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Transformative change for a sustainable management of global commons – biodiversity, forests and the ocean.

Recommendations for international cooperation based on a review of global assessment reports and project experience

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Recommendations for international cooperation based on a review of global assessment reports and project experience

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List of Abbreviations

BES	Biodiversity and Ecosystem Services
BMUV	Federal Ministry for Environment, Nature Conservation, Nuclear Safety and Consumer Protection
BMZ	Federal Ministry for Economic Cooperation and Development
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CFS	Committee on World Food Security
DNS	German Sustainability Strategy
EEA	European Environment Agency
EID	Emerging Infectious Diseases
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
GAFF	Global Alliance for the Future of Food
GBF	Global Biodiversity Framework
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFR	Green fiscal reforms
GHG	Greenhouse Gas
GIZ	German Corporation for International Cooperation GmbH
GSDR	Global Sustainable Development Report
HLP	High Level Panel
ICSU	International Council for Science
IKI	International Climate Initiative
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
IPLCs	Indigenous people and local communities
IUCN	International Union for Conservation of Nature
IUFRO	International Union of Forest Research Organizations
IUU	Illegal, Unreported and Unregulated
KfW	German Development Bank
MBI	Market-based Incentives
NYDF	New York Declaration on Forests
OECD	Organization for Economic Co-operation and Development
PES	Payments for Ecosystem Services
RFMO	Regional fisheries management organisations
SCBD	Secretariat of the Convention on Biological Diversity
SDGs	Sustainable Development Goals
SRI	Swiss Re Institute
TSR	Transformative Sustainability Research
TC	Transformative Change
TEEB	The Economics of Ecosystems and Biodiversity
UN	United Nations
UN Stats	United Nations Statistics Division
UNCBD	United Nations Convention on Biological Biodiversity
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
WBGU	German Advisory Council on Global Change
WEF	World Economic Forum
WOA	World Ocean Assessment
WPN	Germany's Science Platform Sustainability 2030
WWF	World Wide Fund For Nature

Executive Summary

Global scientific assessments increasingly reach the conclusion that transformative change of the world's production and consumption systems is necessary to safeguard and maintain global commons, such as biodiversity, natural forests and the ocean, and to stabilise climate at the planetary scale.

Against this background, the **objective** of the present study is to analyse how to increase the transformative potential of international negotiations and agreements as well as development cooperation programs, projects, and initiatives. First, we develop a **conceptual framework** building on the academic literature. We argue that interventions are much more likely to encourage transformation to sustainability if they are embedded within a more comprehensive framing of transformative change consisting of 1. a compelling transformative vision, 2. knowledge on systemic change, 3. navigation of the dynamics inherent in changing development pathways, and 4. emancipated agency providing room for inclusive deliberation. Transformative governance reflects this framing by being inclusive, informed, integrated, adaptive and accountable. We then identify **core challenges and gaps** for the conservation and sustainable management of biodiversity in general and for forests and the ocean in particular by (i) examining the recommendations from global assessment reports on the state of nature and the environment, and (ii) analysing international cooperation projects for biodiversity, forests and the ocean with regard to their transformative potential. Finally, we provide **recommendations** on how Germany[1] can support transformation at home, and in the context of international and development cooperation.

The evaluation of the **cross-cutting challenges and underlying causes driving the degradation and loss of global commons**, as identified by the assessments, can be summarised across biodiversity, forests and the ocean:
Over-consumption and excessive waste, especially in the wealthier societies, have led to a level of **resource demand that increasingly exceeds biophysical capacity. Production practices** have high environmental and social impacts, the costs of which are borne by others, including future generations. Impacts in many cases **degrade and reduce the remaining global commons**, and further **aggravate already high levels of socio-economic inequality**.

These challenges can be reformulated as ambitions to guide transformation towards sustainable management of global commons:

1. Reduce overall pressure on natural resources by encouraging more balanced and responsible consumption levels. This includes a reduction of overall material consumption levels and waste, especially in the global north.

2. Strive for production patterns that significantly reduce negative impacts and include all remaining social and environmental costs in product prices – production based on full cost accounting.

3. Reduce socio-economic inequalities, both by ensuring fair access to and distribution of ecosystem service benefits, ensuring self-determined choices and a life in dignity for all.

4. Safeguard, restore and allow recovery of critical elements of global commons to ensure and – where possible – to increase nature's contribution to people.

This shows, the need to not only introduce sustainable practices but also to phase out unsustainable ones. Our analysis concludes that the measures proposed by global assessments constitute important starting points but leave considerable gaps on how to best address these cross-cutting challenges and support the required transformative change. For several of these gaps additional literature provides interesting ideas. Similarly, project experience points to some promising approaches on how to support far-reaching change processes. Findings are summarised according to the building blocks of our framework on transformative change:

[1]The study was supported by German Ministry for Development Cooperation, BMZ who are the principal addressee of recommendations, most of the recommendations apply to other countries in a similar fashion.

Transformative vision (What futures do we want?)
There is a need for a set of mutually compatible compelling new narratives to motivate and guide transformative change conducive to global commons. These cannot rely mainly on biodiversity but need to address economic and social concerns and should contribute to the reduction of inequalities.

Transformative knowledge (What needs to be known for changing the system?)
The most important gap is knowledge on system change, on how to support the transformation of global production and consumption patterns, and on how to address inequality. A democratisation of knowledge is needed, with the goal of deriving context-based, pluralistic and goal-oriented options for strategic interventions. Enhancing Science-Policy-Society interfaces by knowledge co-production and establishing interactive settings for experience sharing are good strategies to achieve this.

Transformative dynamics (How to navigate, nudge and nurture system change?)
The biodiversity agenda should be linked up with the agenda of recovery from the global COVID-19 pandemic and the climate change agenda; else, there is little hope for 'bending the curve' in time. More emphasis is needed on replacing and systematically phasing out unsustainable production and consumption.

Emancipation and agency (How to open spaces for deliberation, inclusion and emancipation?)
Taking cultural diversity seriously and opening spaces for debate on how we want to live is essential to achieve the much-advocated value change and to find ways for a good life and decent livelihood for all humans without degrading global commons. This is especially important in light of strong resistance to change to be expected from those who benefit from the current set-up.

Transformative Governance (Adequate combination of relevant actors (who?), instruments (what?) and governance modes (how?))
The analysis identified several proposals for actions and solutions with high transformative potential. They particularly address the challenge of current production and consumption patterns exceeding biophysical capacities of the planet. These include (i) redirecting finance, (ii) changing incentives, (iii) mandatory supply chain legislation, and (iv) extending rights-based approaches. The agri-food system is a good place to start such a transformation as it directly impacts all of the commons analysed, and is characterised by persisting global and local inequalities.

The study closes with **recommendations** to encourage transformative change for a sustainable management of the global commons of biodiversity, forests and the ocean. While governments should lead by changing rules and incentives, to enable effective transformation, all actors – public, private as well as civil society – have an individual, complementary, and nested role to play.

Global commons would benefit from transformation in three different yet mutually enhancing arenas:

1. 'Transform in Germany and within the EU': Global transformation requires that affluent industrialised societies make substantial and quick progress in reducing their biodiversity, carbon, water and pollution footprints. Thus, they would reduce pressure on global commons and provide examples of how the necessary changes can be achieved.
2. 'Forge international policy for transformation': International commitments and global policy processes should strive for changing rules and incentives towards achieving the SDG (Sustainable Development Goals) agenda. Policy and regulation of supply chains, liabilities, rules for the finance and insurance sectors have significant transformative potential.
3. 'Practice development cooperation which supports transformation in other parts of the world': Options range from finance for supporting the implementation of the SDGs to supporting countries to participate in revising international trade and supply chain policies, to facilitating the civic search for a transformation vision within partner countries.

Recommended measures for all three arenas are presented in tables in the final chapter of the report.

This is a crucial time for the biodiversity agenda to continue creating momentum. The post 2020 global biodiversity frame should help set humanity on a development path that "does justice to humanity's obligations to itself and to the planet which is its home" (Justice C.G. Weeramantry, International Court of Justice 1997). The Covid-19 pandemic and the twin crises of climate change and biodiversity loss remind us of the urgency of action.

1 Introduction

Each year the global economy uses 1.6 times the natural resources our planet produces per year, this means that we – the global population – are using up the basis of our existence and increasingly turning our planet into a less hospitable place (Lin et al. 2020, Dasgupta et al. 2021: 30). Similar to the situation of a village pasture, which is open to everyone, once it is overused, everyone loses and the pasture becomes degraded. Biodiversity, the remaining large forests and the ocean all fall into the category of global commons (Mrema 2017); we can all use and degrade them and will obtain short-term individual gain. But every additional use and degradation is to the detriment of the entire system and ultimately to all of us. This is what Garrett Hardin famously called the "tragedy of the commons" (1968). Elinor Ostrom (1990) described many successfully managed and maintained local 'commons' around the world and identified the success factors behind such sustainable management: accepted and enforced rules that are based on the production capacity of the natural system and allow it to regenerate. Today, such rules and institutions are urgently needed on a global scale. By endorsing the United Nations Sustainable Development Goals (SDGs), the global community has agreed on an encompassing set of targets and principles, but we are not on track towards actually achieving those (UN Stats 2021).

At a global scale, we are making particularly little progress towards SDG 14 "conserving life below water" and 15 "life on land" and thus on safeguarding functioning ecosystems (UN Stats 2021: 54f.). None of the International Convention on Biological Diversity (CBD) 20 Aichi Biodiversity Targets to 2020 have been achieved (SCBD 2020) and a broad agreement is emerging among the policy and science communities that fundamental change is required to effectively address the big drivers and to "bend the curve" of biodiversity loss (Leclere et al. 2020, Figure 1). The IPBES (Intergovernmental Platform on Biodiversity and Ecosystem Services) Global Assessment calls for "transformative change towards sustainability," defined as a "fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values" (IPBES GA SPM 2019: 14). Transformative change is increasingly postulated for tackling 'wicked' problems such as climate change or global biodiversity loss (compare also in Germany: WGBU 2015, or in Europe: EEA 2018, 2019).

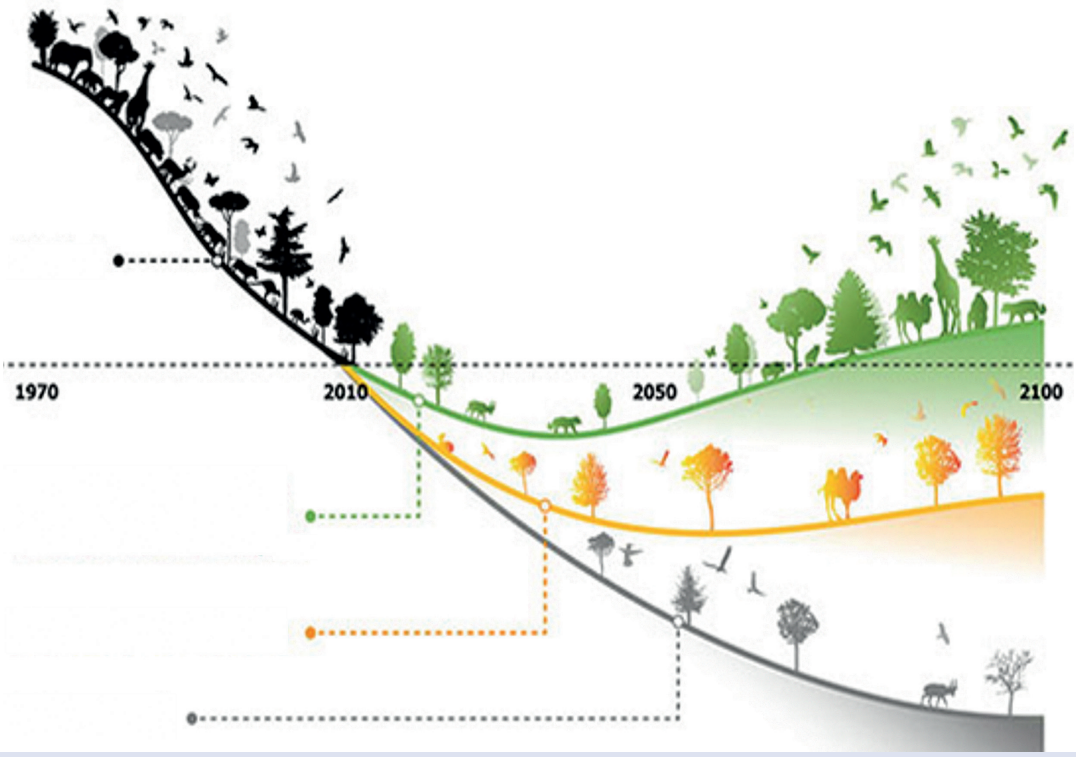


Figure 1: Bending the curve. Source: https://www.pbl.nl/en/publications/bending-the-curve-of-terrestrial-biodiversity-0 (last accessed 10.08.2021) based on Leclere et al. 2020; this artwork illustrates the main findings of the article, but does not intend to accurately represent its results.

The IPBES Global Assessment (GA 2019) very explicitly calls for transformative change as summarised in Chan et al. (2020). It speaks of 'sustainability pathways' and provides first ideas on how these could be pursued: levers and leverage points (GA Chapter 5; see Box 1) and requirements for transformative governance (GA Chapter 6). These ideas will also be considered in this report in more detail (see Chapter 3).

Box 1: Leverage points and levers for sustainability pathways

Based on the IPBES Global Assessment (2019), Chan et al. (2020) define eight priority 'leverage points' which describe principal areas for needed change: (1) Visions of a good life, (2) Total consumption and waste, (3) Latent values of responsibility, (4) Inequalities, (5) Justice and inclusion in conservation, (6) Externalities from trade and other telecouplings, (7) Responsible technology, innovation and investment, and (8) Education and knowledge generation and sharing.

They also define a set of five policy levers for bringing about such change: (A) Incentives and capacity building, (B) Coordination across sectors and jurisdictions, (C) Pre-emptive action, (D) Adaptive decision-making and (E) Environmental law and implementation. Such categories can be specified in many different ways and at different levels.

While there seems to be agreement on the need for transformative change, the ideas outlined in the IPBES Global Assessment are only first pointers for how to make this happen. Further contributions to this question can be expected from Chapter 5 of the ongoing IPBES Methodological Assessment on the values of nature, which deals with 'transformation to just and sustainable futures', and from a future IPBES assessment specifically dedicated to the topic of transformative change.

