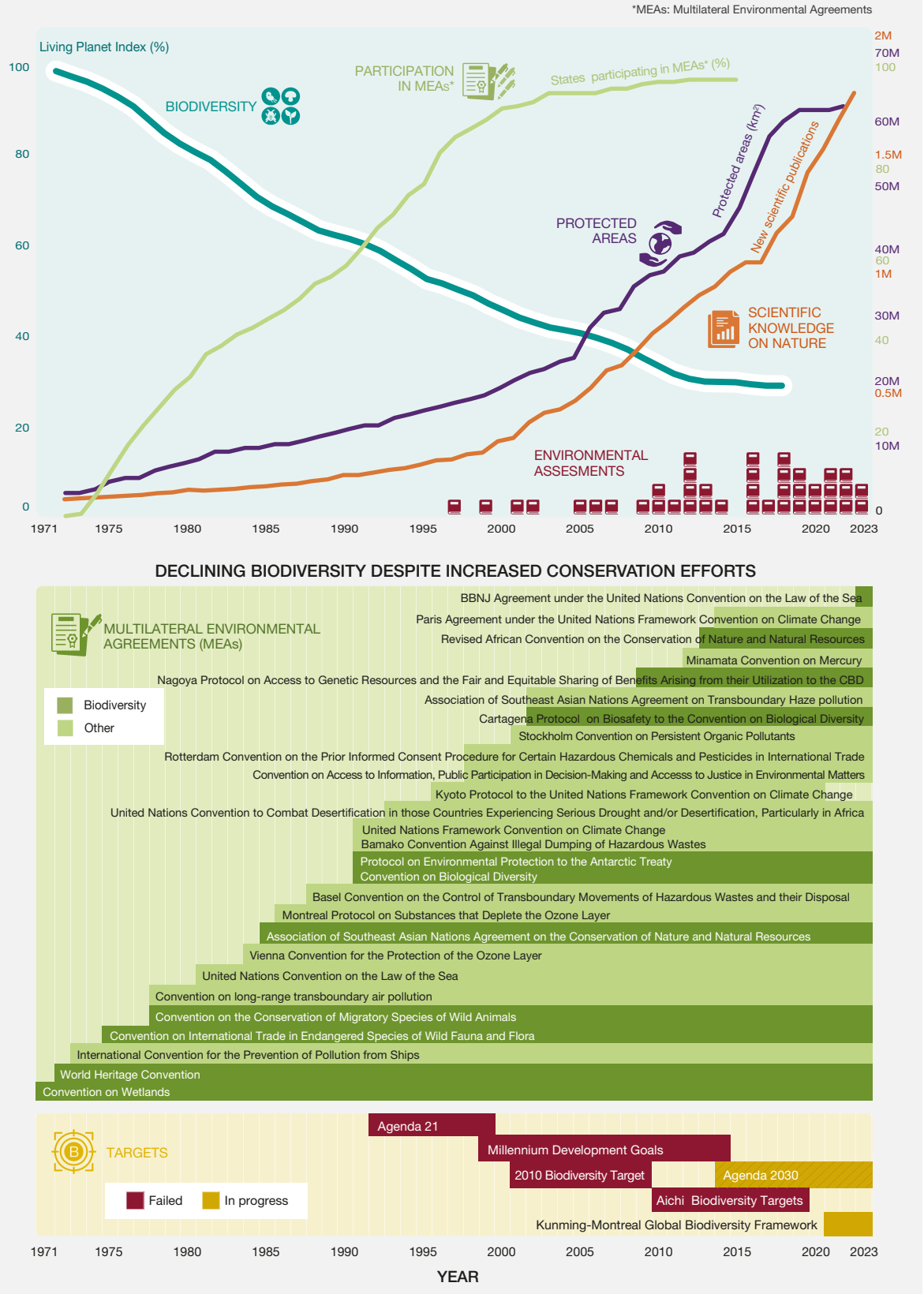


Figure 1 5 **Declining biodiversity despite increased conservation efforts.**

The relationship between adopted multilateral environmental agreements MEAs, States' participation in them, the key biodiversity targets set under them and the status of biodiversity. The top panel shows how biodiversity has been declining over time, from 1971 to

Figure 1 5

the present day (1971 was selected as the baseline because this is when MEAs began to emerge and because the earliest data available in the Living Planet Index dates back to 1970). Over this same period, protected areas[3] have increased in number. Scientific knowledge about biodiversity (number of publications) and environmental assessments have also increased. The number of adopted MEAs and the number of countries participating in MEAs have also continued to rise during this period. In the lower panel, these MEAs and their targets are specified according to when they were introduced. Specific biodiversity-relevant targets are also shown, with an indication of whether or not they were successfully achieved. Full details on the data used for this figure (including the different MEAs) are available in the analysis of effectiveness of environmental governance.[10]

While consistently failing to meet existing targets, governments continue to make ambitious new commitments. In most cases, there is insufficient information to be able to quantify what the trends would have been in the absence of existing policy commitments and actions (IPBES, 2019a). A global meta-analysis of biodiversity outcomes from different types of conservation actions found that in two thirds of cases, there was a positive impact when compared to taking no action at all, however, less than half of the cases actually showed an improvement in the state of biodiversity (Langhammer *et al.*, 2024). This means that although substantially better than no action, the available evidence clearly indicates that current approaches, policies and actions have neither stopped nor reversed the global trend of biodiversity loss over time (see **Figure 1.5**).

Current multilateral environmental agreements not only suffer from insufficient implementation of agreed goals and targets, but they rarely contain goals and actions that address the underlying causes and they do not always establish clear links between the actions and outcomes that they prescribe and the actual sources of the problems (Burgass *et al.*, 2021; Moranta *et al.*, 2022). As the IPBES Global Assessment notes, removing environmentally harmful subsidies and regulations is as important as increasing funding for conservation (Dempsey *et al.*, 2020; McElwee *et al.*, 2020; Turnhout *et al.*, 2021) (see **Chapter 5**).

Similar limitations can be identified in protected areas, the cornerstone of conservation policy. Protected areas have been increasing over time and although their effectiveness varies geographically and is commonly impeded by inadequate management and insufficient financing (Geldmann *et al.*, 2019; Heino *et al.*, 2015; Langhammer *et al.*, 2024), they have in some cases been effective at keeping direct drivers of biodiversity loss at bay (land use change, overexploitation of organisms) or mitigating their impacts (climate change, pollution, invasive and alien species) (Claudet *et al.*, 2020; Geldmann *et al.*, 2018; Hoffmann, 2022; Relano & Pauly, 2023). However, protected areas have not addressed the underlying causes of biodiversity loss and nature's decline that continue to accelerate the indirect and direct drivers (Leclère *et al.*, 2020; Maxwell *et al.*, 2020; Mora & Sale, 2011). Moreover, some of the initiatives aimed at biodiversity conservation have had negative effects on equity and justice. For example, some of these initiatives displace people from areas on which these people depend upon for their livelihoods – areas that are also increasingly scarce due to the unabated acceleration of direct and indirect drivers (Brockington *et al.*, 2008; Büscher & Fletcher, 2020; Kashwan, 2017; Kashwan *et al.*, 2021; Nadow *et al.*, 2023).

The same limitations apply to voluntary measures to stimulate sustainable consumption and production, including sustainability certification and information campaigns, or market-based instruments like biodiversity off-setting, payment for ecosystem services programmes, cap and trade policies and taxation of pollution. These measures address the symptoms, but have not been able to halt biodiversity loss because they are embedded in regulatory and institutional contexts that fail to disincentivize or regulate unsustainable practices, while also placing undue responsibility on individuals and communities (Beyers *et al.*, 2023; Gullison, 2003; Hadjimichael & Hegland, 2016; McElwee *et al.*, 2020; Penca, 2020; Skutsch & Turnhout, 2020; Stoll *et al.*, 2020; Turnhout *et al.*, 2021).

Assessment of the literature also emphasizes a preference for so-called "technofixes" or stopgap measures that focus on minimizing direct drivers or mitigating their impacts while ignoring the underlying causes (Buck *et al.*, 2020; Fletcher, 2023; Massarella *et al.*, 2021; Robbins, 2012; Robertson, 2006; Wyborn & Evans, 2021). These types of measures are preferred because they do not threaten the status quo and maintain dominant paradigms, values and power relations[3], and protect vested interests (Buck *et al.*, 2020; Massarella *et al.*, 2021; Wyborn & Evans, 2021). The challenge of transformative change is to complement these with measures that catalyze deeper changes and address the underlying causes of biodiversity loss. This will inevitably need to include measures that reconfigure current structures, policies and regulations driving biodiversity loss.

10. Analysis of effectiveness of environmental governance (https://doi.org/10.5281/zenodo.10245399).

1.3 UNDERSTANDING TRANSFORMATIVE CHANGE

1.3.1 Transformative change: fundamental shifts across the three dimensions of views, structures and practices

This assessment has identified dimensions of transformative change from a review of 284 documents that were identified as pivotal across contributions from 28 experts from across a wide range of knowledge communities, together with submissions from a call for contributions to the assessment from Indigenous and local communities.[11] The dimensions of transformative change identified through this analysis are views, structures and practices. Currently dominant views, structures and practices enact, consolidate and perpetuate the underlying causes of biodiversity loss and nature's decline, for example through current political, economic and regulatory structures, dominant power relations and the mindsets, values, priorities and practices of individuals. As human constructs, these currently dominant views, structures and practices can be changed – with multiple possible alternatives and pathways.