While economic transformations (e.g. in post-Soviet countries) and socio-technical transitions (e.g. towards renewable energy) have been well studied and understood, the called-for socio-ecological transformation at global scale is largely uncharted territory. The 'commons' character underlines the interconnectedness of regional environments within a global biosphere, and of regional resource use within a globalising economy. National responses can contribute, but rarely by themselves change global system conditions. The maintenance and integrity of global commons will rely on international cooperation and on collective choices (Brousseau et al. 2012).

For the next ten-year Global Biodiversity Framework of the CBD further efforts are urgently needed to promote transformative change. As one example for such efforts, in mid-2020, the European Commission organised a workshop, with support from the 'EKLIPSE science-policy mechanism on biodiversity and ecosystem services', to help policy makers identify how the post-2020 Global Biodiversity Framework can better encourage transformative change (Bulkeley et al. 2020).

The present study builds upon and extends this effort by identifying options on how to increase the transformative potential of international and of development cooperation programmes, projects, negotiations and initiatives. This will be done (i) by examining conclusions and recommendations from global assessments and reports on the state of nature and the environment, and (ii) by analysing selected international cooperation projects for biodiversity, forests and the marine realm with regard to their transformative potential.

This study aims at answering the following questions:

- What does transformative change have to entail in order to lead to sustainable management of global commons?
- How can transformative change towards sustainability be facilitated/enhanced?
- How can transformative change be supported at the international level – including the 15th Conference of the Parties of the International Convention on Biodiversity (CBD COP 15) and other high-level events such as UNFCCC[2], G7, G20 – and at the level of development cooperation?

[2]United Nations Framework Convention on Climate Change

The study is structured as follows:

- Chapter 2 briefly describes the methodology applied.
- In Chapter 3, a conceptual framework is developed based on a synthesis of literature on transformative change, and on how transformative change can be encouraged and governed.
- In Chapter 4, main challenges in the fields of biodiversity, forests, and marine/coastal ecosystems are identified as outlined in scientific global assessments. While these fields are largely overlapping, they represent distinct policy and science communities.
- Chapter 5 summarises the recommendations of international global assessments on each of these fields (biodiversity, forests and the ocean).
- In Chapter 6, we examine how 'transformative' current recommendations are, by applying the developed framework, identifying gaps and filling some of these gaps with complementing recommendations from other global reports.
- Chapter 7 takes a different perspective and adds insights from on-the-ground experiences arising from international development projects.
- Chapter 8 presents the main findings by synthesising results across the three commons and by combining the top-down perspective of global assessments with the bottom-up experiences of the projects.
- The study closes with recommendations on how transformative change can be encouraged in international collaboration and development cooperation (Chapter 9).

2 Approach and methods

To answer the main research questions, we applied several qualitative approaches in triangulation (Flick 2004): qualitative content analysis, semi-structured interviews, and expert workshops. In this section, we outline the methodological steps we took; for more details see Appendix 1. Figure 2 illustrates the overall process.

In the **first step**, we analysed how transformative change is conceptualised in current literature, starting with the IPBES Global Assessment. As their conceptualisation remains rather abstract, we complemented it by reviewing further scholarly literature on transformative change, including the seminal texts by Loorbach et al. (2017), Scoones et al. (2019), and Bulkeley et al. (2020). At the same time, we screened and then conducted a qualitative content analysis of selected international global assessment reports on biodiversity, forests, and the ocean. Out of this twofold review activity, we developed a conceptual framework to bring together, in a structured way, the elements that make transformative change possible (see Chapter 3). The formulation of a "building blocks" framework is our conceptual answer to the challenge of operationalising transformative change. This framework helps us address the research question on how transformative change can be encouraged by policy.

In the **second step**, we used our conceptual framework to analyse elements of transformative change within the global assessment reports, the question being how transformative change can be encouraged. We first extracted the main challenges identified across the different assessment reports for each of the three global commons addressed in this study (Chapter 4), and then summarised the recommendations presented or implied in these reports to address the selected challenges (Chapter 5).

In a **third step**, we analysed to what extent these recommendations are transformative by using our conceptual framework to take stock of elements conducive to transformative change, identify gaps in the recommendations, and systematically search for suggestions to fill these gaps. In order to find such gap-filling suggestions, we relied on studies and reports on global challenges that were not negotiated within intergovernmental platforms. This literature is more targeted at specific topics. A short description of the reports used for each of the three global commons can be found at the beginning of the respective sections in Chapter 6.

Global assessments, no matter whether negotiated within intergovernmental platforms or not, necessarily provide general – and therefore rather abstract – conclusions and a top-down perspective. We complement this with a bottom-up perspective in order to better understand operating spaces and options for enhancing transformative potentials in project design and implementation. Thus, the **fourth step** of our analysis used the conceptual framework to reflect on a set of past and ongoing research and cooperation projects in terms of how they have (or could have) contributed to transformative change. We drew on two sets of projects: a set of six projects mainly funded by the International Climate Initiative (IKI) in which the authors of this study were personally involved as partners, and a set of nine BMZ[3]-funded projects, implemented by GIZ[4] and/or KfW[5]. All these projects aimed at conserving or improving the state of biodiversity, natural forests, and the ocean. We adapted the conceptual framework by formulating specific, open-ended questions about each building block. The next methodological step for analysing the projects was twofold: for the first set of projects the respective authors of this study answered the questions analysing their project resulting in an Excel file. For the second set of projects these lists of questions (see Appendix 13) were sent to project members and we subsequently discussed their responses in semi-structured interviews with them. Our summaries of these conversations were sent back to each participant respectively for cross-checking. The lessons learned across projects are presented in Chapter 7.

In the **fifth and final step**, the analytical framework facilitated deriving recommendations for (1) international policy design and implementation as well as (2) for development cooperation. These draft recommendations were discussed in two virtual expert workshops with development cooperation practitioners in January (biodiversity and forests) and March 2021 (marine and coastal ecosystems). Based on workshop discussions we refined the recommendations, which are presented in Chapter 9.

[3]Federal Ministry for Economic Cooperation and Development, BMZ
[4]German Corporation for International Cooperation GmbH, GIZ
[5]German Development Bank, KfW

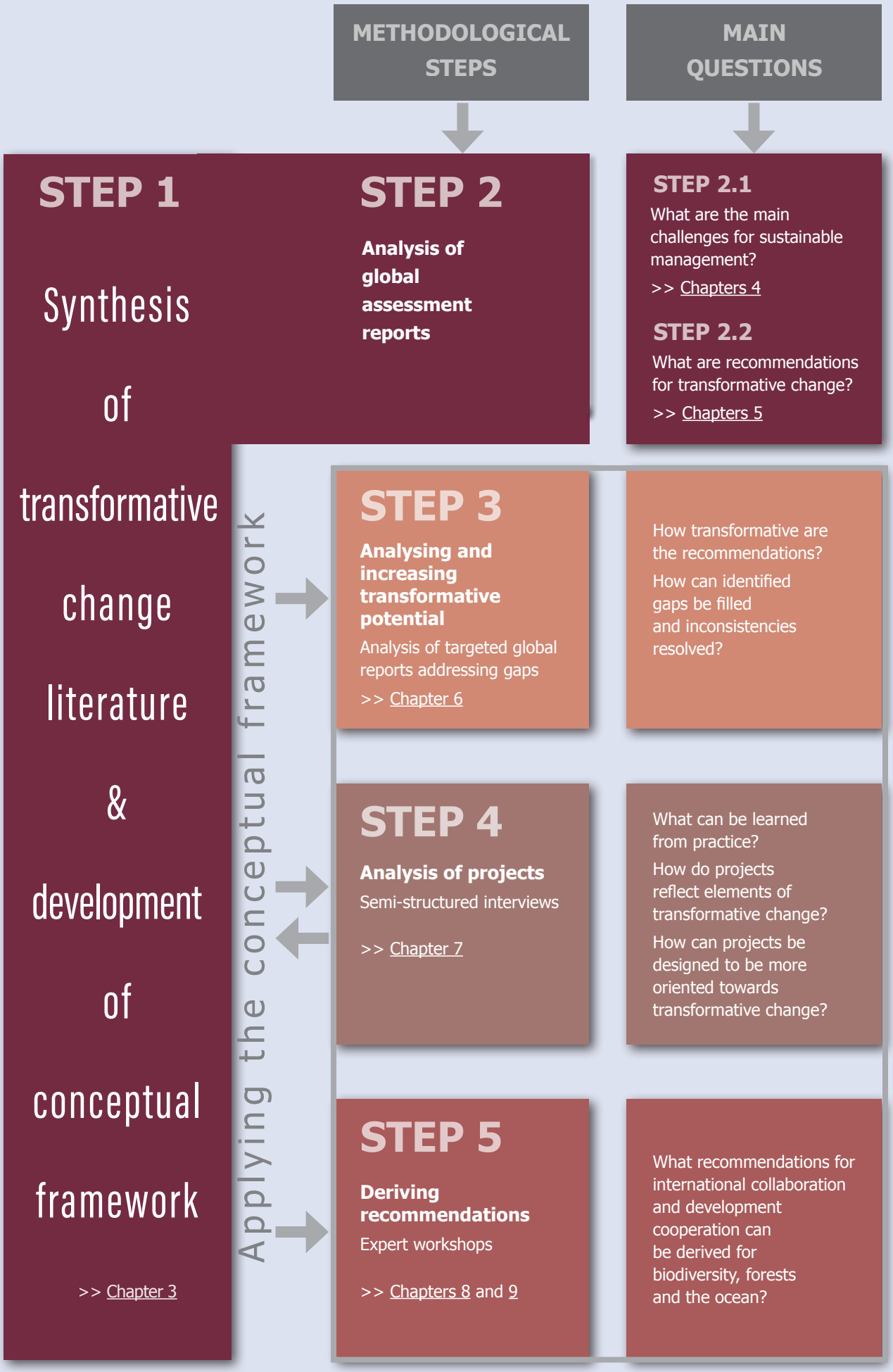


Figure 2: Overview of the study's key questions and methodological approaches

3 What is transformative change and how can it be encouraged? – A conceptual framework

STEP 1

Synthesis of transformative change literature & development of conceptual framework

There are widespread indications that current sustainability efforts are insufficient to achieve the ambitious international agenda of the SDGs and that prevailing development trajectories continue to lead in the wrong direction. According to the 2019 SDG progress report chart (UN Stats 2019), only one of 41 targets are likely to be met at global scale by 2030. This underscores the increasing calls for 'transformation to sustainability'. Biodiversity plays a crucial role for many, if not all, of the SDGs (Blicharska et al. 2019).

What are adequate responses to the growing tensions and socio-economic impacts that result from over-using and degrading the biosphere? Pursuing incremental adaptation, optimisation and progress towards sustainability neglects the speed and scale of current losses of our bio-physical life support systems. Within the coming decades, large-scale and disruptive socio-ecological changes could likely happen too fast for societies to cope with, even within current regimes and paradigms of adaptation. Therefore, transformations – i.e. fundamental or radical shifts – are required in the way societies treat this planet (Haberl et al. 2011). And the more such shifts are delayed, the higher the risks and damages for future generations.

The notion of 'transformation' is used differently in politics and in science (Blythe et al. 2018). In politics, it is a wake-up call for bolder multilateral action. In science, different schools of thought elaborate conceptual underpinnings for what transformation to sustainability actually entails: What needs to be transformed? And into what? How fast? Who should do it? And how? Yet, ambiguities in the definition and pursuit of transformative change are widespread (O'Brien et al. 2012, Feola 2015, Blythe et al. 2018 – see below).

In the following, we first summarise key literature regarding transformative change to sustainability and then propose a simple framework to guide the empirical analysis in this report, focusing on the global commons.

3.1 Transformative change – a brief overview of the literature

Transformation to sustainability has been studied from different viewpoints. It entails **a normative dimension** which is embodied in the SDGs: their fulfilment constitutes the desired alternative future state or trajectory (i.e. 'System B'). It also entails **a dynamic or change dimension** which refers to the nature of the metamorphosis itself (i.e. the shift from the current 'System A' to 'System B'). These dimensions can only be jointly understood and pursued.

Several perspectives describe 'main ingredients' of transformation processes. Scoones et al. (2019) review the literature and identify three basic perspectives on transformation: structural, systemic and enabling approaches. Structural perspectives typically describe and analyse transformations ex-post, focussing on perceived changes in the fundamental structures of politics, economy and society. Examples include the shift from hunter-gatherers to agricultural production, or the age of industrialisation. Systemic perspectives on transformation are rooted in socio-ecological and socio-technical systems thinking. These focus on system elements, levels, and interactions, with interests in tracing and explaining issues such as resilience or innovation; a main aim is to understand how the system functions and reacts. A typical example is changing energy supply from fossil fuels to renewables. In turn, enabling perspectives argue that change must emerge from below through open spaces and democratic empowerment of civil society movements and grassroots activity. Scoones et al. (2020) argue that these **perspectives are usually complementary** and that in many, if not most settings, **structural changes, systemic innovation, and local emancipation are needed for transformation towards sustainability**.

Many scholars conceive transformation to sustainability as **a change-of-path**, a fundamental – as opposed to a minor or incremental – change (Feola 2015). Such large-scale change cannot be planned and implemented in one piece, but will rather involve a number of steps that, in retrospect, can be considered as fundamental. Others argue for a "strategy of incremental change with a transformative agenda, **where a normative focus on sustainability transformations helps to orient incremental efforts** (such as policy change) within a broader narrative of transformative change" (Patterson et al. 2017: 4, emphasis ours). This thinking is captured in the notions of "progressive incremental" change (Levin et al. 2012), "directed incrementalism" (Grunwald 2007), or "radical incrementalism" (Göpel 2016). In this sense, narratives and visions provide an important role as a compass for what a transformed system, and thus a desirable future, would look like. At the same time, the exact outcomes of fundamental change cannot be anticipated and there will be many different options to achieve the desired (i.e. more sustainable) outcomes. This highlights the importance of ensuring that transformations are democratically negotiated and debated within wider society.

Loorbach et al. (2017) conceive transformation as a sequence of phases needed for (i) establishing new ways of doing things, and for (ii) phasing out the "old" and unsustainable system. Doing the first without doing the second will not bring about the desired fundamental change. This is due to the fact that the existing system is usually well-established and self-reinforcing, locked-in by path dependencies. For example, introducing electric vehicles or improving public transport will by itself not lead to phasing out a transport system where most people drive private cars that run on fossil fuels.

However, one must consider that, due to its radically different outcomes, inducing transformation involves substantially higher short-term risks or side effects (e.g. on disadvantaged groups or specific economic sectors), in comparison to an adaptive or reactive mode of governance: When trying to change path, more things can go wrong accidentally. Also, transformation requires proactive (rather than responsive) investments and it should aim for a lasting change in dominant power relations by favouring equity, fairness, and justice (Chaffin et al. 2017). Here, normative and analytical dimensions are hard to separate.

A strategy for change requires a comprehensive **understanding of the elements of the system that would need to be changed**. Recently, scholars have been using the notions of leverage points and levers, where leverage points are the places "where to intervene to change social-ecological systems" (Chan et al. 2020: 695). Levers are governance approaches and interventions as the means to achieve the changes. Abson et al. (2017) build on Meadows' (1999) set of leverage points and emphasise the **need to engage with the 'deep', or ultimate, causes of unsustainability** (e.g. values, goals and worldviews) and to consider interventions that address these underlying causes. Typical examples are attempts to establish new narratives in the societal and political debate (e.g. away from a growth paradigm) or to change the educational system that shapes awareness and attitudes at an early age.

In the aim to bring this literature closer to biodiversity decision-making, especially within the post-2020 Global Biodiversity Framework (GBF), Bulkeley et al. (2020) propose principles for deriving a transformative biodiversity agenda (see Box 2 for a summary).

Box 2: Principles for a transformative biodiversity agenda (Bulkeley et al. 2020)

Bulkeley et al. (2020) distil from the literature six principles on how to encourage the potential for transformative change in strategic policy agendas, in particular the global biodiversity framework. The six principles highlight complementary avenues for encouraging far-reaching and thus potentially transformative change towards sustainability. Enhancing inclusive and deliberative arenas allows for agency and buy-in, focusing on co-benefits facilitates building alliances across different sectors, expanding action arenas and multiple paths broaden the impact and have the potential to become mutually reinforcing. Addressing root causes and anticipating resistance point to the fact that indirect drivers and vested interests cannot be ignored.

Principles:

1. Address Root Causes: Transformative change towards sustainability can only be achieved if the root causes and underlying/indirect drivers of the problem in question are addressed.
2. Take Multiple Paths: Multiple [concurrent] efforts will be required, through diverse development pathways that are compatible with biodiversity goals.
3. Expand Action Arena: Transformative change requires opening up traditional action arenas, which need to be extended to encompass multiple areas of the economy and society to achieve (diverse) goals for biodiversity.
4. Realise Diverse Co-Benefits: Focusing on "co-benefits" biodiversity conservation entails for other societal goals, offers opportunities to encourage transformative change.
5. Design Deliberative & Inclusive Processes: Transformative change requires space for deliberation, inclusion of diverse knowledge types, views and values, as well as forms of co-production.
6. Adopt Proactive Approach to Resistance: Resistance, likely to come from powerful societal actors with vested interests in the status quo, needs to be anticipated to pave the way for transformative change.

The principles can be used both ways: to identify and develop actions that enhance transformative change potential but also to analyse which aspects of transformative change are already being addressed and which ones are not.

This cursory overview indicates that social and sustainability sciences have taken several perspectives and analysed a broad set of different aspects in connection with the term transformation.

3.2 Building blocks for a conceptual framework on transformative change

The objective of this report is to inform international cooperation by structuring and interpreting the recommendations on how to achieve sustainable management of global commons, both from scientific assessment reports as well as based on the experiences in individual programmes or projects. To this end, the authors of this report were looking for a conceptual framework which contains the main elements and characteristics of transformative change from the scientific debate in a consistent and applicable manner. The reviewed literature did not, however, include a framework that serves the purposes of balancing breadth, relevance and parsimony. Therefore, the authors draw on some of the above and further sources to pro-

pose a framework with five building blocks for transformation to sustainability. This framework is presented here and summarised in Figure 3.

In essence, we argue that intended transformative interventions (Figure 3, yellow boxes) can best encourage transformation to sustainability if they are embedded within a more comprehensive framing of transformative change (Figure 3, blue boxes):

- oriented by a compelling transformative vision,
- addressing knowledge on systemic change and on how to deal with the uncertainties involved,
- with a balanced navigation of the dynamics inherent in changing development pathways,
- and with emancipated agency providing room for inclusive deliberation.

We therefore have four substantial additional building blocks which go along with any concrete action or intervention geared towards transformation.

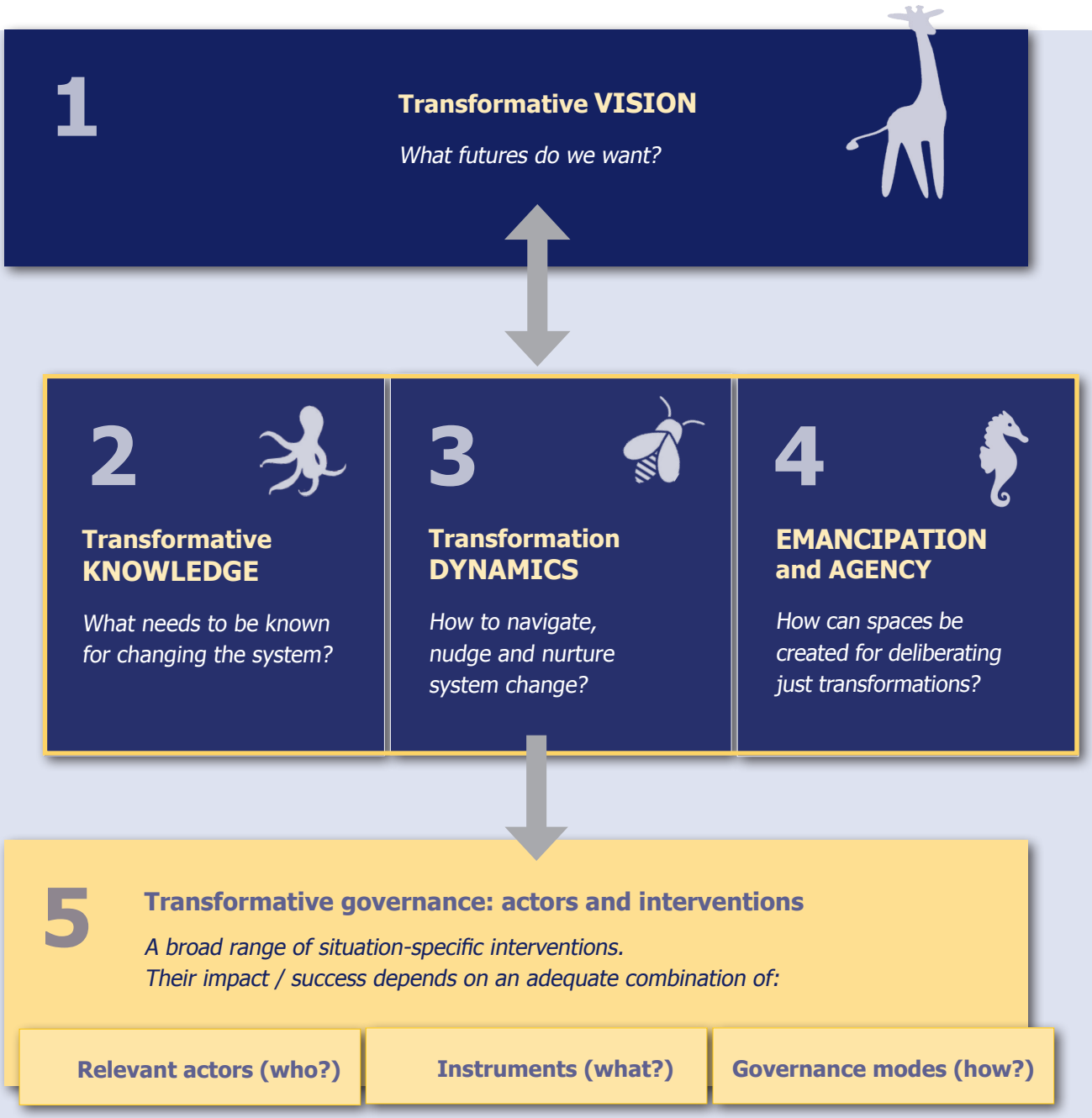


Figure 3: Building blocks for the framework on transformative change. Note: The animal icons are used within the report to indicate where we address the respective building block.

Block 1: Transformative Vision: What future(s) do we want?

A transformative vision provides ideas for the future that makes the desired state tangible or at least imaginable and thus provides i) orientation and ii) inspiration and motivation to people to actually work towards this future. In terms of system change it provides answers to the big questions of how the new system will be different from the current. How do we create a safe and just space for humanity on this planet (Hajer et al. 2015)? How can we transform our development trajectories in a way that safeguards the biosphere as our "natural capital" (Neumeyer and Dietz 2009)? The SDGs are signposts of the desired state of environmental, social, and economic conditions. Yet, modern development narratives do not convincingly cope with the fact that the SDGs will unlikely be met (UN Stats 2021): blind faith in the 'invisible hand' of the market, in a responsible private sector, or in (multilateral) geo-strategic policy is unwarranted to drive the 'big leap' towards the SDGs at global scale. Intergovernmental efforts have seen mixed outcomes, and national governments have preferred to try steering change towards selected SDGs in a top-down manner rather than mobilising new agents of change such as businesses, cities and civil society (Hajer et al. 2015). At a larger scale and with respect to global commons narratives of liberalism (Harari 2018) and of neoliberalism (Monbiot 2016) are increasingly seen as intellectually obsolete. The terms of sustainability and sustainable development, which have techno-scientific and management connotations (Salmivaara and Kibler 2020), have also lost some of their original appeal over the nitty-gritty of implementation, indicators and monitoring. The core ideas of sustainability have become diluted. Many actors claim to contribute to sustainability or to be sustainable, but few understand the implications of the SDGs being inseparable, and given there are 17 goals and 5 principles this is indeed a challenging task.

Therefore, new, mobilising narratives are needed. They will have to build on a clear critique of prevailing yet outdated development and growth paradigms, and recognise the politics of global sustainability issues (Patterson et al. 2017). A new narrative will also have to make explicit those values that favour sustainable societal welfare (and those values which do not), and it will have to offer a new 'way out' (Monbiot 2019). Such a narrative would combine the 'big picture' of what goes wrong with answers that provide orientation and inspire change. While some objectives might be predefined and easy to specify, others and the trade-offs they entail might only appear along the transformation process. Hence, developing a transformative vision means specifying a feasible scenario that combines the different development targets for the specific context.

The term 'transformation' itself does not tell this story. While it has gained traction in various problem domains (e.g. energy, mobility), it does not by itself offer the kind of visionary answers needed. Transformation as a concept describes the degree of change, but not necessarily its trajectory (Pelling et al. 2015). In fact, one of the risks of 'transformation' is that its vaguely positive and solution-oriented connotation can be used for all kinds of ideas and interests (Blythe et al. 2018); it could become the next buzzword that loses traction over time. For example, a 'radical economic transformation' – as had been propagated in South Africa – does not necessarily pursue more sustainable and equitable economic futures (Desai et al. 2018).

Transformative visions will require a step back so as to consider a society's entire socio-ecological system and its international linkages. They have to address the root causes of current unsustainability (Bulkeley et al. 2020). The role of economic growth for human well-being needs to be revisited, without dogmatism. Natural capital is vastly more important than solely as input to production processes. And: natural capital can only be substituted by other capitals to very limited degrees – and only for those who can afford it. The planetary boundaries are far closer to the 'poor' than to the 'rich'.

Transformative visions will also face resistance from those who benefit from current setups and expect to lose out in the new narrative. Therefore, both content and genesis of a new vision will have to be normatively legitimised, e.g. by emphasising common ground (content) and by facilitating debate (genesis). To pre-empt denial of inconvenient truths, the narrative should refrain from claims to superior knowledge (Chilisa 2017). This narrative should identify a common problem ('formerly good ideas are not so anymore because the world has changed – we are trapped by old convictions in unhealthy pathways'), and a common emancipation story towards alternative futures ('we actually know enough to find ways out of the dilemma, and now is a good moment to begin this voyage') (Wittmayer et al. 2019, Kothari and Joy 2017).

Overall sustainability conditions should be embraced and taken seriously as 'bottom line' and guidance for efforts aimed at changing the system. They should include at least: respect of planetary boundaries, provision of living wages or incomes, concern for future generations, and life in dignity. Such principles translate into a vision of the 'future as a commons' which respects the diversity of human life itself:

"What one needs is not a common future, but the future as a commons. A commons is the plurality of life worlds to which all citizens have access. It is not merely the availability of nature as being, but of alternative imaginations, skills that survival in the future might require." Visvanathan 1991: 383)

Block 2: Transformative Knowledge: What needs to be known for changing the system?

The second building block of the framework connects visions to actions and indicates a continuous learning process. This is due to the very nature of transformative change, where: i) uncertainty is inherent in each transformative vision since it is not a fixed goal, but a beacon that guides a plurality of possible interventions; ii) knowledge needs may change with time; iii) knowledge gaps are progressively filled with scientific advancement; iv) the process becomes more inclusive.

An essential part of the transformative knowledge process is identifying and understanding **elements of the system** with the potential to solve the respective sustainability problem, including: the actors, their functions, the connections between them, available knowledge and knowledge needs on how practises can change. It is important to keep in mind that the bigger the system, the more complex it becomes due to the many possible relationships and levels of interaction. To understand the levels within a system, the notion of a multi-level perspective is useful, with different degrees of knowledge precision at different systemic levels (Patterson et al. 2015). Importantly, transformative knowledge in our understanding goes beyond scientific or technical knowledge (despite using metaphors of systems analysis), and includes practical, traditional, and indigenous perspectives.