Views, structures and practices serve as umbrella terms that capture and convey a broad range of related concepts across the different knowledge communities reviewed.[11] Some of these knowledge communities, and individual works within these communities, focus on one of the three dimensions, while others span more than one (including, for example, the three spheres framework of transformative change from O'Brien (2018)). The family of concepts incorporated under each of these umbrella terms are not all synonymous, and sometimes the same word is defined differently by different users (see **Annex 1.3**). However, there is common intent towards what the concepts convey:

- Views – ways of seeing, thinking and knowing
- Structures – ways of organizing, regulating and governing
- Practices – ways of doing, behaving and relating

Views, structures and practices can be understood as three interwoven dimensions of social phenomena **(Figure 1.6)**. All systems (e.g., food, water, energy, health, knowledge and technology) can be understood as comprised of and constituted through these three dimensions. As an example, information technologies used to aid biodiversity conservation can be understood, analyzed and affected through their purposes or framings of the world, including the biases embedded within them (views), through the infrastructures used for organizing and creating access to data (structures) and through how people or organizations create, apply or interact with such data and accompanying infrastructures (practices). While each dimension is significant and important, the three-dimensional whole of any social phenomena emerges through how views, structures and practices operate together.

Each of the three dimensions of views, structures and practices provides entry points to generate fundamental systemwide changes. Since all three dimensions are interwoven and affect each other, entering through and significantly changing one has the potential to create knock-on changes through the others. For example, shifting views can lead to changes in practices that contribute to changes in structures. Similarly, shifting structures can lead to changes in practices that over time stimulate changes in views. However, due to their interconnections, changes in one dimension can also be constrained from having fundamental system-wide impacts by what is present in the other dimensions. For example, despite people holding certain views, they may be unable to change practices due to certain structures shaping or limiting their behaviours (Wamsler *et al.*, 2022). This means that achieving system-wide change necessarily involves integrated shifts across all three dimensions.

Different knowledge communities vary in which entry point or dimension they see as being the most appropriate or powerful for initiating transformative change, as well as how actions across these different dimensions combine in a theory of change (see **Chapter 3**). Acting to generate transformative change includes creating new, dismantling old, fostering nascent, or sometimes, supporting existing, views, structures and practices. Such changes can be deliberate and planned, or arise as a result of reactive responses to sudden shocks or disruptions (Benessaiah & Eakin, 2021; Folke *et al.*, 2010). Examples include (temporary) changes to views, structures and practices during COVID-19 lockdowns. Here, shifts in working practices were accompanied by changes to supply chains and infrastructures (including digital infrastructures), and often to views, e.g., around the desirability of remote work (Battisti *et al.*, 2022; Klymenko & Lillebrygfjeld Halse, 2021).

Views

Views are ways of seeing, thinking and knowing. Views refer to the ways humans make sense of and understand the world, and relate to cognition and ways of "seeing" the world. The term "views" is used to include world views and mindsets (Woiwode *et*

11. Analysis of contributions on what transformative change is, according to different communities of knowledge (https://doi.org/10.5281/zenodo.10246572).

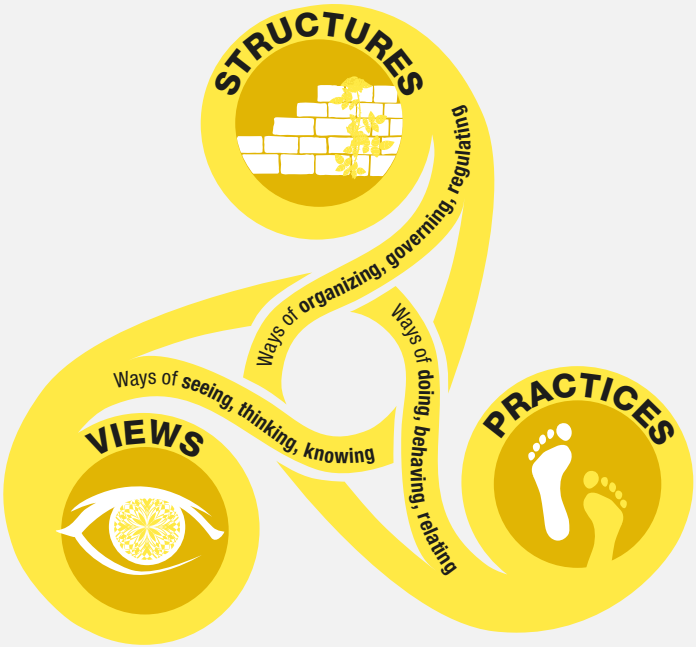


Figure 1 6 **The three interwoven dimensions of transformative change: views, structures and practices.**

Each dimension can serve as an entry point to change, but for change to be truly transformative, shifts should occur across all three dimensions. Since all three dimensions are interconnected, starting with one dimension as an entry point can lead to changes in the other dimensions. However, if changes in one dimension are not coordinated with changes in the other dimensions, fundamental system-wide change can be blocked.

al., 2021). These can be general and pertaining to the world as a whole, including personal and cultural values (Horcea-Milcu, 2022) individual and community beliefs, spirituality,[3] myths and religions (Köhrsen, 2023). Views can also be specific to the environment and nature, including values of nature (Raymond *et al.*, 2023) and relationships to nature (Artmann, 2023). However, the term also includes views on what is more generally valuable and desirable, including the goals, intentions and paradigms that social, economic and political systems work towards (Abson *et al.*, 2017; Dengler & Strunk, 2018). Views also include positions on what constitutes knowledge (including intergenerational memory, biocultural memory and ancestral knowledge) and how science and knowledge are legitimized and used (Massarella *et al.*, 2021).

When the entry point to transformative change concerns views, a large part of the literature makes a link between dominant views actively stifling transformative change, while conceiving the inclusion of the marginalized views as a potential for transformative change (Armitage *et al.*, 2020; Blythe *et al.*, 2018; O'Brien & Sygna, 2013; Reyers *et al.*, 2018; Temper *et al.*, 2018; Yoamarã, 2011). Starting with views can include the self-realization of new ways of seeing, thinking and knowing the world and embracing the self as part of nature (Ives *et al.*, 2020; Woiwode *et al.*, 2021). It can also include adopting and prioritizing broad sustainability-aligned values such as care and stewardship (IPBES, 2022a), fostering views that are reflexive[3] and critical to the underlying causes, or that already embody the principles of transformative change **(Section 1.3.2)**. Such views can include relational world views such as those of many Indigenous Peoples, particularly around the perception of oneness between people and nature (Artmann, 2023; Bhaskar, 2012; Dabezies & Taks, 2021; Ingold, 2002). Starting with views as an entry point can prompt people to change structures and practices in ways that are aligned with these views. However, individuals often hold multiple, sometimes contradictory views, and can be limited in their ability to act according to their views by structural barriers[3] (Wamsler *et al.*, 2021).

Structures

Structures are ways of organizing, relating and governing. They can be tangible or physical structures, as well as intangible structures that facilitate or constrain views and practices. Such structures include legal, governance and policy systems (including rules and regulations and how they are made) (Patterson *et al.*, 2017; Visseren-Hamakers *et al.*, 2021) and institutions (formal and informal, and including, e.g., land tenure) (Bisong & Andrew-Essien, 2010; Coglianese, 2001). Structures include ways of organizing production and provision systems

(Gudynas, 2019; Hickel, 2021), as well as the economic, social, cultural and physical power that is embedded within them (Avelino, 2017; Stoddard *et al.*, 2021). The term structures in this assessment also encompasses infrastructure and service provision (Roelich, 2020).

When the entry point to transformative change are structures, there is a recognition that structures embodying and enforcing underlying causes need to be deconstructed and that new ways of organizing and facilitating practices need to be created. Initiating changes in structures can unlock opportunities to engage with views and to encourage and guide the performance of certain practices. This can include creating new alternative structures, for example, new models of democracy and of production, co-creation of new institutions, and strengthening of local organizations[3] (Kenis *et al.*, 2016; Pelenc *et al.*, 2019; Willis, 2020). Initiating changes in structures can also entail the deconstruction of existing structures that constrain shifts in views and behaviours (Abson *et al.*, 2017; Newig *et al.*, 2019). Indeed, a key challenge of transformative change is not just about designing and implementing new actions; it is also about overcoming persistent resistance by disempowering, phasing out, removing or replacing incumbent structures that perpetuate the underlying causes (Bluwstein, 2021; W. C. Clark & Harley, 2020; EJOLT, n.d.; Feola *et al.*, 2021).

Practices

Practices are ways of doing, behaving and relating. Practices include consumption and other individual behaviours related to lifestyles, habits and routines (Marteau *et al.*, 2021; Schultz, 2011). They can also include the adoption of social and/or technological innovations (Geels *et al.*, 2018; Renn *et al.*, 2021) and decision-making behaviour, particularly by incumbent decision-makers, policymakers and power holders (Whitmarsh *et al.*, 2021). This dimension also covers collective practices, such as participation in social, political, environmental and cultural activities and movements by citizens (including youth) (Grasso & Giugni, 2022; Mitkidis & Valkanou, 2020; Sloam *et al.*, 2022), and raising awareness in others (Fernandes-Jesus & Gomes, 2020; Schlosberg & Coles, 2016).

When the entry point to transformative change concerns practices, there is an effort to change behaviours and decisions directly and to enact practices that serve to shift views and structures. Starting with practices can include changing undesirable practices or preserving desirable practices, such as those that are already embodying living in harmony with nature (Chaudhary *et al.*, 2021; Frandy, 2021; Lin *et al.*, 2021). Practices can also be intended to shift views and structures. This may come through promoting practices that encourage views that reflect deeper connections to nature, including outdoor experiences, mindfulness, education and religious and spiritual engagement (Ives *et al.*, 2018; Wamsler, 2020), or by influencing structures and the views of others. Changing practices of enough people can also lead to shifts in structures in response. For example, new markets or regulations can emerge in response to a shift in practices such as consumer behaviour. Practices are therefore related to the actions that can be taken to create transformative change **(Section 1.4.2)**.