Locating entry points within a system for stimulating transformation (Loorbach and Rotmans 2010) then becomes especially important. What aspects of the system are to be addressed first and, therefore, what knowledge is to be prioritised? Ultimately, such scoping should involve broader groups of stakeholders, thus also cross-checking for a shared understanding of transformation: technical solutions are usually insufficient and societal innovation or adjustments required (Hajer et al. 2015).

While analysis and understanding can be expected to remain incomplete due to the complexity of systems, it should be possible to identify entry points and try out interventions to support transformation of the system. It is also important to differentiate knowledge gaps and knowledge needs. The former describes missing information for better system understanding; the latter describes necessary information for making decisions or taking action (Dewulf et al. 2020).

Distinguishing entry points within a system means identifying the 'neuralgic points' also called 'leverage points' by some authors in the system, for which strategically oriented interventions are feasible and promising. These are intimately related to understanding the root causes of the problem and this requires being able to navigate and distil, from the rapidly growing supply of data and information, knowledge relevant for transformation whilst referring back to the transformative vision.

For example, if the transformative vision relates to providing clean energy to all, the system under analysis is Germany's energy sector, and the issue is coal-dependent energy production, in terms of knowledge one needs to account for **what is the critical knowledge necessary for this system to change** and for **proposing strategic governance interventions** to pursue such change (Scoones et al. 2020).

Now, with the root causes of the issues and entry points within the system pinpointed, the aim is to devise actions and solutions. At this point, three knowledge skills have been identified as essential for designing interventions:

(i) Knowledge about how to identify action-oriented knowledge needs from a decision-making perspective: This is knowledge at a more specific or granular level, because it relates to the already identified intervention strategy and specific actions. It entails specific knowledge required for informed decision making. Trust and relationship building are essential, as this demands a trustful exchange between not only technical and political experts,

but also incorporating local knowledge from a plurality of sources (Berghöfer et al. 2016). The latter is important as action-oriented knowledge needs to account for context, resources and the feasibility of achieving consensus to enable (local) implementation (Caniglia et al. 2021).

(ii) Knowledge about how to deal constructively and pragmatically with the unknown: A major obstacle for transformation is the fact that one cannot anticipate all relevant components and consequences of decisions in a complex system (Westley et al. 2011). This means the effects of decisions can also be counterproductive or unsatisfactory in terms of promoting the desired change. In other words, when aiming at transformation, the need for ex-ante knowledge coincides with cognitive limits in grasping complex systems (Chaffin et al. 2016).

Considering that transformation efforts aim at systemic tipping points, they require taking higher risks because of the scale of the attempted change (Chaffin et al. 2017). Such systemic risks necessitate more integrative risk analyses beyond single cause-event chains (Renn 2020). However, this raises the concern for what is unknown. Concepts such as the 'safe operating space' (within planetary boundaries) or the 'precautionary principle' (within environmental law) are intended to orient policy in view of insufficient knowledge (Rockström et al. 2009, Kriebel et al. 2001). At the same time, supporting transformation requires process knowledge and 'learning by doing' in a trial and error mode. It is therefore useful to be cognisant of the preliminary nature of what is known in a specific setting, as well as highly attentive to emerging results and their (side) effects for different groups, e.g. by monitoring efforts to spot them early on. The management philosophy should shift from reactions to observed changes to proactive preparation for the unexpected, e.g. by explicitly pursuing and maintaining multiple options (Chapin et al. 2010). Therefore it is key to enhance the pursuit of multiple strategies and pathways (Bulkeley et al. 2020) and to improve procedures for adaptive and meaningful learning from ongoing initiatives and pilot projects aimed at transformation.

To increase the probability of recognising changes in time to react, it is important to include different perspectives and types of knowledge when discussing proposals, negotiating priorities and monitoring results.

(iii) Knowledge about designing strategic interventions for sustainability transformations: Moving towards sustainability requires competences such as systems thinking, multi-stakeholder communication, and multi-disciplinary analytical skills in order to identify which changes would actually lead to more sustainability. For most transformation processes, and certainly for transforming the use of and impacts on the global commons, this requires negotiation processes and settings that enable adaptive learning. In addition, knowledge and abilities are needed for designing appropriate interventions and for conducting the actual change process itself (Salgado et al. 2018, Caniglia et al. 2021). For designing and implementing sustainability interventions, several specific competences have been identified (Salgado et al. 2014):

- Being able to engage in political-strategic thinking, combined with personal goal-directedness (strategic decision making);
- Being able to steer towards collectively produced proposals and decisions, articulating policies and/or proposing initiatives which challenge existing non-sustainable practices;
- Being able to translate this diversity into propositions and decisions for interventions.

Typically applied concepts include the development of a Theory of Change, a focus on change agents, or the establishment of social-ecological change labs. Another important aspect is the idea of levers and leverage points, which describes those actions with high impact across sectors and sustainability dimensions (Meadows 1997, Chan et al. 2020). These will be further discussed in the following sections.

Block 3: Transformative Dynamics: How to nurture, nudge, and navigate system change?

Describing a fundamental shift, 'transformation' cannot be designed nor steered by a master plan or expert panel. Far-reaching system change can be nurtured, nudged, and navigated, but such processes cannot be managed or controlled. To nurture change means to create fertile ground for it; to nudge into change means to provide situation-specific stimuli; and to navigate change refers to seising opportunities and recognising obstacles along the way.

For transformation to sustainability, we can differentiate between two different yet com-

plementary processes (Loorbach and Oxenaar 2018): (i) The innovation and establishment of new sustainability solutions ('phase in'), and (ii) the reduction and ultimately closure of practices that are unsustainable ('phase out'). Both phase in and phase out processes have to coincide to lead to bigger system change – yet, they tend to have different stages and dynamics. Phase in processes involve initial promoting and extensive mainstreaming efforts for successful niche experiences and pilot solutions. Once these gain traction, we can imagine a stabilising phase. In contrast, 'phase out' processes are about challenging established rationales and confronting – or convincing – those who adhere to them. 'Phase out' by definition has to disrupt routines and practices until solutions are found for those who lose out from such change (see Figure 4).

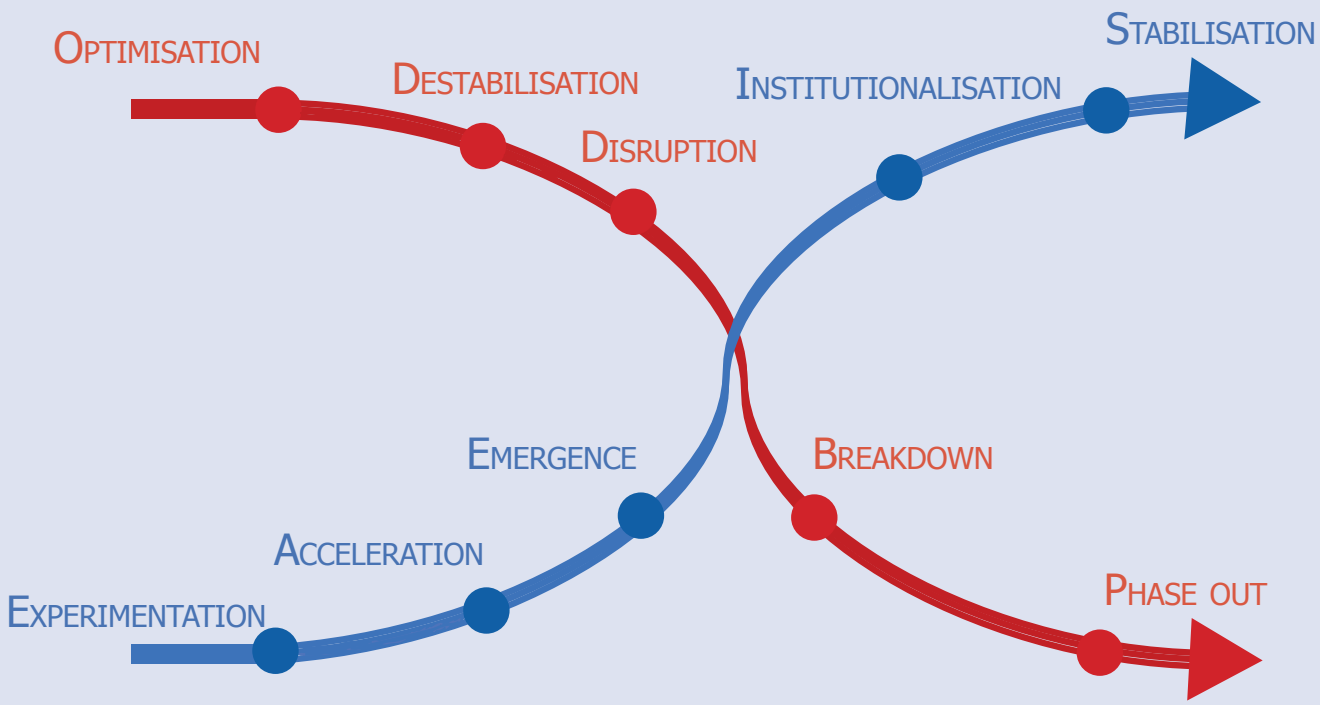


Figure 4: Dynamics of societal transitions as iterative processes of build-up and breakdown over a period of decades. In a changing societal context, established regimes develop path-dependently through optimisation, while change agents start to experiment with alternative ideas, technologies, and practices. Over time, pressures on regimes to transform increase, leading to destabilisation as alternatives start to accelerate and emerge. The actual transition is then chaotic and disruptive and new combinations of emerging alternatives and transformative regime elements grow into a new regime. In this process elements of an old regime that do not transform are broken down and phase out.
Source: Loorbach and Oxenaar 2018: i

In a dynamic perspective, generating momentum for change is of central interest. Chaffin et al. (2017) emphasise the importance of moments of opportunity. These are created by ecological, social, or political instability (such as by crises and catastrophes); by the innovative and creative processes of individuals and groups; and by dramatic shifts in social norms, values, or ethics. Such moments of opportunity are seldom planned, nor do they inherently stimulate change in the 'right' direction. They merely bear the possibility of questioning truths, rules, and practices which would otherwise not be subject to debate, i.e. under formerly stable circumstances.

In phase-out processes, **obstacles to transformation arise from vested interests** that benefit from existing system configurations, **or from technical or institutional legacies ('lock-ins')** and stabilising factors that favour current trajectories, often linked to behaviour, culture, and lifestyle. All of these potential obstacles should ideally be anticipated and proactively addressed. Bulkeley et al. (2020: 9) suggest that

"addressing concerns about who will [lose] and who will gain from transformative action for biodiversity proactively whilst also adopting strategies to build diverse 'coalitions of the willing' and generate radical incrementalism through multiple forms of intervention towards transformative outcome" are means through which structural resistance can be countered.

The transformative potential of any measure or intervention not only depends on how adequately it addresses the specific situation. **Timing is also of key importance:** Instruments to institutionalise new practices can only work if these practices are already known and proven by a relevant number of users. Likewise, heavily subsidising new technologies in the experimental stage can lead to major breakthroughs, but continuing this support beyond the experimental stage may prevent efficiency gains and even inhibit widespread use.

Block 4: Emancipation and agency for transformation: What is the role of bottom-up agency?

Even with broad agreement on a vision, there will be different possible ways of achieving it. Next to a convincing vision, a more selective pursuit of knowledge, and awareness of change dynamics, transformation to sustainability therefore requires an opening of political spaces "for individuals and communities to take action on their own behalf" (Scoones et al. 2020). The conditions for exercising collective will and for human agency are unevenly distributed within societies. However, as previously discussed, transformation itself cannot be managed, and therefore it cannot be imposed or spoon-fed. The size of the sustainability challenge, the enormous implications of any radical system change, and the ethical compass of present-day societies command active involvement, voice, and fairness – which will also increase the legitimacy and acceptance of possibly inconvenient measures geared towards transformation. Moreover, new ideas often emerge from diverse, open-ended, bottom-up processes.

The kind of large-scale system change envisaged here is essentially a political affair. How to make sure that the interests and perspectives of diverse groups and individuals, especially marginalised ones, are fairly represented in debates about transformative measures? How can the politics and governance of transformation be organised? How to ensure that democratic institutions are adequately involved in making far-reaching decisions? The devolution of political powers does not per se lead to just and sustainable transitions (Swilling et al. 2015). It needs to come along with practices and capacities for fair deliberation (Dryzek 2001, Curato et al. 2017). Centralist autocratic regimes might be able to more swiftly impose radical system change than federal democratic regimes. However, it seems highly unlikely that mandated or imposed change will be able to achieve sustainable outcomes at a global scale, locally adapted approaches evolving from the respective socio-cultural setting seem far more suited to achieve these.

In both coerced and liberal societies, conditions are often absent that would support the negotiation of the choices and consequences of transformation. This is further exacerbated by increasing structural inequality (Tschakert et al. 2013). The public – and often subnational – arenas for cultivating and facilitating open-ended negotiation need to be strengthened and expanded (Scoones et al. 2020). Key ingredients for driving a just transformation include civic articulation and engagement, as well as the recognition and enactment of plural values and worldviews (Stirling 2014).

In order to encourage open societal debate and enable the creation of agency for affected groups, it helps to anticipate who will create resistance to proposed changes (Bulkeley et al. 2020). Although resistance is often attributed to individuals, most evidence suggests that these will typically be part of those groups that benefit from the current system and would be expected to forgo benefits or incur higher costs in the future.

Box 3: Creating agency by integrating multiple voices

The participation and integration of multiple voices, particularly those often overlooked, such as Indigenous people and local communities (IPLCs), women and youth, has been recognised as crucial to moving forward transformative change. Better securing their rights and agency, particularly in the context of biodiversity policy, has significant potential considering that IPLCs visions are in line and manifest the 2050 Biodiversity goals defined by the Convention on Biological Diversity (CBD) "Living in harmony with nature" (Reyes-Garcia et al. 2021). As Beck and Forsyth (2020) argue, if a change is considered transformative, it needs to go beyond the goal of only reaching already defined visions through changing individual behaviour and social values. They underline the importance of reflecting and evaluating if visions and specific processes are including multiple perspectives as intended (Borie et al. 2020, quoted from Beck and Forsyth 2020: 221). To tackle this challenge, they identify the need for "consulting with more devolved forms of engagement [...] to reduce the risk of [...] becoming locked into pre-existing belief, assumptions and values". And going beyond participation, the question of 'whose vision counts?' points to the fundamental challenge of who is included to imagine transformative change in the first place and whose opinions are considered essential (Beck and Forsyth 2020: 221).