1.3.2 Transformative change for a just and sustainable world: four principles to address the underlying causes

Transformative change that deliberately moves humanity towards living equitably and in harmony with nature is enabled by shifts in views, structures and practices away from those that enact the underlying causes of biodiversity loss and nature's decline and towards those that support the emergence of a just and sustainable world. These will be views, structures and practices that are grounded in and guided by broad sustainability aligned values. Interrogation of a set of 1,063,513 references on transformative change[12] revealed strong support for four principles that are embodied by views, structures and practices when enacting deliberate transformative change for a just and sustainable world.[13,14] The term principles is used here in the sense of guidelines, which can be both normative[3] and procedural. The four identified principles of deliberate transformative change for a just and sustainable world are:

- Equity and justice
- Pluralism and inclusion
- Respectful and reciprocal human-nature relationships
- Adaptive learning and action

Equity and justice

The principle of equity and justice relates to the imperative to ensure that interventions for transformative change are fair and allow for the flourishing of all people (both present and future generations) as well as other species and natural entities. The terms equity and justice are closely related and, although aspects may be emphasized differently across various disciplines

12. Literature review determining the principles of transformative change (https//doi.org/10.5281/zenodo.11657639).
13. Literature review of the underlying causes of biodiversity loss (https://doi.org/10.5281/zenodo.11657982).
14. Analysis of contributions on what transformative change is, according to different communities of knowledge (https://doi.org/10.5281/zenodo.10246572).

Figure 1 7 **The principles of transformative change for a just and sustainable world.**

Deliberate transformative change that is grounded in and guided by these principles supports shifts across views, structures and practices occurring in ways that address the underlying causes of biodiversity loss and nature's decline and advance just and sustainable futures.

and contexts, the terms are often used interchangeably in everyday conversation. For this principle, both terms are used to ensure that the breadth of relevant considerations is captured. This includes fairness[3] in terms of i) the allocation of benefits, costs and risks; ii) capabilities and access to resources and power; iii) participation in decision-making and change processes, and iv) social recognition. The principle also concerns fairness in both immediate and long-term perspectives, including addressing specific existing disparities as well as working towards changes in structures and societal norms to ensure equity and justice over time (Loos *et al.*, 2023; Martin *et al.*, 2013).

A focus on delivering equity and justice is important if transformative change is to counter the underlying causes of biodiversity loss and nature's decline such as concentrations of power and wealth and the domination of people and nature. The expansion of justice considerations to include future generations and other species and natural entities also counters the prioritization of short term, individual and material gains. Committing to this principle therefore targets all three underlying causes of biodiversity loss and nature's decline.

Research emphasizes that ensuring equity and justice is crucial for global sustainability and for addressing the underlying causes of biodiversity loss and nature's decline (Alier, 2002; Büchs, 2021; Ivanova & Middlemiss, 2021; Leach *et al.*, 2018; Lele, 2018; Martin *et al.*, 2013; Mikkelson *et al.*, 2007; Sultana, 2022). The links between sustainability and equity have been clearly recognized and acknowledged in international agreements relevant to biodiversity conservation (including the Convention on Biological Diversity and its Nagoya Protocol, the Kunming-Montreal Global Biodiversity Framework, and the 2030 Agenda for Sustainable Development).[3] As explained in **Section 1.2**, serious wealth and income inequalities persist and fair and equitable sharing of benefits from the use of nature has not been achieved to date (Chancel *et al.*, 2022; Christensen *et al.*, 2023). The literature on transformative change stresses that securing biodiversity involves deliberate and direct actions against global inequalities, including concentrations of power and extreme wealth (IPBES, 2019a, 2022a; Martin *et al.*, 2020; Scoones *et al.*, 2020; Turnhout & Purvis, 2020).

Inequities are understood in this assessment as uneven opportunities and processes of discrimination, which can arise in connection with different characteristics (e.g., gender, class, ethnicity, age and (dis)ability) and can take different forms (e.g., between rich and poor, centre and periphery, urban and rural citizens, science and other forms of knowledge, or Western and other ways of life). A commitment to equity therefore means working to create systems free from favouritism or discrimination and extending fair treatment to all, including consideration of distributional, procedural and recognitional aspects of justice. The principle of equity and justice entails

commitment to human rights[3] and the rights of Indigenous Peoples and local communities. Considerations related to environmental justice[3] are also particularly relevant, i.e., the fair treatment and meaningful involvement of all people (regardless of race, gender, age or income) in the development and implementation of environmental policies (Schlosberg, 2007; Schlosberg & Collins, 2014; Stephens *et al.*, 2008). However, for transformative change to address the underlying causes of biodiversity loss and nature's decline, concepts of equity and justice expand to specifically encompass considerations for other species and natural entities, as well as youth and future generations, e.g., through contemporary concepts and approaches such as intergenerational, restorative, multispecies and Earth system justice (Barraclough *et al.*, 2021; Celermajer *et al.*, 2021; S. Gupta *et al.*, 2023; Llewellyn, 2021; Menkel-Meadow, 2007; Menton *et al.*, 2020; Rana *et al.*, 2020; Rossner & Taylor, 2024; Tremmel, 2006, 2009; Treves *et al.*, 2018; Wienhues, 2020; Winter, 2022), and through exploring the transformative potential of the rights of nature (Bussoletti, 2022; Hsiao, 2012; Macpherson, 2020; O'Donnell & Talbot-Jones, 2018; Willems *et al.*, 2021).

Pluralism and inclusion

The principle of pluralism and inclusion refers to a commitment to recognizing that a diversity of perspectives is legitimate and important, including perspectives, voices and experiences that are, or traditionally have been, marginalized from social discourse[3] and decision-making. This principle is about ensuring the inclusion of diverse actors (human and non-human[3]), world views, values and knowledge systems[3] in ways that both recognize and respect differences and remain open to ongoing contestation, renegotiation and change. Meeting this principle is vital to consistently counter the underlying cause of concentration of wealth and power and to resist the domination of people and nature.

There are plural perspectives on what biodiversity is, how humans and nature relate, and how problems, causes and desirable solutions are framed (Pascual *et al.*, 2021; Raymond *et al.*, 2023). There are also differences in how people of different genders relate to, depend on, and value nature, as well as different levels of influence and opportunities to participate in decision-making related to environmental policies (Booker *et al.*, 2022). A commitment to justice requires decision-making processes that are inclusive of plural ways of valuing, knowing and living with biodiversity. A crucial aspect of pluralist approaches is the recognition of difference and the importance of creating equitable opportunities for engagement (Mouffe, 1999, 2005). This entails including marginalized voices and knowledge systems and challenging dominant power relations (Escobar, 2020; Scoones, 2016; Scoones *et al.*, 2020; Stirling, 2016). Pluralism underscores that transformative change does not have a single endpoint or pathway and will take context-specific forms (Hill *et al.*, 2020; McElwee *et al.*, 2020).

Pluralism and inclusion are of particular importance for Indigenous and local knowledge systems. Indigenous and local knowledge systems are often based on holistic perspectives with dynamic interconnections between people, biodiversity land and spirituality (IPBES, 2022b, 2023). Indigenous Peoples have tenure rights over at least 38 million square kilometers in 87 countries across all continents – representing over a quarter of the land's surface and are thereby crucial for meeting global conservation goals (Garnett *et al.*, 2018; IPBES, 2019a). While there is some evidence to suggest that traditional societies have found it hard to manage resources sustainably (Fennell, 2008), there is much evidence showing that territories managed by Indigenous Peoples consistently show high biodiversity and slower rates of decline (Ceddia *et al.*, 2015; Grantham, 2022; IPBES, 2019a; Peres, 1994, 2000; Schuster *et al.*, 2019; Waller & Reo, 2018). However, while there is increasing recognition under multilateral environmental agreements of the value of knowledge held by Indigenous Peoples and local communities, the type of holistic world views and associated values and knowledge systems of many Indigenous Peoples remain marginalized in conservation science, policy[3] and practice (Bussoletti, 2022; Frandy, 2021; Gordon, 2022; IPBES, 2019c, 2022b). This is despite increasing agreement across Indigenous world views, faith-based traditions and cutting-edge scientific research on the importance of recognizing interdependencies and unity across diversity to achieve sustainable and just futures (IFAD, 2022; Yoamarã, 2011). Approaches that dismantle colonial and neocolonial structures and ways of thinking to actively make space for other world views, values and knowledge systems are vital for transformation (Arora & Stirling, 2023; Liboiron, 2021; L. T. Smith, 1999; Todd, 2016; Tuck & Yang, 2012).

Respectful and reciprocal human-nature relationships

This principle of transformative change refers to a focus on the importance of creating and sustaining meaningful, respectful and reciprocally nourishing relationships between humans and nature (beyond nature simply being used as a means to human ends), as well as among humans through nature (e.g., through spirituality and sense of place). This is grounded in the recognition that humanity does not exist in isolation from nature, but rather, arises through and in relationship with nature. In combination with the principle of commitment to equity and justice, the principle of respectful and reciprocal human-nature relationships is essential for effectively addressing disconnection from and domination over nature and people and the prioritization of short-term,

individual and material gains. The principle supports intergenerational concepts of justice by considering and recognizing responsibilities for both the past, present and the future during decision-making and allows for both linear and circular concepts of time (IPBES, 2021a). This principle is also important to counter the logic of accumulating power and wealth at nature's expense.

Respectful and reciprocal human-nature relationships entail recognition of humans as a part of nature and overcoming (false) separations in the way the world is viewed and structured (e.g., bifurcations between nature/people, subject/object, knowledge/action, material/spiritual) (Berger *et al.*, 2024; Hertz *et al.*, 2020; Hertz & Mancilla Garcia, 2021; IPBES, 2022b; Latour, 1993, 2004; Law & Urry, 2004; Mignolo & Walsh, 2018; Thaman *et al.*, 2013; Walsh *et al.*, 2021). It aims to dismantle hierarchies of domination, including the idea that humanity sits in hierarchical supremacy over other species (Artmann, 2023; Singer, 2009; Weitzenfeld & Joy, 2014). This principle, therefore, not only recognizes relational values[3] and responsibilities and acknowledges human-nature connectedness, but also creates conditions to recognize the liveliness of a world in which non-human entities also have agency[3] (Barad, 2007; J. Bennett, 2010; Braidotti, 2013; Braun & Whatmore, 2010; Haraway, 2006; Harbers, 2005; Latour, 2005; Law & Hassard, 1999). This highlights the possibility of relating to beings other than humans as subjects and kin, acknowledging their unique identity, inherent worth and integrity (Haraway, 2016; Kimmerer, 2013). What this entails is a recognition of interconnected becoming, or "interbeing" (Hanh, 2017) and the importance of being in "right relationship" with the world (Brown *et al.*, 2009; Ferguson & Weaselboy, 2020, 2020; Gram-Hanssen *et al.*, 2022; Thaman *et al.*, 2013). The principle emphasizes moving away from instrumentalized relationships of extraction, exploitation, domination and control and towards fostering values of care, respect, solidarity, responsibility and stewardship (Hinchliffe, 2008; IPBES, 2019c, 2022b, 2022a; Petersmann, 2021; Thaman *et al.*, 2013; Turnhout *et al.*, 2013; West *et al.*, 2018). Acknowledging humanity's dependence on nature can be expressed in attitudes of gratitude for the gifts of Mother Earth[3] and a willingness to give back (Kimmerer, 2013, 2014), e.g., through processes and actions for restoration, reparation and regeneration.

The essence of this principle can be found in a wide range of concepts in Indigenous languages (see **Table 5.3**). This includes for example, *"suma qamaña"*[3] (a term from the Aymara people of Bolivia meaning living well together with harmonious relationships between people and nature) (Albó, 2018; Artaraz & Calestani, 2015); *"kciye"*[3] (a Penawahpskek word meaning harmony with the natural world entailing both recognition of interconnectedness[3] and adopting attitudes, beliefs and actions that enact this in practice) (S. Mitchell, 2018); *"ukama"*[3] (a term stemming from the Shona people of Africa that acknowledges human interrelatedness in a network of mutuality with everything in the cosmos and an ethic of care for the wellbeing of all) (Ikeke, 2015; Murove, 2004); *"birgejupmi"*[3] (a North-Sámi concept that means to have a good life according to what one has access to, living in a modest way with interactions between humans and non-humans based on care and respect) (Rybråten *et al.*, 2024) and *"yindyamarra"*[3] (a vital term for the Wiradjuri people of Australia that is often translated as respect and informs a way of life grounded in mutual respect and caring for all, including self, community, ancestors, land and animals) (B. Sullivan *et al.*, 2016). The essence of the principle of respectful and reciprocal human-nature relations is expressed in all these different terms (and many others) and the expression and enactment of this occurs in various ways across different contexts, reflecting the diversity of cultures and practices across Indigenous Peoples and local communities.

Adaptive learning and action

The principle of transformative change labelled adaptive learning and action is more process-oriented than the others and refers to the specific importance of engaging in ongoing processes of evaluation and reflection to support both adaptive learning and adaptive actions in ways that foster attentive care towards unfolding impacts and mitigation of unintended consequences. Adopting this principle is important in view of the open-ended and unpredictable nature of transformative change (Reyers *et al.*, 2022) and the need to be mindful of emergent impacts and the potential for the processes and impacts of change to perpetuate rather than counter underlying causes (Barth *et al.*, 2023). Despite good intentions, there will always be potential risks from fundamental system-wide change and the possibility of negative impacts or unintended consequences necessitates full attention (Blythe *et al.*, 2018; Menton *et al.*, 2020).

Processes for ongoing learning and adaptation[3] are particularly important for managing trade-offs, for example where climate measures negatively affect biodiversity, or where biodiversity measures result in inequities and injustices (Visseren-Hamakers *et al.*, 2021). Commitment to the principle of pluralism and inclusion of diverse actors, world views and pathways in transformative change is vital to ensure that all relevant stakeholders, perspectives and forms of knowledge are included in deliberations and negotiations guiding transformative change, in the identification of unintended consequences that arise, and in the discussions on how to change course when necessary (Fazey *et al.*, 2018; Ofir & Rugg, 2021). Evaluation, learning and adaptation enable assessments of transformative change processes as they unfold, thereby creating possibilities for self-correction towards the principles.

Adaptive learning and action involves shifts in the evaluation of interventions and their impacts (see **Annex 1.4**). There are multiple frameworks to facilitate adaptive learning and action, including utilization-focused evaluation (Patton & Campbell-Patton, 2022), the 'signals of transformational change' framework (Williams *et al.*, 2021), Patton's six criteria for evaluating transformative development (2021) and principles-focused evaluation (2018). Overall, these approaches encourage a shift towards evaluative frameworks that go beyond top down metrics and support empowerment, participation and reflection (van Mierlo *et al.*, 2010; van Wessel, 2018); align with the realities of systemic transformation (Junge *et al.*, 2020); enable adaptation to dynamically changing conditions (Patton, 2011); enhance creativity, innovation,[3] shared learning and resilience (Gates *et al.*, 2023; Sibanda & Ofir, 2021; van den Berg *et al.*, 2021); encourage commitment to act on evaluation results (Rodríguez-Bilella *et al.*, 2021) and are ethically imperative (Gates *et al.*, 2023; Patton, 2021). The criteria against which transformative interventions are evaluated are adapted to the particular context (ideally co-designed with local stakeholders) (Patton, 2021). This is important because every initiative or program subject to evaluation will be unique and will have context-specific features (Rodríguez-Bilella *et al.*, 2021). More detail on monitoring, evaluation and learning[3] is provided in **Chapter 5**.

1.3.3 The framework of transformative change for a just and sustainable world

Without targeting the underlying causes and being grounded in and guided by the above-described principles, fundamental system-wide changes may occur across views, structures and practices, but these will not necessarily be towards just and sustainable futures (see **Chapter 2** for further analysis of visions for these futures). Adopting these principles as a core part of transformative change actively works to dismantle or decompose the underlying causes of biodiversity loss and nature's decline, thereby preventing transformative initiatives from being co-opted or diluted through "transformations-washing" (Feola, 2015) or inadvertently further consolidating the social and cultural patterns identified in the underlying causes.

Indigenous Peoples and local communities have raised important questions about who and what needs to change and have emphasized the differentiated rights regimes between Indigenous Peoples and local communities (IPBES, 2019b, 2022b, 2023). Embracing and being guided by the four principles of deliberate transformative change for a just and sustainable world identified through this assessment allows for a clearer and more nuanced identification of exactly which changes are necessary, i.e., which views, structures and practices are vital to create or foster, and which are important to dismantle or decompose through processes of transformative change.

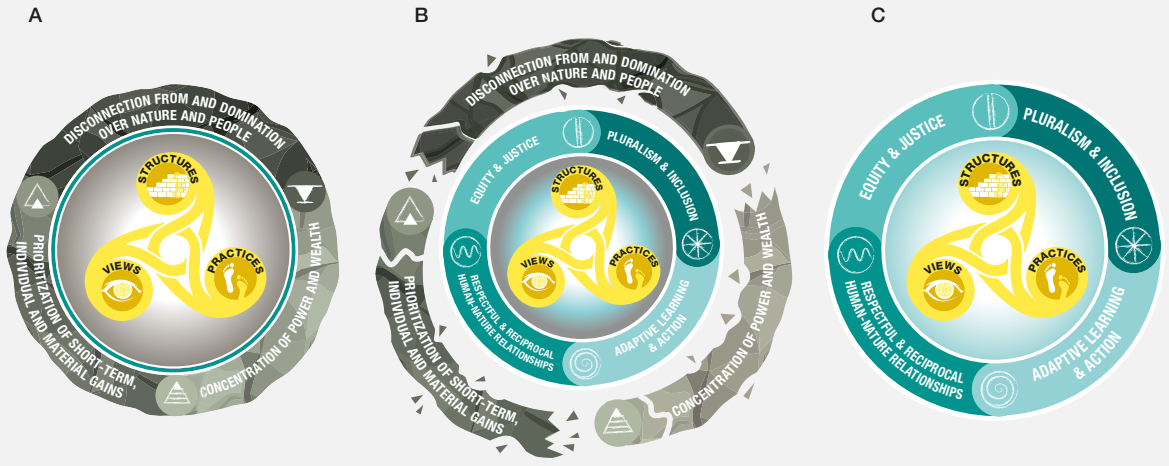


Figure 1 8 **The framework of transformative change for a just and sustainable world.**

(A) indicates views, structures and practices (the inner golden spirals) being strongly shaped by the underlying causes of biodiversity loss and nature's decline (solid grey ring). **(B)** shows shifts in views, structures and practices breaking the influence of the underlying causes when they are guided by the four key principles of transformative change (blue ring). **(C)** illustrates a just and sustainable world, with prevailing views, structures and practices aligned with the principles of transformative change. This framework can be used by different actor groups to help identify where and how they can promote, accelerate and scale the process of transformative change towards a just and sustainable world.