Latulippe and Klenk (2019) suggest 'making room' and 'moving over' as two valuable concepts to broaden the inclusion and agency of indigenous and local knowledge. While the first one is reaching out to value "indigenous ways of knowing, being and doing" and to focus on collaboration, partnership, fostering understanding, equity and empowerment, the second one means the need to decentralise knowledge production from western science and institutions, and "giving up power and privilege". These concepts are – according to the authors – considered transformative and due to the requirement of "fundamentally transforming ways of knowing", also a practice of decolonisation.

Adding to this, within the context of transformative governance, it makes sense to acknowledge the concept of right relations by Gram-Hanssen et al. (2021). They identify deep listening, self-reflexivity, creating space, and action as crucial steps for tackling unequal access towards participation. From engaging with other paradigms and ways of living, to being aware of the own position in a hierarchical system, especially regarding the Euro-Western belief system, it is crucial to ensure that different voices are listened to and included. Those steps are important as "the concept of transformation implies deep-rooted changes to unsustainable societal systems and structures" (Gram-Hanssen et al. 2021: 674). Overall, these groups are still facing challenges to achieve full participation at different levels, from the local to the global level (Forest Peoples Programme et al. 2020).

Interestingly, "the current zero draft of the post-2020 biodiversity framework continues to make the same long-standing calls for promotion of traditional knowledge and "full and effective participation" of IPLCs without the more concrete measures they have requested" (Reyes-Garcia et al. 2021: 84).

Block 5: Transformative Governance: Actors and interventions

It is not a single action, solution or technology that shifts trajectories from 'small improvements of business as usual' to 'transformation towards sustainability'. Instead, implementing a whole set of actions drives transformation. This fifth block looks at the governance of transformation processes, in the sense of organising and taking decisions towards actions and solutions that achieve the transformative dynamics (Block 3) and agency (Block 4). We distinguish the "who" (actors), "what" (policies) and "how" (modes of governance) of governing the transformation process, for a more detailed discussion of the literature see Appendix 2.

Who: Addressing different roles in transformation processes

Transformative processes need to be initiated and facilitated by key agents. The scientific literature identifies market initiatives, governmental regulation and self-regulating communities as key agents, who can either act deliberately/intentionally or whose actions evolve as part of the social dynamics (Chaffin et al. 2016).

Analyses of 'agents of change' focus on organised actors with different degrees of organisation and influence on the respective policy, either as agents of change or as carriers of transformation processes (for example, Bliesner et al. 2013, Sommer and Schade 2014). 'Agents of change'

can be leaders across different actor groups, including governmental agencies, NGOs, practitioners, communal leaders, and others (Griffin et al. 2016). The multilevel system-wide interactions and interdependencies between different actors can be affected by external or internal disturbances (Chaffin et al. 2016) and require coordination and cooperation. What is more, powerful actors often advocate for political persistence (Brand 2017). Overcoming powerful resistance requires disconnecting existing institutional configurations and societal structures to subsequently facilitate targeted interaction that favours the development of new coalitions and societal paradigms (Abson et al. 2017). Moreover, transforming a system from one development path to another requires identifying winners and losers of decisions, mapping the distribution of costs and benefits among them and shedding light on conflicts (Selbmann 2015). We therefore conclude that in order to enhance transformation in any given setting, it is necessary to identify all relevant actors and the role of key actors in the transformation process including 'agents of change', 'agents expected to create resistance' and 'affected actors'.

What: Selecting strategic actions and instruments

Loorbach and Oxenaar (2018) group four types of interventions (see Table 1), distinguishing on the one hand between their roles for 'phasing in' versus 'phasing out' and on the other hand between top-down and bottom-up approaches.

Table 1: Examples of policy instruments for different types of interventions which, in combination, drive transformation. Source: Loorbach and Oxenaar 2018: ii

Transform ('top down')	Envision and adapt (ideas for phasing in)
• Legal and regulatory instruments • Market and pricing instruments • Industry policies • (International) Collaboration, agreements and accords • Institutional and organisational labelling	• Societal dialogues and transition arenas • Future visioning and imaging • Scenarios, roadmaps • Reflexive monitoring • Social learning and evaluation
• Innovation instruments • Subsidies and niche management • Network instruments • Experimentation areas and urban labs • Impact investment funds • Incubators and right to challenge	• Phase-out pathways • Divestment strategies • Training and retraining • Financial support stranded assets • Prohibition and penalties • Removal and decommissioning
Build ('bottom up')	**Phase out**

How: Combining governance approaches for enhancing their transformative potential

Chapter 6 of the IPBES Global Assessment (by Razzaque et al. 2019) elaborates on the modes of transformative governance, namely that governance needs to be at the same time inclusive, informed, adaptive, and integrated in order to enhance the transformative potential of interventions and to be able to adjust as transformation unfolds. In addition, literature discusses the importance of accountability, especially in the context of integrating biodiversity concerns in decision making at all levels. Accountability is seen as relational, asking who is held accountable by whom, what actors are accountable for, and which elements can serve for monitoring, evaluation and possible sanctions in case of non-compliance (Mashaw 2006, Biermann and Gupta 2011). As highlighted by the literature on mainstreaming and policy integration of biodiversity concerns, effective design and implementation requires leadership and a clear allocation of responsibilities (Karlsson-Vinkhuysen et al. 2017, Lambin et al. 2018, Zinngrebe 2018).

- **Inclusive:** The multiplicity of political stakeholders, interest groups and local actors in sustainability governance requires the consideration of different value systems, needs, rights, gender perspectives and knowledge systems in participatory settings (Visseren-Hamakers et al. 2019).
- **Informed:** A broad array of local and scientific knowledge on diverse aspects needs to be integrated in structured, problem-oriented processes (Raymond et al. 2010); for this, a relevant, effective and transparent exchange of sustainability knowledge between society, science and politics has to be organised.
- **Adaptive:** Structures should be responsive to new insights – the idea of adaptive management (Norton 2006) describes the capacity and willingness to adjust actions to newly developed knowledge (e.g. Rodriguez et al. 2018).
- **Integrated:** Sustainability challenges demand coordinated responses across sectors and jurisdictions, policy areas and strategy processes (Persson and Runhaar 2018).
- **Accountable:** Governance shapes accountability. All key actors need to assume their respective responsibilities. In contexts of bigger change, evaluation and sanction processes determine to what extent agents can be held accountable (Mason 2020).

Based on these insights the following enabling conditions for the governance of transformation processes can be defined. Institutional spaces provide room for inclusion, and for knowledge integration across different sectors, needs and sources, which enables adequate feedback for informed and integrated decisions. Accountability benefits from organisational structures that ensure actors and institutions can be held responsible. Capacity for adaptive responses and for ensuring that all five approaches are combined need to be built and will benefit from learning and reflective loops.

Suitable combination of approaches for transformative governance:

To address underlying causes and indirect drivers of unsustainable trajectories, transformative governance needs to be inclusive, informed, adaptive, integrated and accountable.

- **Inclusive:** for each step of the governance process all relevant actors are included and their role defined
- **Informed:** Available and necessary information for strategic options are compiled and accessible to all stakeholders.
- **Adaptive:** Structures are constantly reflected, evaluated and adjusted in order to enable adaptive learning processes.
- **Integrated:** Across sectors and institutional settings incentive options coherently support the implementation of the strategic mechanism/governance process.
- **Accountable:** All key actors assume their responsibility in the governance process.

Bringing it all together: Guiding questions for nurturing transformative governance

The criteria and conditions described thus far in Block 5 need to be turned operational to gain practical relevance. For this, 'who', 'what' and 'how' need to be analysed jointly and the different aspects of governance need to be combined. In Table 2, we have done this by means of questions that can be used, for instance, project or programme planning or evaluation.

Table 2: Guiding questions for turning transformative governance criteria operational in project planning. Example questions

How?	Who?	What?
Inclusive Governance	• Are key agents identified? • Are power regimes and related discourses, values and interests analysed and considered? • Are potential losers of the transformation and their expected losses assessed?	• Are the direction and goals of the initial vision for transformation acceptable to key agents (input legitimacy)? • Are the means and instruments of the governance process acceptable to key agents (throughput legitimacy)? • Are the final outcomes of the actions acceptable to key agents (output legitimacy)? Are processes inclusive but manageable?
Adaptive Governance	• Do change agents take leadership in facilitating learning processes? • Is the performance of the governance process frequently evaluated and improved, e.g. revisit a policy after 5 years and adjust if necessary?	• Is there a solution that can be improved or does the system require innovative experimentation and learning? • Do regulatory systems as well as human, institutional, financial and social capital support the implementation of the transformation pathway/project?
Informed Governance	• Are knowledge holders involved? • Are different forms of knowledge and epistemological cultures taken into account?	• What transformation mechanisms/instruments exist? • What do scientists, local people and other knowledge holders know about the performance of these instruments? • Do communication and collaboration processes allow for the inclusion of different knowledge systems (for instance by offering appropriate formats and boundary objects)?
Integrated Governance	• Are relevant agents collaborating connecting relevant political and non-political processes for the transformation? • Are political levels and implementing agents collaborating in an efficient, complementary governance? • Do sustainability considerations have the necessary priority in policy design, political decisions and implementation processes?	• What is the level of integration of policies, finance and information in order to coherently support the aspired development path? • Do (formalised) platforms enable and facilitate the proactive integration of relevant policy and governance processes to coherently incentivise the transformation? • Do institutional configurations and the political mandate/will support the integration as a prerequisite for transformation?
Accountable Governance	• Who takes decisions on how to transform? Do the key agents take leadership in the transformation? • Do all relevant agents take ownership and accept responsibility addressing all potential "responsibility gaps"? • Do agents take responsibility for adverse effects on third parties and vulnerable groups? Who gets to decide it is time to transform?	• Do "protagonist" of the transformation process take responsibility for assuring legitimacy as identified in „inclusion"? • How will governance actors justify the legitimacy of transformation measures? • Do participatory processes generate ownership without deterring important stakeholders? Are evaluation processes (adaptive governance) connected to political consequences and potentially sanctions? • How will governance actors justify the legitimacy of transformation measures? How can key agents be held responsible?

Summary of the Chapter

Based on a literature review and informed by the results of the global assessments, we developed a conceptual framework that distinguishes five building blocks for addressing transformative change towards sustainable management of global commons (Figure 5). We argue that these five elements need to be incorporated when aiming at inducing and supporting change towards sustainability transformations.

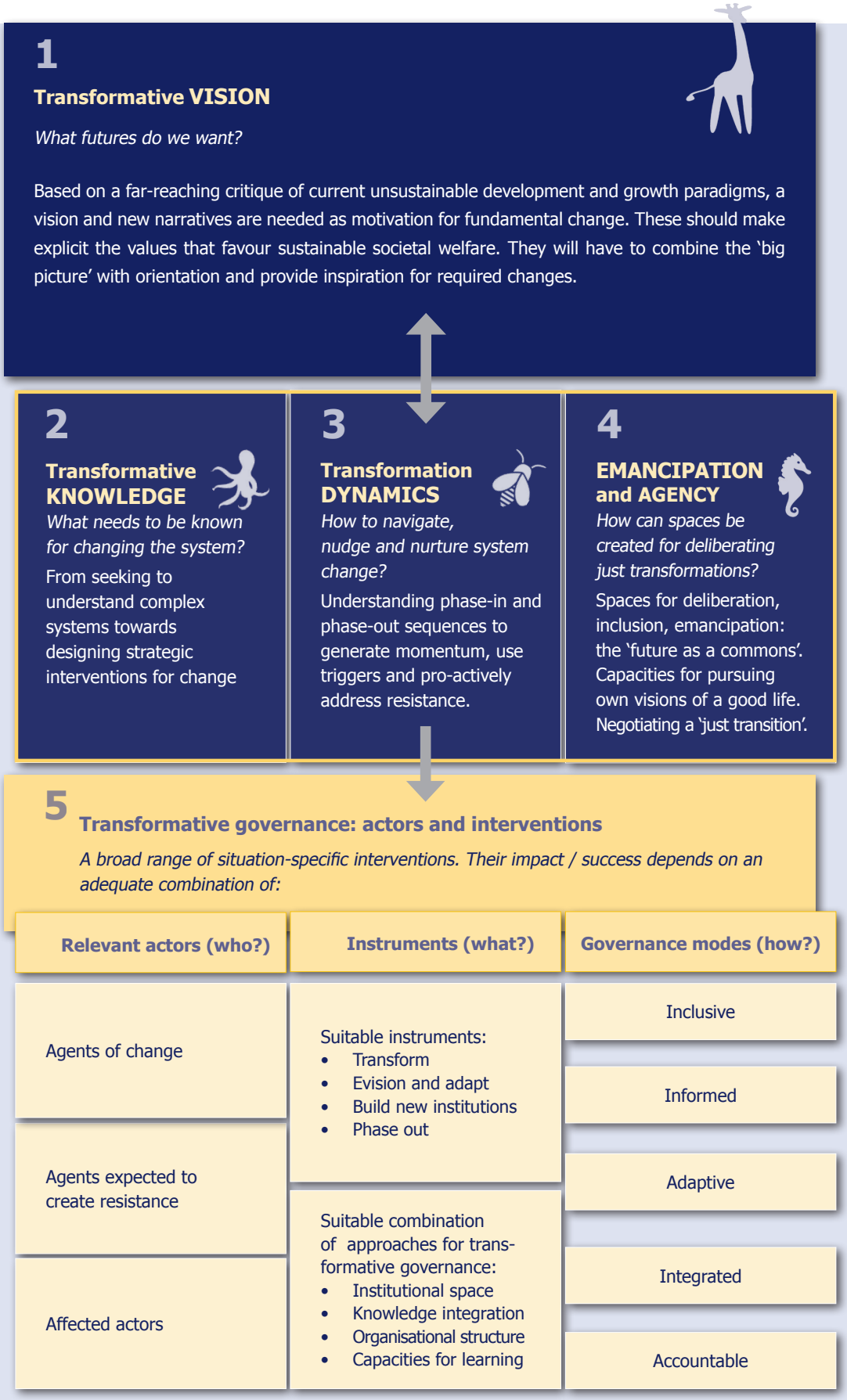


Figure 5: Transformative change framework

We apply this framework as a heuristic to analyse the transformative potential of the recommendations of the global assessment reports (Chapter 6), project experiences (Chapter 7), and present our main findings according to the building blocks of this framework (Chapter 8).