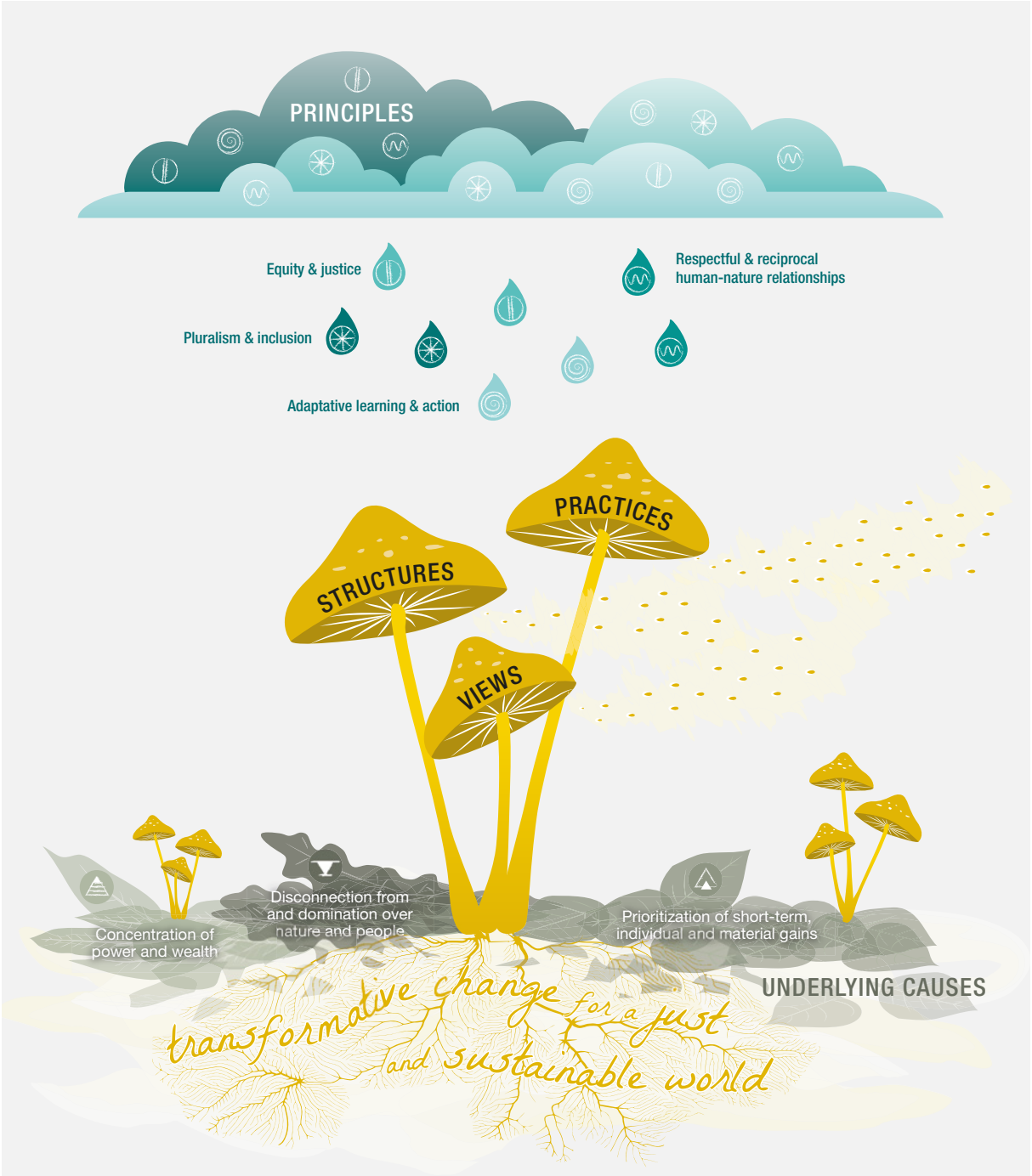


Figure 1 9 **The framework of transformative change for a just and sustainable world through a biological metaphor.**

Fungi are decomposers with the transformative ability to break down dead or decaying matter and make nutrients available to support new life and growth. To do this, they require water at all stages. In this representation, the underlying causes are the material to be broken down and decomposed. The principles are the rain necessary for the mushrooms representing new views, structures and practices to emerge and spread. Different actors and initiatives are the hyphae (root like filaments) that take up the principles, decompose the underlying causes, and swell into the mushrooms of new views, structures and practices. Together these collectively form the expanding mycelium of transformative change for a just and sustainable world. Transformative change has the possibility to grow both through the mycelium of initiatives expanding and through the mushrooms of new views, structures and practices releasing spores and establishing themselves in new locations.

This assessment's identification of a) the underlying causes of biodiversity loss and nature's decline, b) the dimensions of what constitutes transformative change and c) the key principles to guide deliberate transformative change for a just and sustainable world all come together in the transformative change framework. This framework is presented in two different visual forms. **Figures 1.8** and **1.9** represent two ways of understanding and thinking about the framework of transformative change for a just and sustainable world, each of which may connect, be meaningful for, or accessible to different audiences.

1.4 OPERATIONALIZING TRANSFORMATIVE CHANGE

1.4.1 Transformative change happens through initiatives at multiple scales and levels

Studies of transformative change emphasize that it involves many context-specific, local or place-based initiatives that seek changes on the ground (Lam *et al.*, 2020). Such examples are evident in a range of collections and databases (E. Bennett *et al.*, 2016; Nishi *et al.*, 2021; Penca, 2020; Temper *et al.*, 2018), including in the case study database (see **Section 1.4.3**). Such local initiatives are often transformation experiments in themselves and can be labelled living labs, real world laboratories, transdisciplinary cases or transformative spaces and serve as forums to develop and test context-specific solutions (Bulkeley *et al.*, 2016; Pereira *et al.*, 2018; Schäpke, Stelzer, *et al.*, 2018; Wolfram *et al.*, 2016). While some of these initiatives seek holistic cross-sectoral sustainability, many are sector specific (e.g., focused on food, energy or mobility) or limited in geographic scope (Leventon *et al.*, 2022).

The scale of the underlying causes of biodiversity loss and nature's decline mean, that transformative change for a just and sustainable world will only occur when initiatives are embedded in and connected to scales[3] and decision-making levels that extend beyond local communities. Yet, there is tension between local and global scales in transformative change (Escobar, 2000; IPBES, 2023) and a gap between the scale at which people experiment with and study transformative change initiatives, and the global level phenomena that these initiatives seek to address (Salomaa & Juhola, 2020). Indeed, there is strong agreement that opportunities to act and innovate or behave differently at local scales can be restricted by views, structures and practices originating in broader scales and levels (Brosch & Steg, 2021; Eom *et al.*, 2016; Javaid *et al.*, 2020; Kashima, 2020; Leventon *et al.*, 2024; Marteau *et al.*, 2021; Nielsen, Marteau, *et al.*, 2021; Rosengren *et al.*, 2023; Seto *et al.*, 2016; Thøgersen *et al.*, 2021). It is vital to address this gap through transformative initiatives that engage the systems-wide conditions and broader geopolitical, macroeconomic and social-cultural paradigms that shape these systems (Geels, 2014, 2019; Kanger, 2021; Keller *et al.*, 2022; Raven *et al.*, 2012). These can include changes at multiple levels of governance systems (Leventon *et al.*, 2021; Visseren-Hamakers *et al.*, 2021), for example driving changes in decision-making processes and outcomes (Bolton, 2022; Roelich, 2020) or intentional facilitation of alternative systems (e.g., decentralized energy systems operating at the level of communities or municipalities) (Dütschke & Wesche, 2018).

Because views, structures and practices influence each other across scales and levels, some interventions and actions will create impacts beyond their initial starting point (Cash *et al.*, 2006). For example, some people can make changes at higher scales that unlock changes for many others at more local scales (Bolton, 2022; Stirling *et al.*, 2023; Whitmarsh *et al.*, 2021). Newell *et al.* (2021) frame this as deep scaling[3] whereby political-economic systems change to unlock, incentivize and encourage changes to the behaviour of a larger number of people. This approach gives governments and private corporations a leading role in creating change at broader levels and scales. Alternatively, a significant body of research refers to stimulating behaviour changes in large numbers of people in order to create sustainability transformations, thus scaling from individual change to society-wide change (Newell, Srivastava, *et al.*, 2021; Otto *et al.*, 2020; Whitmarsh *et al.*, 2021). According to this perspective, local transformative change initiatives can scale out (replicating an initiative to more locations), scale up (looking to higher policy levels to remove barriers to change) and scale deep (prompting deeper changes within actors involved in initiatives) (M.-L. Moore *et al.*, 2015). **Chapter 3** offers more detail on processes of scaling transformative change. Respecting the principles of pluralism and inclusion, and adaptive learning and action, will mean that processes of scaling will create shifts in the groups of initiatives contributing to transformative change over time (e.g., the actors involved, the types of actions taken or the locations of change).