4 Biodiversity, forests, and the ocean – status quo and challenges

STEP 2.1

Analysis of global assessment reports

What are the main challenges for sustainable management?

This Chapter is based on global assessments regarding the three global commons. We provide short summaries of the **current status and core challenges for the conservation and sustainable management** of biodiversity in general and as well as coastal and marine ecosystems in particular. The final section highlights the interactions between the different global commons, climate change and the current pandemic. For a list of the scientific assessments and reports analysed see Appendix 3.

4.1 Biodiversity

The need to conserve biodiversity (see Box 4 for definition) has become a broadly acknowledged societal goal reflected in international frameworks and policies – such as the 2030 Agenda and the CBD – and national and local policies. Beyond ethical or spiritual motivations for biodiversity conservation, the focus on the tangible benefits biodiversity provides to human society has become the dominant narrative. As a result, the fact that biodiversity is critically important to human life is beginning to enter the political and social mainstream.

Box 4: Definition of biodiversity and ecosystem services

Biodiversity is the "variety of life on Earth, including diversity at the genetic level, among species and among ecosystems and habitats. It includes diversity in abundance, distribution and behaviour, as well as interaction with socio-ecological systems. Biodiversity also incorporates human cultural diversity, which can both be affected by the same drivers as biodiversity, and itself has impacts on the diversity of genes, other species and ecosystems". (UN Environment 2019 GEO 6: 689)

Biodiversity is fundamental for providing ecosystem services, which are the "benefits people obtain from ecosystems. According to the original formulation of the Millennium Ecosystem Assessment, ecosystem services were divided into supporting, regulating, provisioning and cultural. This classification, however, is superseded in IPBES assessments by the nature's-contributions-to-people system". (IPBES GA SPM Glossary 2019: 14)

4.1.1 Stocktaking: State of biodiversity

The critical role biodiversity plays in underpinning human well-being and sustainable development was powerfully demonstrated by the Global Assessment of Biodiversity and Ecosystem Services prepared under the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES):

"For example, more than 75 percent of global food crop types, including fruits and vegetables and some of the most important cash crops, such as coffee, cocoa and almonds, rely on animal pollination. Marine and terrestrial ecosystems are the sole sinks for anthropogenic carbon emissions, with a gross sequestration of 5.6 gigatons of carbon per year (the equivalent of some 60 percent of global anthropogenic emissions). Nature underpins all dimensions of human health and contributes to non-material aspects of quality of life – inspiration and learning, physical and psychological experiences, and supporting identities – that are central to quality of life and cultural integrity, even if their aggregated value is difficult to quantify." (IPBES GA SPM 2019: 10)

At the same time, the IPBES Global Assessment identifies multiple anthropogenic drivers, in particular land/sea use change, direct exploitation, climate change, pollution and invasive alien species, which cause significant declines in biodiversity. Figure 14 in 4.4 summarises some of the impacts across different ecosystems. In order to meet the SDGs and the 2050 Vision for Biodiversity, these drivers have to be addressed. The IPBES Global Assessment diagnoses, that current efforts for biodiversity conservation and sustainable development are insufficient and require transformative changes across society:

"Goals for conserving and sustainably using nature and achieving sustainability cannot be met by current trajectories, and goals for 2030 and beyond may only be achieved through transformative changes across economic, social, political and technological factors" (IPBES GA SPM 2019: 14).

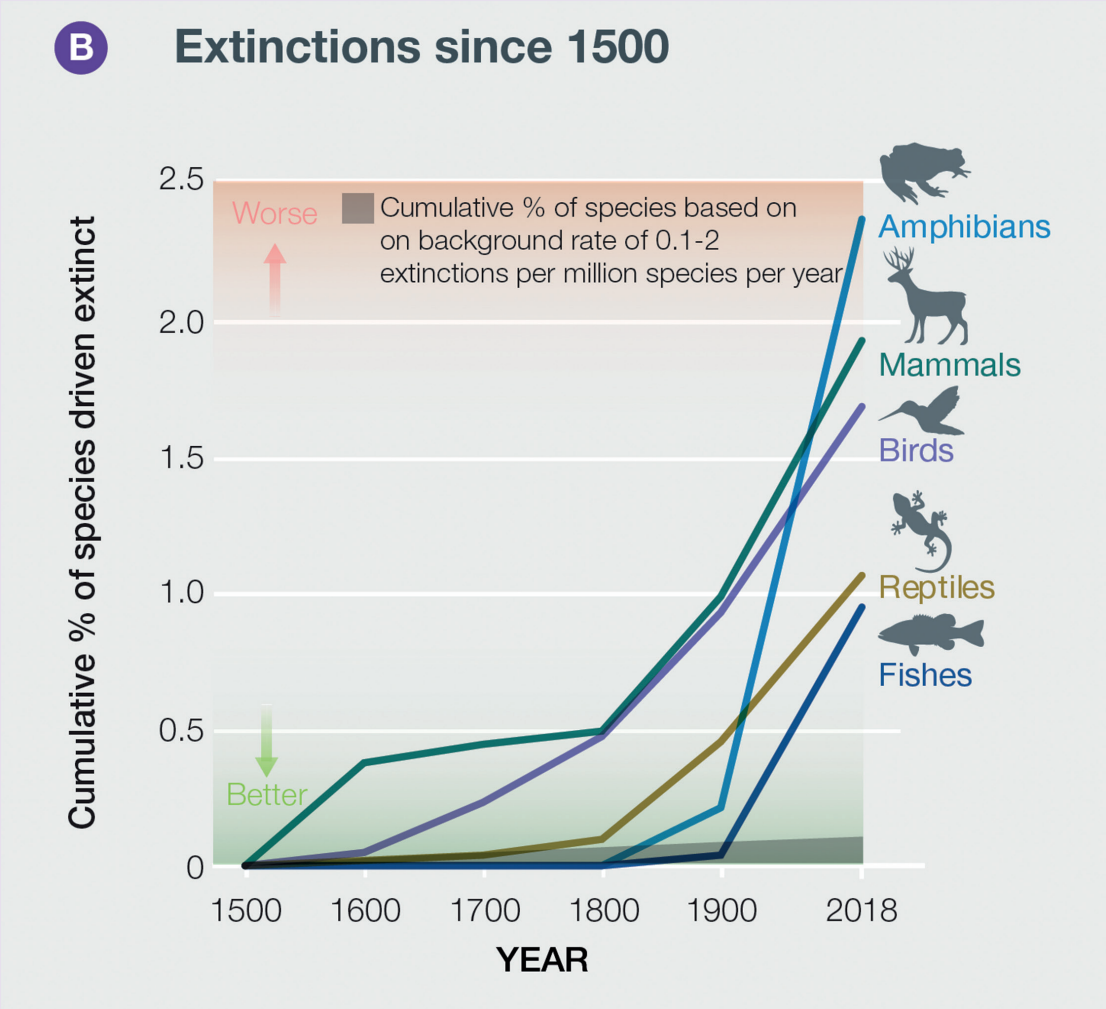


Figure 6: Species extinction since 1500 for vertebrate groups. Extinction rates are increasing sharply in the past century. Source: IPBES GA SPM 2019: 26, Figure SPM 3B

The assessed decrease of biodiversity is dramatic. Over the past century extinction rates have been increasing dramatically. The adverse consequences of each of the drivers are in themselves huge and undermine sustainable development. It is also important to be aware of interactions between these drivers (in particular climate change interacting with others) which is exacerbating negative impacts on biodiversity and sustainable development.

For example, agriculture is a major cause of land use change driving biodiversity loss and climate change, e.g. through forest conversion (IPBES 2018 LDR SPM Figure 6: 31). But this loss in biodiversity is also enhancing the exposure of agriculture to other risks: *"Reductions in the diversity of cultivated crops, crop wild relatives and domesticated breeds mean that agroecosystems are less resilient against future climate change, pests and pathogens."* (IPBES GA SPM 2019: 12). Hence strategies for more sustainable agriculture including diversification can contribute to both reducing the loss of biodiversity and enhancing the resilience to climate change.

It is widely accepted that biodiversity loss and climate change are interconnected and must be addressed together in order to achieve sustainable development (CBD 2019). On the one hand, species and ecosystems are negatively impacted by climate change leading to ecosystem degradation (e.g. forest and wetlands), which in turn contributes to carbon emissions. On the other hand, biodiversity can be part of the solution for contributing to climate change mitigation, adaptation and disaster risk reduction. Such nature-based solutions include *"actions to protect, sustainably manage, and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits"* (IUCN 2016: 1); these also may include, for example, afforestation and reforestation for climate change mitigation. However, trade-offs can occur when such activities encroach on land needed for food production or cause adverse impacts on biodiversity through the introduction of invasive species (IPCC SR1.5 SPM 2018). Assessments address these interrelations and the benefits nature-based solutions can have for sustainable development. The main interactions are summarised in Figure 8. However, too often, climate and biodiversity are addressed only within their disciplinary and sectoral silos, and more integration of approaches to tackling these challenges is needed (CBD 2019). Even though governments and the wider societies are increasingly engaging in biodiversity conservation – the global community is not on track to halt or reverse biodiversity loss. With regards to the Aichi Biodiversity Targets under the Strategic Plan for Biodiversity 2011–2020, the IPBES Global Assessment states that it is well established that *"[o]verall, the state of nature continues to decline (12 of 16 indicators show significantly worsening trends)"* (2019: 33). Bridging the gap between science and policy remains challenging, resulting in a situation in which scientific findings do not translate into effective policy responses.

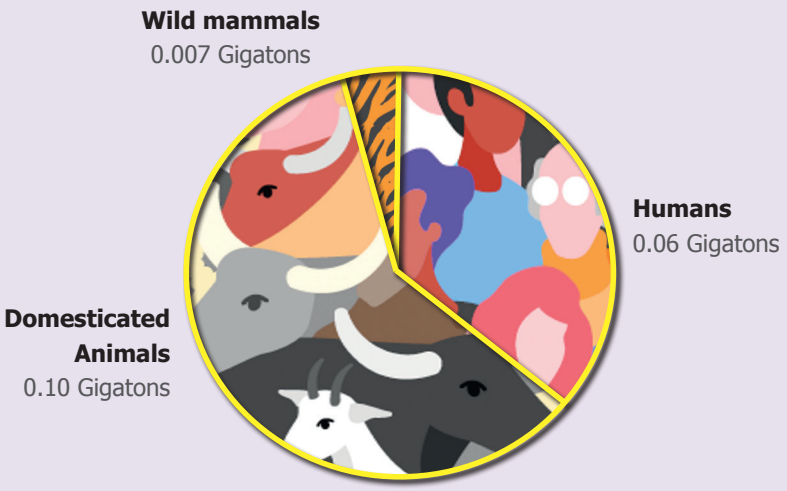


Figure 7: Estimates of the biomass mammals on Earth, split between humans, domesticated mammals and wild mammals (the area of the circle indicates the relative biomass of each group measured in gigatons of carbon). Source: Based on/Adapted from Bar-On et al. 2018, In: UNEP MPN 2021: 61. This figure illustrates how comparatively few individuals of all other species are left on the planet, when compared with humans and the animals we have domesticated.

4.1.2 Putting biodiversity at the core of development agendas – three main challenges

The consideration of biodiversity loss alongside climate change as issues critical for sustainable development – rather than "merely" as environmental and as such „subordinated" problems – is gaining attention. The Independent Group of Scientists appointed by the United Nations Secretary-General concludes in the Global Sustainable Development Report (GSDR) that *"science has shown that we are on an unsustainable path that is destroying the natural world on which we depend for survival. Science has also indicated that the outcome is not inevitable"* (GSDR 2019: 135). A number of interlinked challenges and structural constraints to change the negative trends can be synthesised from global assessments. By scrutinising assessments for this report, possible impediments hindering or delaying sustainable development were identified, which we relate to three core challenges:

Challenge 1: Prevailing socio-economic models and incentive structures lead to land and resource use that exceeds bio-physical capacities

A major challenge is that prevailing socio-economic models and incentive structures lead to land and resource use that increasingly exceeds bio-physical capacities and undermines nature's contributions to people (IPBES GA SPM 2019: 23). The current structures promote indirect and direct drivers of biodiversity loss that are highly interrelated and impede sustainable development (see Figure 14 in 4.4.) Current policies and measures fail to address these interlinkages: the IPBES Global Assessment states that it is well established that "[s]ectoral policies and measures can be effective in particular contexts, but often fail to account for indirect, distant and cumulative impacts, which can have adverse effects, including the exacerbation of inequalities" (IPBES GA SPM 2019: 39). Economic instruments (e.g. subsidies, financial transfers, tax abatements and commodity prices) that fail to include environmental and social costs create perverse incentives for unsustainable production that is harmful to nature (IPBES GA SPM 2019: 30). This has led to the expansion of unsustainable practices (e.g. unsustainable agriculture and overfishing), which is promoted by indirect drivers such as global trade, at the expense of biodiversity and human well-being. The Independent Group of Scientists describes a *"Western-style path dependence of economic growth at environmental costs"* (GSDR 2019: 133). As a consequence, current development efforts continue destroying nature and its contributions needed for human well-being and for many of the economic activities humans rely on.

Challenge 2: Biodiversity loss reinforces global inequalities which reinforces biodiversity loss

The assessments diagnose that competing exploitations of nature are in particular impacting people that are depending on biodiversity for their livelihood, in other words, biodiversity loss has disproportionate negative impacts on indigenous and traditional peoples and poor communities whose livelihoods are highly dependent on natural resources. Although these effects of biodiversity loss *"are distributed and experienced differently among social groups, countries and regions"* (IPBES GA SPM 2019: 10), it exacerbates their vulnerability to poverty (IPBES GA SPM 2019: 15). As highlighted by IPBES GA SPM: *"the negative impacts of all these pressures include continued loss of subsistence and traditional livelihoods resulting from ongoing deforestation, loss of wetlands, mining, the spread of unsustainable agriculture, forestry and fishing practices and impacts on health and well-being from pollution and water insecurity"* (2019: 14).

This is due to the fact that decisions on the use of nature tend to *"benefit some people at the expense of others, particularly the most vulnerable"* (IPBES GA SPM 2019: 10). Assessments have drawn attention to the trade-offs in the way certain contributions of nature are being used, for instance *"clearing of forest for agriculture has increased the supply of food, feed, [...] and other materials important for people [...], but has reduced contributions as diverse as pollination [...], climate regulation [...], water quality regulation [...], opportunities for learning and inspiration [...] and the maintenance of options for the future ..."* (IPBES GA SPM 2019: 22). This often has a snow-ball effect and with their livelihoods being threatened may result in *"... [e]xtreme poverty, [which] combined with resource scarcity and inequitable access to resources, can contribute to [further aggravate] land degradation and unsustainable levels of natural resource use"* (IPBES LDR SPM 2018: XLI).

On a country level, a similar causal relation is at work: the *"least developed countries, often rich in and more dependent upon natural re-*

sources, have suffered the greatest land degradation, have also experienced more conflict and lower economic growth, and have contributed to environmental outmigration by several million people" (IPBES GA SPM 2019: 30). This is exacerbated by climate change, which is having adverse impacts on species and ecosystems (e.g. reducing species range), causing ecosystem degradation (e.g. of coral reefs, forests and coastal ecosystems) with negative impacts on ecosystem services with negative consequences for livelihoods, human health, infrastructure and food systems (IPCC SRCCL SPM 2019: 16; IPBES GA SPM 2019: 13; IPCC SR1.5 2018: 11).

Figure 8: The interactions between climate change, land use and biodiversity. Source: UNEP MPN 2021: 82

Challenge 3: The conservation of biodiversity as a global public good lacks more determined, integrative and multilateral responses

Biodiversity is not only a global commons but also affected by many different activities from a broad range of sectors. Therefore another major challenge relates to global governance – in terms of the set of rules, norms and decision-making processes but also in terms of target-setting, responsibilities, compliance, accountability but also equity and participation (IPBES GA SPM 2019). The protection of biodiversity requires more determined, integrative and multilateral responses. Several multilateral agreements address different aspects of biodiversity conservation (e.g. UN CBD, Ramsar Convention, CITES, CMS and others) but there is a lack of coordination and coherence in policy approaches across the sectors driving biodiversity loss. Policies and responses to address biodiversity loss often remain in silos and thereby limited to certain aspects or policy fields (CBD 2019). The IPBES Global Assessment diagnoses the need for *"mainstreaming biodiversity and sustainability across all extractive and productive sectors, including mining, fisheries, forestry and agriculture, so that together, individual and collective actions result in a reversal of the deterioration of ecosystem services at the global level"* (IPBES GA SPM 2019: 17).

The IPBES ECA (2018: XLVIII) describes *"a lack of human resources, institutional capacity and financial means, or corruption"* as key constraining factors for effective efforts to achieve biodiversity conservation and also calls for more integrative and multilateral development cooperation.

In light of the speed and scale of environmental and societal change and the outlined challenges, the assessments generally agree that a critical shift and transformative action across several sectors of society are necessary but such changes cannot be brought about by a country alone and require international collaboration (IPBES GA SPM 2019: 17). This is also increasingly recognised within the business community as the report by the World Economic Forum states: *"Addressing the nature crisis requires a critical shift towards nature-positive models in three key socio-economic systems: food, land and ocean use; infrastructure and the built environment; and extractives and energy."* (WEF 2020: 10).

4.1.3 Summary

All assessments agree on the fact that the loss of biodiversity is devastating and increasing and interdependent with climate change. By analysing the stock-taking done in the assessments (Appendix 3 contains a list of the assessments), we identified core challenges that have to be met in order to conserve and restore biodiversity: the unsustainable use of natural resources due to structural issues **inherent in our socio-economic systems, inequalities and weak global governance**. Increased scientific evidence, growing public understanding and political awareness of the importance of biodiversity, the extent of its loss, and the negative consequences for human well-being alone are at present not sufficient to stop, let alone reverse, biodiversity loss.

We will summarise the key recommendations given by the reports to address these challenges in Chapter 5.1 below, and further zoom in on recommended actions for transformative change in Chapter 6.1.

4.2 Forests

Forests play a critical role for humans and nature. Not only peoples' livelihoods are directly dependent on forest ecosystems through the provision of food, timber and non-timber products; they also contribute to ecosystems functioning (regulating ecosystem services – e.g. soil protection, carbon storage, nutrient cycling, water quantity/quality, regional rainfall patterns) and human health and well-being (cultural ecosystem services – e.g. recreation, traditional uses, spirituality). All these services and functions that forests provide are vital to our lives. They need to be maintained and strengthened if we want to mitigate and adapt to current and future socio-environmental challenges such as climate change. As an example of the relevance of forests for our society considering solely market economic terms, the forest sector contributes directly to the World Gross Domestic Product (GDP) an estimated USD 539 billion annually. When accounting for direct, indirect and induced market effects, the global forest sector amounts to USD 1.2 trillion (Li et al. 2019), which is roughly the equivalent of the GDP of Australia (World Bank 2020), with the forest industry providing about 13.2 million jobs (IPBES GA SPM 2019: 3).

The deep interconnection among people, forests and their associated biological diversity has a long history, reflecting the roots of the human species in forests and savannas (Roberts 2020). Forest flora and fauna have been a vital source of raw materials for food and feed, construction, clothing, handicrafts, medicines and other daily livelihood needs to human societies for millennia (Camara-Leret and Denney 2019). An example of these crucial roles of natural forests is given in a regional IPBES assessment report:

"Forests in Africa are major providers of food and energy on the continent, and they play a crucial role in conserving biodiversity, mitigating climate and maintaining functional ecosystems. Africa is home to 17% of the world's natural forests (675 million hectares)" (IPBES Af 2018: 129).

Forest biodiversity loss has critical repercussions on ecosystems' resilience and with it on the capacity of human food systems to adapt to future changes. Its role is crucial by preventing desertification, pest attacks, soil erosion, increase of zoonotic diseases, maintaining the balance of pollinator populations, and providing resilience

against flooding in coastal areas, among others. Furthermore, forest biodiversity plays an essential role as a gene pool for food and medicinal crops at the local and global level.

Healthy forests maintain critical ecological functions at the local and global level, supporting human well-being, health, livelihood and survival, much more than is reflected by their above-mentioned contribution to GDP. Taking into account the value of ecosystem services for which no market exists, studies have concluded that e.g. tropical forests *"have a value four times higher when maintained for providing services such as carbon sequestration, non-timber material provisioning, etc. than use for timber production only"* (IPBES Af 2018: 169).

4.2.1 Stocktaking: State of natural forests

Globally, natural forests have declined over the past decades. Since 1990, about 10 percent of the total world's forests have been lost due to conversion to other land uses, primarily agricultural land. In total, the estimated loss of forest since 1990 amounts to 420 million hectares on a global scale through deforestation (FAO SWF 2020: 14, Figure 5). Although the deforestation rate has decreased in the last three decades, from 16 million ha per year in the 1990s to 10 million/year during 2015–2020, intact old-growth forests have seen significant declines worldwide, with an estimation of 80 million hectares since 1990 (Potapov et al. 2017; Watson et al. 2018, FAO SWF 2020). This loss has been especially acute in biodiversity hotspots in Australia, Brazil, Central America, Madagascar, Southeast Asia, and West Africa (Hill et al. 2019). Deforestation and forest expansion trends vary in different regions of the world as illustrated in Figure 9 (below), with net forest gains in Asia, Oceania and Europe contrasting with continued net forest losses in Africa and South America. Since 2010 Africa shows the highest net loss of natural forest areas in 2010–2020 with a loss of 3.94 million ha per year, followed by South America with 2.60 million ha per year (FAO SWF 2020).

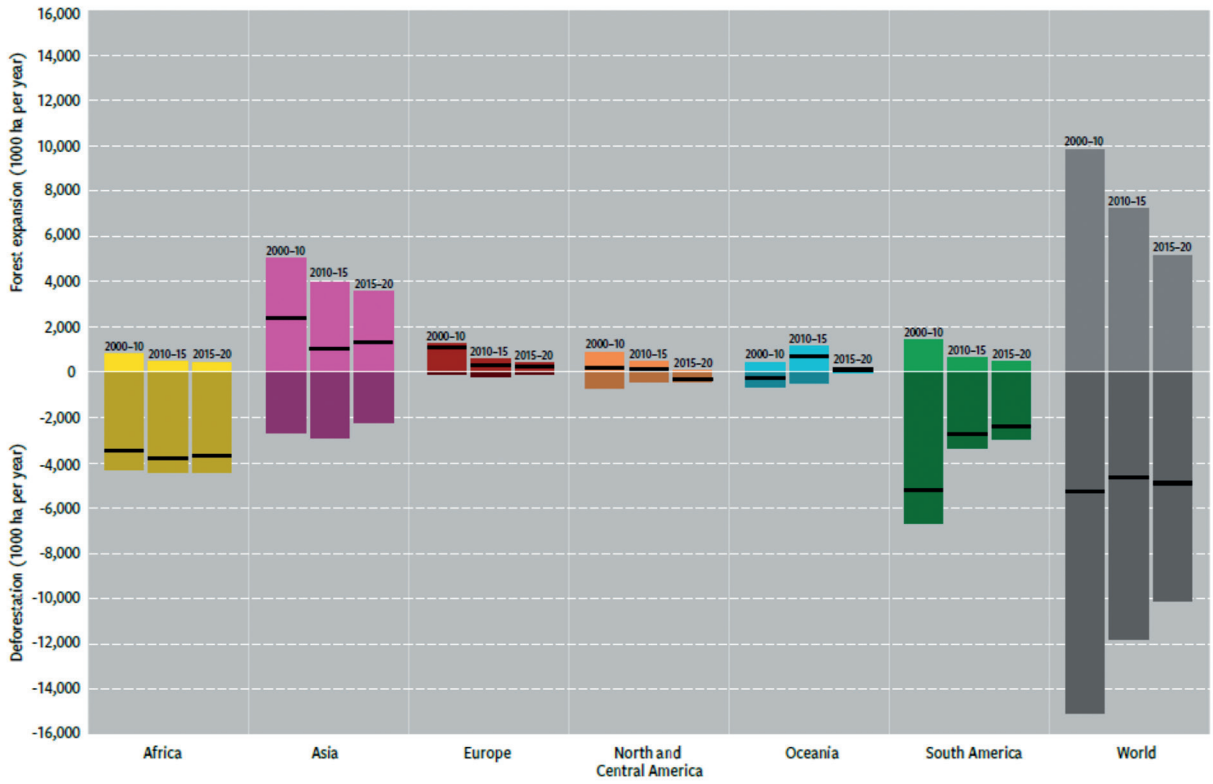


Figure 9: Annual rate of global forest expansion and deforestation (the black line on each bar shows the difference between forest expansion and deforestation – net forest loss/gain). Source: Global Biodiversity Outlook 5, 2020: 53

Considering climatic and ecological zones, 45 percent of the world's forest is found in the tropics, followed by the boreal (27 per cent), temperate (16 per cent), and subtropical domains (11 per cent). Within these areas, the largest negative change has been occurring in the tropical rainforest. Despite the slowdown of tropical forest loss from 13.8 million ha per year in the 1990s to 9.28 million ha annually in 2015–2020 (FAO SWF 2020: 36) (Figure 9 above), there is still a disturbing rise of deforestation rates in all the Amazon region. Walker et al. (2020) showed that after a period of relative stability in the mid to late 2000s, there was a dramatic 200 per cent increase in Amazon-wide carbon loss from 2012 to 2016. These results reveal that the emission sources were nearly twice as large as previously recognised, confirming Amazon-wide losses from degradation and disturbance (−1,463.7 MtC) accounting for nearly half (46.6) of the estimated total (−3,140.7 MtC) in the same period.

Besides deforestation, forest degradation is also taking place at alarming rates globally. Forest degradation in the Brazilian Amazon has been found to have an extent of affected area equal to or greater than deforestation (Martricardi et al. 2020). While there is no universally agreed definition of forest degradation, the FAO SWF assessment states that it *"entails a reduction or loss of the biological or economic productivity and complexity of forest ecosystems resulting in the long-term reduction of the overall supply of benefits from forest, which includes wood, biodiversity and other products or services"* (FAO SWF 2020: 19). The technical difficulties in providing reliable quantification of degradation and the resulting fact that the different countries are not able to report on its status at national levels have led to the use of proxies, such as forest ecosystem health and forest fragmentation indicators, for global assessments to examine degradation. The urgent need for decisive action concerning the world's tropical forests is compounded by the fact that the rapid disappearance of forest areas often takes place outside any regulatory framework:

"A large share of tropical deforestation is likely to be illegal, while corruption, weak enforcement, insecure tenure, and conflicting laws and regulations all hinder effective implementation of even the most promising policies. While there have been small steps forward (e.g. in recognizing the rights of indigenous peoples and local communities), there must be a sustained commitment to support governance to effect transformational change" (NYDF 2019: 74).

4.2.2 Challenges for the sustainable management of forests

The following global challenges are based on the reports underlying this study (see Appendix 3). The general biodiversity-related challenges outlined in Chapter 4.1.2 above (excessive resource use, the reinforcement of inequalities, and the need for coordinated action) apply to forests as well, but we focus here on the specific set of issues that are emphasised concerning forests around the world. We organised the main challenges, as they emerged from our qualitative content analysis, into two sections: one deals with deforestation and forest degradation, and the other with competing demands and conflicts with other sectors.

Challenge 1: Addressing deforestation and forest degradation, in particular conserving remaining natural forests

Across the global assessment reports, there is a consensus that the biggest concern for forests at a global level is the alarming rate at which they have been disappearing and degrading. According to recent FAO figures, *"the absolute global forest area declined by about 178 million ha (an area approximately the size of Libya)"* in the last three decades (FAO SWF 2020: 10). The area of naturally regenerating forests even decreased by 301 million ha (FAO SWF 2020: 32), an area almost the size of India. On the other hand, *"the area of planted forests increased by 123 million ha"* in the same period (FAO SWF 2020: 30), with large areas planted with introduced species as is the case for South America (97 per cent) (FAO SWF 2020: 16).