1.4.2 There is a role for everyone within their own sphere of influence

Given the multiple scales and levels of transformative change and the context-specificity of how to enact the principles of transformative change, there is scope for everyone to play a role in creating just and sustainable futures. There are different national circumstances, imperatives and personal capacities to act in global

Table 1 1 **Five broad categories of the roles that people play in the process of transformative change.**[15]

Role	Description	Key References
Innovating and creating change	Creating new views, structures and practices that support a just and sustainable world. This can include change agents and systems entrepreneurs, as well as those who lead social and/or technological innovations and organize communities, working to create new ways of thinking, organizing and doing. Such innovations can also include ways to dismantle or replace views, structures and practices that are reinforcing the underlying causes.	Buhr *et al.* (2023); Kapoor (2007); M.-L. Moore *et al.* (2018)
Adopting and following change	Adopting new views, structures and practices that support a just and sustainable world. This can include the adoption of new technologies, changing modes of transport and mobility practices, food choices or patterns of consumption, as well as participating in community initiatives organized by others.	Alexiades (2009); Dabezies & Taks (2021); Geels *et al.* (2018); N. Gupta *et al.* (2019); Ingold (2002); Kemp *et al.* (1998); Mayaux *et al.* (2022); Olsson *et al.* (2014); Renn *et al.* (2021); Reyers *et al.* (2018); Siamanta (2021); Taebi *et al.* (2014); Trahan & Hess (2022); Whitmarsh *et al.* (2021); Wolfram *et al.* (2016)
Raising awareness	Demonstrating, communicating and educating about views, structures and practices that advance a just and sustainable world. This can include helping others to see the necessity and urgency of change, as well as the possible and available alternatives. Raising awareness enables others to see their choices and opportunities for participating in change.	Barbosa (2017); Coolsaet (2016); Fernandes-Jesus & Gomes (2020); Hope (2021); Kapoor (2007); Kenis *et al.* (2016); Meek (2016); M.-L. Moore *et al.* (2018); Rosset *et al.* (2019); Schlosberg & Coles (2016); Schmid (2019); Temper *et al.* (2018); Wolfram *et al.* (2016); Yates (2015)
Unlocking broader changes	Making decisions that influence the shift towards views, structures and practices supportive of a just and sustainable world across different systems and sectors. This is enacted by people in positions of power and capacity to make decisions. Unlocking change can happen by creating new views, structures or practices, or by dismantling those that block change for others. This can include changing financial incentives or energy or transport infrastructures to enable others to make choices that support sustainability objectives.	Black *et al.* (2023); Bolton, (2022); Newell, (2021)
Influencing powerful actors to create change	Campaigning and advocating for views, structures and practices that support a just and sustainable world. This can include mobilizing actors and encouraging change by those with more power or decision-making authority, through actions such as protest, lobbying, voting or participating in consultations. Influencing change goes beyond raising awareness, into actively motivating and encouraging actions that can unlock broader changes without coercion or manipulation.	Barbosa (2017); Coolsaet (2016); Fernandes-Jesus & Gomes (2020); Hope (2021); Kenis *et al.* (2016); Meek (2016); Pelenc *et al.* (2019); Pelenc & Dubois, (2020); Rosset *et al.* (2019); Schlosberg & Coles (2016); Schmid (2019); Temper *et al.* (2018); UN Department of Economic and Social Affairs (2023); Van Den Berg *et al.* (2022); van den Berg *et al.* (2021); Yates (2015)

processes of transformative change (Shen *et al.*, 2023). However, all actors and individuals have the potential to contribute to the process of transformative change from within their own spheres of influence (O'Brien, 2021). The term sphere of influence refers to the domain in which a person (or organization) has the capacity to encourage or effect meaningful change. This includes the range of people and topics they have the potential to engage with and the spatial reach of their actions, ideas or decisions, as well as the specific context, stakeholders, or systems that can be shaped by their identity and interests.

Roles of people vary with the scale of action they are taking, if they are seeking change through collaboration or confrontation, and if they are seeking change within themselves, or encouraging others towards change (Kirsop-Taylor *et al.*, 2023). However, roles can also be more passive, for example participating in change opportunities and decision-making processes created by others (United Nations Department of Economic and Social Affairs, 2023). Actors can also work to oppose transformative change (see **Chapter 5**) but when focusing on the different roles available for those who promote deliberate transformative change, these can be summarized into five broad categories **(Table 1.1)**. These roles overlap with the practices outlined in **Section 1.3.1**, but the chapter makes the distinction that roles are the actions that actors can take with the intention of changing views, structures and practices.

15. Analysis of contributions on what transformative change is, according to different communities of knowledge (https://doi.org/10.5281/zenodo.10246572).

The precise actions that can be taken in each category are numerous (see **Chapter 5**) and will be effective if guided by the principles of transformative change for a just and sustainable world. Actions available extend beyond those that are directly and deliberately targeting biodiversity because biodiversity loss is one of multiple interacting crises currently driving nature's decline **(Section 1.2.1)** and the underlying causes are not specific only to biodiversity loss **(Section 1.2.2)**. Therefore, actions that address the underlying causes will not necessarily all focus specifically on biodiversity as a core input or outcome of their process. Indeed, actions that address wealth inequality and social wellbeing are as important a part of transformative change for a just and sustainable world as those that create habitat for an endangered species, even if the impact on biodiversity cannot be measured as neatly. Different types of action for transformative change and their relationship to biodiversity are summarized in **Table 1.2**.

The roles people play and the actions they take can depend on their sphere of influence as well as on the capacities that they have. This assessment explores four general categories of actors that promote transformative change (see **Table 1.3** and **Chapter 5)**: civil society, government, private sector and communicators and knowledge holders. People can fall into more than one category due to the way multiple overlapping identities can be held across professional and personal lives. People can also exercise their agency across practical, political and personal spheres (O'Brien *et al.*, 2023; O'Brien & Sygna, 2013). Many people take multiple, changing roles as part of their participation in evolving, complex systems (Fischer & Newig, 2016; Lyon *et al.*, 2020). For example, as actors in the general category of civil society, women, youth and Indigenous Peoples and local communities have instigated change by adopting different roles while speaking and acting from these specific identities (Dawson *et al.*, 2024). Actors may play one role in their personal lives through activities online (e.g., media and communication) and another in their professional lives (e.g., in the private sector by changing company processes). Individuals can create and contribute to impacts at much broader scales than just individual change, through their activities towards transformative change and the way they inform, inspire and unlock change for others (O'Brien *et al.*, 2023). However, it is rare that single actors work alone and coalitions of actors working together in networks often have higher impact (see **Chapter 5**).

Some actors possess greater capacity to create transformative change at large scales than others, and they often also have a greater responsibility to act. Those who can unlock changes for others are those that are often key decision- and policymakers who can create

Table 1 2 **Types of actions for transformative change for a just and sustainable world.**

Type of action	Description
Transformations FOR biodiversity	Transformative changes made with a primary intention to specifically conserve, sustainably use, share benefits from, and/or restore biodiversity. These are changes made with biodiversity at the centre of decisions and can include on-the-ground conservation projects, as well as changes to policy and integrated governance with the specific intention of creating benefits to biodiversity (Berger *et al.*, 2024). Transformations FOR biodiversity mean that biodiversity is mainstreamed through other policy areas to ensure decisions benefit biodiversity (ENCA, 2022).
Transformations THROUGH biodiversity	Exploring and implementing possibilities for facilitating transformative change through the use of biodiversity. Such transformations could, for example, include adaptation to and mitigation of climate change through the implementation of measures such as nature-based solutions[3] and ecosystem-based approaches.[3]
Transformations OF biodiversity	Engaging with transformative understandings of (as well as relationships with) nature beyond those currently linked to or embodied within the term "biodiversity". This involves a recognition that nature can mean more to some people and cultures than the term biodiversity allows; transformations to the way biodiversity is understood and framed may shape how people protect and live within nature. For some cases and with cautions around invasive alien species, transformations of biodiversity could also include translocating or enhancing the evolution or characteristics of species as a way to adapt to significantly altered future environments (e.g., developing or translocating coral species with a higher tolerance for warmer waters).
Transformations BEYOND biodiversity	Drawing on the beneficial knowledge and actions related to transformative change that exist beyond those focused specifically on biodiversity, including awareness of the interconnections and interactions between different sectors, or between environmental, economic and social systems and crises. Transformations BEYOND biodiversity might include changes targeting public health, energy security, gender equality or racial equity. Such transformations can have positive impacts also on biodiversity (direct and indirect) and generate knowledge about transformative change that is applicable to biodiversity.

Table 1 3 **Summary of actor types and actor groups, exemplified with initiatives from the case study database.**[16]

The analyses of the transformative change assessment corpus of literature on case studies (referred to hereafter as case corpus) used 17 actor groups as described in the second column.

Categories of actors	Examples of actor groups*	Example initiatives from the case study database
Civil society	• Individual citizens • Indigenous Peoples • Local communities • Civil society organizations • Non-governmental organizations • Environmental movements/activists	• Malama Maulamua (United States of America) • Nashulai Maasai Conservancy[17] (Kenya) • Mujeres y Ambiente (Mexico) • Os Miñarzos MPA[18] (Spain) • AKTEA (Europe) • Chipko Movement (India) • Namati (Global)
Government	• Local/regional governments • National governments • Intergovernmental organizations • Justice system	• Coexistence with the crested ibis in Sado[19] (Japan) • Pachamama – Ecuador Constitution (Ecuador) • EU Water Framework Directive (Europe) • Kunming-Montreal Global Biodiversity Framework (Global)
Private sector	• Donors/philanthropic foundations • Financial actors • Business	• Bhutan Trust Fund (Bhutan) • ABALOBI (South Africa) • Coral Vita (The Bahamas) • FinTech Ant Forest (China)
Communicators and knowledge holders	• Education • Media and communications • Networks • Scientific community	• GemüseAckerdemie • (Europe – Austria, Germany, Switzerland) • French television weather news (France) • Small Scale Fisheries Academy • IPBES (Global)

structures that embed sustainability–aligned views and values and facilitate sustainable practices (Newell, Twena, *et al.*, 2021; Nielsen, Nicholas, *et al.*, 2021; Stoddard *et al.*, 2021). Furthermore, people with higher income can contribute with significant benefits to the environment by participating in transformative change as their lifestyles usually have a higher environmental footprint (see **Section 1.2**), because of their ability to raise awareness and inspire change in lifestyles, and due to their power and access to decision-making (Nielsen, Nicholas, *et al.*, 2021). The outsized responsibilities of the wealthy are seen within countries, as well as between countries (Koslowski *et al.*, 2020; Kubiszewski *et al.*, 2024; Weinzettel *et al.*, 2018). Embodying the principle of equity and justice thus enables people and countries with greater capacity and power to take responsibility for their roles in unlocking changes for others.

16. See summary of these initiatives in **Annex 1.5**.
17. This case study is presented in **Box 1.4**.
18. This case study is presented in **Box 1.3**.
19. This case study is present in **Box 1.2**

1.4.3 Realizing transformative potential and cultivating transformative capacities

Transformative change for a just and sustainable world will occur through a collective of various actors working within, and extending their own spheres of influence to create many different initiatives across multiple scales and levels. To address the global scale of the underlying causes, deliberate transformative change will necessarily shift views, structures and practices at more than just a single point in space and time, or a single level of policy and governance. It will also extend beyond focusing on biodiversity in isolation from other global sustainability challenges. In sum, deliberate transformative change for a just and sustainable world will occur through a rich mosaic of many different types and forms of initiatives and actions (Global Tapestry of Alternatives, 2020; Rodríguez, 2023).

The multiplicity of opportunities for diverse initiatives within this mosaic **(Figure 1.10)** means that there is enormous potential to create transformative change for a just and sustainable world. Transformative potential is a latent quality, characteristic or ability for realizing fundamental,

Figure 1 10 **The mosaic of transformative change for a just and sustainable world.**

Transformative change for a just and sustainable world will occur through many different initiatives engaging with views, structures and practices in ways that embody the four principles (i.e., equity and justice, pluralism and inclusion, respectful and reciprocal human-nature relationships and adaptive learning and action) across multiple scales and levels. In this figure, the image of the coral reef represents a biodiverse world in which nature and people thrive together, while the multiple faces represent the wide range of initiatives involved in the unfolding process of transformative change and the notion that there are roles for all. The mosaic communicates the way that deliberate transformative change for a just and sustainable world will occur through the collection of all these efforts, actions and initiatives by multiple actors.

systemwide shifts in views, structures and practices to address the underlying causes of biodiversity loss and nature's decline. This latent potential is demonstrated by the wide range of initiatives that are already working towards a just and sustainable world, as documented in the case study database[20] and illustrated in the boxed examples (**Box 1.2**, **Box 1.3** and **Box 1.4**). These initiatives are taking actions towards achieving global sustainability objectives that in some way engage with views, structures and practices, and embody the principles of transformative change. They are therefore participating in the emerging mosaic of transformative change. There is, however, additional scope for each initiative and action to more fully realize its transformative potential. Since transformative change is a process rather than a single specific endpoint, actions and initiatives can always further develop and grow their impact by improving or expanding the extent to which they strategically engage with all three dimensions of views, structures and practices together with all principles of transformative change for a just and sustainable world.

Given the persistent and pervasive challenges facing transformative change **(Chapter 4)**, the many theories and approaches that can be combined **(Chapter 3)**, and the diverse strategies, options and pathways that are available **(Chapter 5)** for achieving visions of a just and sustainable world **(Chapter 2)**, realizing transformative potential will inevitably involve the development and cultivation of transformative capacities.[3] Transformative capacities refer to the knowledge, skills and attitudes necessary to realize transformative change, including by working with available resources within spheres of influence to realize transformative change. These capacities are described throughout the chapters of this assessment.

20. Case study database with transformative potential and pitfalls (https://doi.org/10.5281/zenodo.10260233).

Boxes describing different case study initiatives are presented below, with the information provided indicating how these initiatives work with the different components of transformative change, and identifying where they may still have potential to develop transformative capacities and expand into their full transformative potential.

Box 1 2 **Case study: Harmonious coexistence with the crested ibis in Sado Island.**

School children and Non-Governmental Organization members monitor biodiversity by a rice field.
Photo credit: Yuki Yoshida – CC BY.

Location: Japan
Actor groups: Government – national, prefectural, local; civil society – non-governmental organizations, farmers; communication and knowledge – multi-sectoral committees, scientists; private sector – agricultural cooperative, retailers, consumers.

In Sado, Japan, multi-stakeholder efforts have enabled the resurgence of the crested ibis. The ibis was once ubiquitous, relying on human activities for habitat. However, overhunting, and particularly, loss of habitat and feed due to modernization of agriculture (such as institutional land improvement measures and the use of pesticides) led to its extinction from the wild in 1981. Alongside its reintroduction in 2008, cooperation amongst the local government, agricultural cooperatives, non-governmental organizations and farmers [pluralism and inclusion] led to institutional structures such as direct payments to farmers for agroecological practices and capacity-building (e.g., technical training, school education) (M. Takahashi & Honda, 2016; Y. Takahashi *et al.*, 2023). Residents show close attachment to nature, with many residents including children participating in biodiversity monitoring and demonstrating a high level of environmental awareness (Kawashima *et al.*, 2023; Sado City, 2012; Yoshida *et al.*, 2022) [views]. Moreover, conservation efforts commit to equity and justice (e.g., ensuring equitable accessibility of the payment scheme (Japan Ministry of the Environment, 2023; Y. Takahashi *et al.*, 2023) and explicitly strive towards harmonious coexistence of humans and nature (e.g., FAO, 2024; Sado City, 2012) [respectful and reciprocal human-nature relationships]). Takahashi *et al.* (2023) point to adaptive management of the agroecological certification scheme as a venue for potential future transformation [adaptive learning and action].

Legend:
Dimensions: views; structures; practices
Principles: equity and justice; pluralism and inclusion; respectful and reciprocal human-nature relationships; adaptive learning and action

Box 1 3 Case study: Co-management of the Marine Reserve "Os Miñarzos" (Galicia-Spain).

Photo by courtesy of Antonio García-Allut; Copyright © Lonxanet Foundation for Sustainable Fisheries 2024.

Location: Spain
Actor groups: Civil society – small-scale fishers, *cofradias* (fishing guilds), non-governmental organizations; government – regional government; knowledge – scientists.

The Prestige oil spill in 2002 was Spain's largest environmental disaster that caused high environmental, social and economic damages. In response, fishers from Lira (Galicia, Spain), came together to create the *Os Miñarzos* Marine Reserve of Fishing Interest in April 2007. The objective of the 2,000-hectare Marine Reserve of Fishing Interest was to guarantee the sustainable use of marine resources with two core areas of 78.8 and 61.3 hectares where fishing activity was restricted [structures]. This initiative brought together different actors of an earlier fragmented and divided fisheries sector who now increasingly trust and respect each other and value long-term sustainability of the Marine Reserve of Fishing Interest [views]. A cooperative under the leadership of local fishers and communities was established and laws and regulations that support sustainable fishing practices were designed and implemented [structures]. Several changes were observed, including sustainable fishing practices by local fishers, research and participatory monitoring by scientists who combined both scientific and local knowledge, and inclusive governance approaches[3] with most of the decisions taken by consensus [practices] (Villasante *et al.*, 2021). The *Os Miñarzos* Marine Reserve of Fishing Interest was registered under the Fisheries Law of the *Xunta de Galicia* [structures] (Law 11/2008, December 3, of Galician Fishing) (Pascual-Fernandez *et al.*, 2020).

There are gaps in understanding the impact of this initiative on equity and justice, but there is high emphasis on the co-production[3] of knowledge and active, multi-actor processes for coordination resulting in significant reduction in conflicts and in mistrust between the local government and fishers [pluralism and inclusion] (Villasante *et al.*, 2021). However, there exists some tension and contested actions arise from a few *cofradias* and fishers, along with an increase in poaching, indicating the need to address some underlying causes of prioritizing short-term, individual and material gains and disconnection with nature. The marine protected area has been connected not only to other coastal communities in Spain and Portugal but also served as the seed to create a new network of small-scale fishers in Ibero-American countries, involving more than 20 million fishers.

Box 1 4 Case Study: Nashulai Maasai Conservancy – Indigenous and local knowledge informing new ways of coexistence

Traditional community members meeting to discuss the formation of Nashulai Maasai Conservancy.
The Nashulai Maasai Conservancy is owned and governed by the Indigenous Peoples and local community.

Location: Kenya
Actor groups: Civil society – Indigenous Peoples and local communities, individual citizens; communicators – media.

On 28 November 2016, the Nashulai Maasai Conservancy was officially launched as the first Maasai-led and governed conservancy in the Maasai Mara. This community-owned and governed conservancy is an example of a shift from the dominant 'fortress conservation' model that has been practiced for more than a century in Kenya to a model that is based on co-existence, dignity, inclusivity, self-determination, empowerment and human rights [views]. To achieve this, local community members came together and developed a set of bylaws under the leadership of the council of elders and chose to call the conservancy *'Nashulai',* a Maasai word that translates to 'coexistence' – hence a place where people, livestock and wildlife can live together [structures, views]. Community members removed about 20 kilometers of individual property fences and pooled their land together to form the approximately 6,000-acre Nashulai Maasai Conservancy [practices]. Funding for establishing the conservancy came from individual citizens through crowd sourcing and media engagement [practices]. Today, the Nashulai Maasai Conservancy is an officially registered community-based organization with the Government of Kenya and regularly contributes to making policy [structures] (*Nashulai Maasai Conservancy*, n.d.). The Nashulai Maasai Conservancy has seen a reversal of nature's decline with impalas, wild elephants, giraffes, lions and other wildlife returning to the land. Local communities continue to be engaged in governance processes [equity and justice]. Women, who in the past faced gender-based violence, now are actively engaged in economic and decision-making processes [pluralism and inclusion]. Community members have revived the knowledge of their ancestors and deepened their historical and cultural connections to nature [respectful and reciprocal human-nature relationships]. The Nashulai Maasai Conservancy model has been scaled out to at least two other communities in the region and serves as a focal point for inspiring and scaling change in other communities around the world (UNDP, 2021)

1.5 METHODOLOGY AND KNOWLEDGE GAPS

The topic of transformative change calls for particular and additional attention to ensuring inclusiveness (**Section 1.3** and **Box 1.5**). The IPBES Global Assessment notes that "by its very nature, transformative change can expect opposition from those with interests vested in the status quo" (IPBES, 2019a, p. 16). Literature points to two requirements for an assessment of knowledge that avoids perpetuating this status quo. First, it is important to place at the foreground marginalized forms of conceptual and empirical knowledge from a wide diversity of scholarly fields beyond traditional biodiversity research that challenge dominant frames and prevent their reproduction (Arora-Jonsson & Wahlström, 2023; Benton, 2023; Brysse *et al.*, 2013; Castree, 2015; Fricker, 2007; Harding, 1992; Lahsen & Turnhout, 2021; Overland *et al.*, 2022; Rayner, 2014; Saltelli *et al.*, 2020; V. K. Smith, 2010; Stirling, 2019; Swyngedouw *et al.*, 2010; Turnhout, 2024). Of particular importance are critical social science, humanities and decolonial approaches that examine the role of dominant world views and paradigms, power relations, and vested interests and how these resist change and perpetuate the underlying causes of biodiversity loss and nature's decline (Coolsaet, 2016; Fazey *et al.*, 2018; Lahsen & Turnhout, 2021; Leventon *et al.*, 2022; Stoddard *et al.*, 2021). Second, it is important to bridge knowledge to action by means of participatory, co-production and transdisciplinary approaches that support societal actors in challenging the status quo and developing alternatives (Bulkeley *et al.*, 2016; Chambers *et al.*, 2021; De Geus *et al.*, 2023; Fam *et al.*, 2016; Felt *et al.*, 2016; Lang *et al.*, 2012; Ludwig & El-Hani, 2020; Marshall *et al.*, 2018; Max-Neef, 2005; McElwee *et al.*, 2020; Schaefer *et al.*, 2015; Schäpke, Bergmann, *et al.*, 2018; Schneider *et al.*, 2019; Visseren-Hamakers *et al.*, 2021; von Wirth *et al.*, 2019; West *et al.*, 2018).

During the assessment process seven categories of knowledge gaps were identified as relevant to this assessment. Each of the assessment chapters elaborates on applicable categories by providing specific examples of identified knowledge gaps and how they impacted on the assessment. **Table 1.4** provides brief explanations of each of these categories.

Table 1 4 **The typology of knowledge gaps identified as relevant and used in this assessment.**

	Knowledge gap	Explanation
1	Geographic and jurisdictional knowledge gaps	This type of gap refers to how certain countries and regions are under and overrepresented in literature, either in terms of study sites or in terms of authorship. For example, in many fields, there is an overrepresentation of literature by authors from the global North, even when concerning research in the global south (Overland *et al.*, 2022). While this is a broader issue in scientific literature, it is likely exacerbated for the context of transformative change.
2	Knowledge gaps related to the needs of diverse actor groups	This type of gap refers to how diverse actor groups (such as policymakers, businesses, social movements, non-governmental organizations and Indigenous Peoples and local communities), as well as the issues they are concerned with (such as policy and governance, economic interests, justice or rights), are represented in published literature. For example, funding mechanisms can tend to orient to the needs of elite actors (including policymakers or businesses, and their (economic) interests), as well as to mainstream conservation policies and interventions, while the needs of marginalized and vulnerable actors and groups are underrepresented. This knowledge gap can therefore include knowledge on intra and inter-generational knowledge of, and attitudes towards nature and biodiversity; and how biodiversity policies address the perspectives, interests, knowledge and rights of marginalized genders (Booker *et al.*, 2022).
3	Knowledge gaps about historical cases of transformative change	This type of gap refers to the availability and inclusion of knowledge about cases of transformative change from different – historical to current – time periods. For example, literature can have an overrepresentation of current cases, while historical cases are under documented.
4	Linguistic knowledge gaps	This type of gap refers to the availability and inclusion of knowledge in diverse languages. For example, there is often a focus on English language sources over other languages (see also **Box 1.5**).
5	Knowledge gaps about the impacts of interventions	This type of gap refers to the availability and inclusion of knowledge about the intended as well as unintended effects of interventions. This includes interventions that are under or overrepresented and impacts that are over or underrepresented. For example, there can be a focus on formal policy interventions compared to citizen and grassroots initiatives, and a need to consider the complex interactions between multiple interventions. Also, unintended effects tend to receive less attention than intended effects, particularly in evaluation studies, and there can also be imbalances in the reporting of environmental, social and economic effects.

Table 1 4

	Knowledge gap	Explanation
6	Theoretical and conceptual knowledge gaps	This type of gap refers to what disciplines, world views, paradigms and knowledge systems (including associated definitions of key terms and concepts, and methodological approaches) are over or underrepresented in literature. In general, natural sciences tend to dominate social sciences, and within the social sciences, critical, humanities and decolonial perspectives tend to be smaller than disciplines like economics or management sciences. As determined with a systematic review,[21] around 15% of the literature in the nature corpus relates to policy and governance, and around 10% of the literature refers to concepts of nature that go beyond species and ecosystems. Only around 4% of the literature in the nature corpus concerns transformative change. Quantitative approaches tend to dominate over qualitative approaches, and Indigenous and local knowledge systems are marginal compared to academic and scientific systems.
7	Incompatibility related gaps	This type of gap relates to the availability of knowledge that connects across methods, modes of knowledge production, scales or disciplines. For example, there is limited knowledge about how to connect findings about transformative change across different scales (local to global), modes (qualitative versus quantitative; interpretive versus causal), and disciplines and fields (such gaps may also result from differing ontological and epistemological[3] foundations). These incompatibilities produce gaps at the interstices and connections of knowledges across scales, modes and disciplines.

Box 1 5 **Lost in translation.**

Using English as the operating language for this assessment creates some limitations. Translating text from other languages into English is likely to result in a loss of its original meaning. Furthermore, the English language often lacks equivalent concepts, words and/or terms that are available in other languages. For example, Lomas (2019) identified 216 "untranslatable" words relating to wellbeing and many Indigenous languages have a dual or multiple person pronoun that can be used for humanity/nature, which is not available in English (Yunkaporta, 2023). In the case of Indigenous and local knowledge, translating 'oral' knowledge into written forms also results in a loss. Furthermore, in many cases, Indigenous and local knowledge is documented by non-native, non-indigenous researchers, which can result in further loss of meaning. This assessment recognizes and acknowledges these limitations.

In order to counter these knowledge gaps, this assessment took additional actions to increase knowledge inclusivity. This assessment followed the methodology and approach of all IPBES assessments (2018). The methodology and scoping document for the transformative change assessment specify that the assessment 1) is informed by the IPBES conceptual framework (Borie & Hulme, 2015; Díaz *et al.*, 2015); 2) takes a transparent and inclusive approach (Díaz-Reviriego *et al.*, 2019; Pascual *et al.*, 2017); 3) includes diverse scientific disciplines, Indigenous and local knowledge systems, and stakeholders' knowledge and evidence sources; and 4) has multiple rounds of open external review. More specifically, the following actions were taken:

The assessment used the literature catalogue Open Alex, which is a database with global and broad coverage across disciplines, including physical and social sciences and humanities to select documents for systematic literature analysis. The assessment corpus includes documents that intersect search strings linked to transformative change and nature (n=4,720,072) and was used as a common resource across the whole assessment, with chapters performing the specific analyses relevant to their themes of interest.[22]

The assessment held, among others, several dialogue workshops dedicated to implementing the IPBES approach to working with Indigenous and local knowledge systems: to review the scoping document of the transformative change assessment (online, 16 July 2020); to discuss key Indigenous and local knowledge themes and framing of the assessment in the context of the approved scoping report (29 June to 1 July 2022, Bonn, Germany); to review the first draft of the chapters (13-16 February 2023, Leticia, Colombia); and to review the first draft of the summary for policymakers and the second draft of the chapters (13-15 December 2023, Agadir, Morocco). Two reports were

21. Knowledge gaps analysis (https://doi.org/10.5281/zenodo.11657377).

22. Corpus of literature on transformative change (https://doi.org/10.5281/zenodo.10251349).

generated from these dialogues (IPBES, 2022b, 2023) and considered as key inputs for this assessment, together with the dialogue reports from all other IPBES assessments.

In the context of this assessment, as for other IPBES assessments, a call was issued calling for contributions on Indigenous and local knowledge related to transformative change. In response to this call, 118 resources containing photos, games, videos, posters/presentations, web pages, reports, books or book sections, theses, and other types of documents were submitted and assessed.

In addition, and importantly, this assessment assembled a database of 391 case studies. A questionnaire was developed by assessment experts and was distributed to all Transformative Change Assessment experts, Nexus Assessment experts and external reviewers. Respondents could include studies, projects, ventures, initiatives, practices and technologies as 'examples' of initiatives with transformative potential. These were included for analysis through the transformative change assessment.[23]

23. Case study database with transformative potential and pitfalls (https://doi.org/10.5281/zenodo.10260233).

1.6 CONCLUSION

Following an inclusive approach and an assessment of knowledge from across a wide range of actors, communities and fields, **Chapter 1** has synthesized a framework for understanding and operationalizing transformative change for a just and sustainable world. This framework underscores that:

- Transformative change for a just and sustainable world creates shifts across all three dimensions of views, structures and practices in ways that address the underlying causes of nature's decline and biodiversity loss – disconnection from and domination over nature and people; concentration of power and wealth; and prioritization of short-term, individual and material gains.
- Addressing the underlying causes of nature's decline and biodiversity loss involves transformative change guided by four principles – equity and justice, pluralism and inclusion, respectful and reciprocal human-nature relationships, and adaptive learning and action.

The framework for understanding presented in this chapter can be used by a range of different actors to guide their practical actions and to amplify their contribution to the mosaic of transformative change. In addition, useful information that different actors and initiatives can use to realize their transformative potential is provided by the visions, theories, approaches, strategies, options and pathways offered in later chapters. In this way, the assessment describes not only why transformative change is necessary, urgent and challenging, but also how it is possible.

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