Within the category of natural forests, primary forest has an irreplaceable value. These unique ecosystems are hotspots of biodiversity, large contributors to carbon storage and further ecosystem services, including heritage and cultural values (FAO SWF 2020: 34). Despite their relevance, primary forests have decreased worldwide by over 81 million hectares since 1990 (FAO SWF 2020: 16). The lack of an operational definition that would be key to define measurable indicators has led to challenges of monitoring and reporting primary forest status, increasing the uncertainty and threat to these types of forests. In terms of degradation, the FAO reports that more than 100 million hectares of forests are adversely affected, e.g. by forest fires, pests, diseases, invasive species, drought and adverse weather events (FAO SWF 2020: 18).

At the international level, there has been insufficient action to end these trends. If the levels and types of action remain the same, there will be even bigger challenges to face, especially regarding the loss of irreplaceable primary forests (NYDF 2019: 25). The global community is thus falling short in the goal of halving deforestation by 2020 and facing the steep challenge of ending it by 2030, as was agreed in the New York Declaration on Forests (Climate Focus 2015). This jeopardises the essential ecosystem services forests provide to humankind.

Deforestation and forest degradation are driven by several major trends which have consequences on many levels. A central driver of natural forest loss, accounting for 73 percent of deforestation, is the expansion of agriculture. Growing populations and increasing consumption demands motivate an ongoing conversion of forest areas to agricultural use. Large-scale commercial agriculture and, in particular, cattle ranching, soybeans and palm oil are the source of 40 percent of ongoing deforestation, local subsistence agriculture causes another 33 percent. The remaining factors contributing to deforestation are 10 percent urban expansion, 10 percent infrastructure and 7 percent mining (FAO SWF 2020: 82). Even though deforestation is predominantly ongoing in the global South, the underlying demand for products often comes from the global North. With its high demand for food and materials, especially biofuels, soy, palm oil, meat, ores, timber, etc., the European Union is the second-largest importer of tropical deforestation and associated emissions. Although deforestation associated with imports decreased in Europe from 2005 to 2017 by around 40 percent, Europe is still responsible for 16 percent of deforestation related to international trade in 2017 (EU 2019: 4; WWF 2021: 17).

Another major driver is unsustainable forest management, often a cause for severe degradation. The most extreme manifestation of this is illegal logging and related timber trade activities. These are complex, multifaceted phenomena that cover a broad range of activities, including violations of public trust (i.e. paying bribes or using violence for personal gain), property rights (public, communal or private), and regulations (notably, related to forest management, timber processing or finances/taxes). Furthermore, illegal logging is currently recognised as a form of transnational organised crime, which has triggered increased support for internationally concerted interventions. Due to its clandestine nature it is challenging to quantify and monitor but is estimated to have an annual global market value between USD 10 billion and USD 100 billion (IUFRO vol. 35 2016: 133).

Challenge 2: Addressing underlying drivers of deforestation and forest degradation (competing demands and conflicts with other sectors)

A fundamental and intractable debate that has been ongoing for decades, is centred on whether forests should primarily (or even exclusively) be seen as an economic resource or as an ecosystem that needs protection. Combining and finding a balance of these perspectives and stakeholders' interests is the main challenge to reaching positive outcomes for biodiversity and people (FAO SWF 2020: 163). For this process, it is necessary to address possible interdependent challenges while mainstreaming nature conservation into forest policy by balancing conservation and production aspects (IPBES ECA 2018: 785). This conflict leads to the need to handle delicate trade-offs when trying to achieve and strengthen different goals through forest-related measures.

Effective governance at different levels is critical to improve conditions and maintain forests around the globe. This governance needs to be based on policy alignment between sectors and administrative levels, safeguarded through enhanced international cooperation, and linked to locally relevant measures (IPBES GA SPM 2019: 8). This is particularly relevant considering that most of the threats to forest biodiversity originate outside the sector. The need for better governance is also reflected in the conflict around conservation and production. With an overall lack of decisive action, change is developing too slowly to meet international targets (NYDF 2019: 17). The widespread lack of coordination includes the insufficient integration of science and stakeholders into political processes that address these challenges. Furthermore, areas managed by indigenous peoples and local communities (IPLCs) are recognised to be under increasing pressure from natural resource extraction including logging and mining. This pressure affects subsistence, challenges traditional management, indigenous and local knowledge transmission, and acts as a driver of further deforestation and forest degradation (IPBES ECA 2018: 785).

4.2.3 Summary

Forests are currently threatened by interrelated processes on a global scale. Continued deforestation and forest degradation, especially of natural forests in the tropics, comprise the first set of challenges identified by current assessment reports. The major drivers of forest loss and degradation are land-use change, especially conversion to agriculture, which is driven by global consumption demands. In turn, the decline of forests adversely affects human well-being, health, and climate outcomes and contributes to the alarming loss in biodiversity. The second set of challenges arise from the fact that competing demands and conflicts with other sectors are the cause underlying forest loss, and that forest-related policies are often poorly coordinated, underfunded, and bogged down by conflicting interests.

We will summarise the key recommendations given by the reports to address these challenges in Chapter 5.2 below, and further zoom in on recommended actions for transformative change in Chapter 6.2.

4.3 The Ocean

The ocean covers seven-tenths of the planet and hosts, within its complex 3-dimensional space, some of the most complex and diverse ecosystems on Earth. It provides vital services to people and the planet by providing seafood for nutrition, linking countries and markets through shipping routes, offering space for recreation, offshore wind and deep-sea mining activities. Next, the ocean generates half of the overall oxygen on Earth and is essential for climate regulation and buffers climate change effects.

According to the International Council for Science, SDG 14 – Conserve and Sustainably Use the Oceans, Seas and Marine Resources for Sustainable Development along with SDGs 2, 3 & 7, presents most synergies with other SDGs (ICSU 2017). Therefore, a decline in ocean health is a major threat to achieving sufficient nutrition, people's livelihoods and economic growth. This is especially worrisome considering that over 38 percent of the world's population live within 100 km of the shore (Small et al. 2003: 596). Also, this proportion is steadily increasing, mostly due to the fact that 22 of the 32 largest cities in the world are located on estuaries.

In the following we provide a stocktake of the current situation of the ocean. We draw on the findings collated in the World Ocean Assessment (UN WOA 2016), complemented by the Intergovernmental Panel on Climate Change Special Report on the Ocean and Cryosphere in a Changing Climate (IPCC SROCC 2019), Intergovernmental Platform on Biodiversity and Ecosystem Services Global assessment's Summary for Policy Makers (IPBES GA SPM 2019) and FAO's report on the State of Fisheries and Aquaculture (FAO SOFIA 2020). The structure follows three central dimensions of the ocean for humans: as a resource, as a discharge site, and its role in climate change.

4.3.1 Stocktaking: State of the ocean

The ocean as a resource

The ocean plays a central role as a resource of multiple goods and services from which humankind benefits. These range from seafood for global nutrition, marine species as genetic resource, mining of raw materials (sand, fossil fuels, rare metals) and a source for recreation and cultural-spiritual identity. All the requirements oceans currently have to fulfil result in competing demands and conflicts with other sectors (UN WOA 2016). In this section the focus is placed on the ocean's role as a resource for food security.

Despite manifold efforts to foster fisheries management, i.e. ecosystem-based approach to the management of fish stocks, recent numbers of the FAO (2020) show an alarming trend of the global marine fish stocks (Figure 10). In 2017, 34.2 percent of the fish stocks of the world's marine fisheries were classified as overfished. The FAO (2020) notes that overfishing does not only cause negative impacts on biodiversity, but also reduces fish reproduction which subsequently leads to negative social and economic consequences. The fraction of fish stocks that are within biologically sustainable levels decreased from 90 percent in 1974 to 65.8 percent in 2017 (FAO SOFIA 2020: 7).

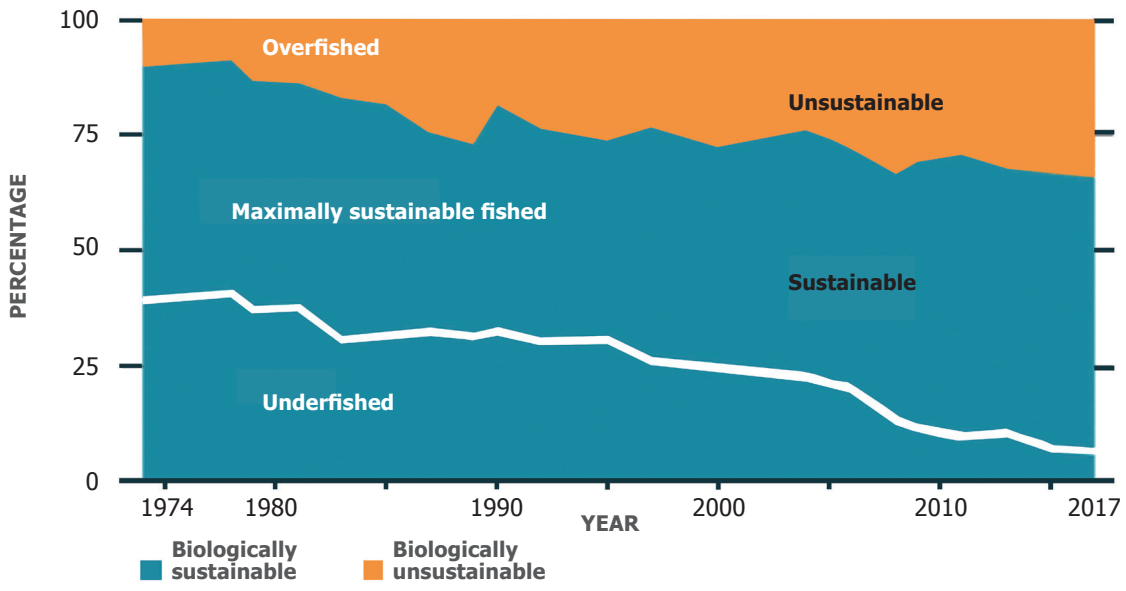


Figure 10: Global trends in the state of world´s marine fish stocks, 1974–2017. Source: FAO 2020: 48

Next to the challenges of how to manage and control fishing capacity and intensity, one of the greatest threats to the sustainability of global fishery resources is illegal, unreported and unregulated (IUU) fishing. IUU fishing occurs both on the high seas and within the 200 mile limits of coastal states, especially affecting coastal rural populations in vulnerable areas. However, as of now, estimating the magnitude of IUU fishing is complex and depends on many factors, i.e. type of fishery and availability of information. Currently, FAO is working on a suite of methodology of future fishing estimation, to ensure that estimates are comparable.

Marine capture fisheries production has remained constant around 80 million tonnes since 1986 (FAO SOFIA 2020: 4), global production is estimated to have reached about 179 million tonnes in 2018 (Figure 11). The FAO SOFIA (2020) report also describes how aquaculture has significantly increased from 1950 to 2018 (Figure 11) leading to dominance of aquaculture in global fish markets. This trend however evokes considerable challenges for sustainability, and hosts significant implications for fish distribution and consumption as fish has become available to regions and countries with otherwise limited or no access to fish, leading to improved nutrition and food security (FAO SOFIA 2020: 72). Disregarding, the World Ocean Assessment only focuses on the issues related to overfishing and fish-stocks of capture fisheries.

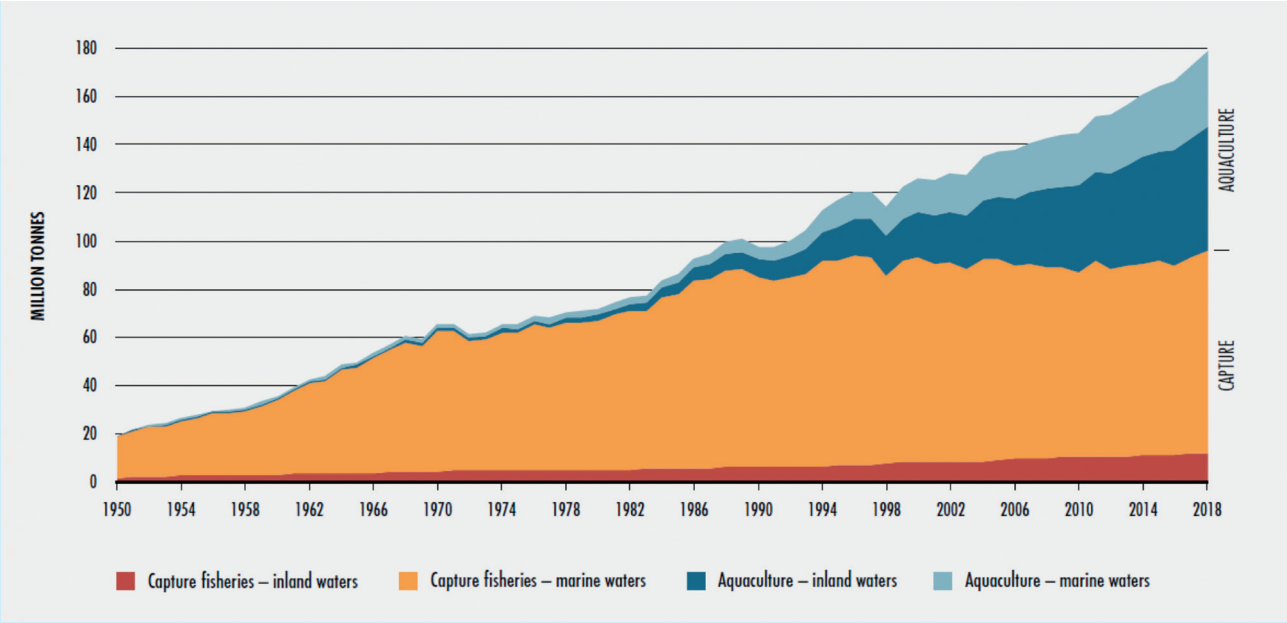


Figure 11: World Capture Fisheries and Aquaculture Production (excluding aquatic mammals, crocodiles, alligators, and caimans, seaweeds and other aquatic plants). Source: FAO SOFIA 2020: 4

Adding to the high pressure from fishing, over the past 50 years many marine species across various groups have undergone shifts in geographical range and seasonal activities in response to climate change effects, such as ocean warming, sea ice change, biogeochemical changes, oxygen loss, and habitat degradation. This has resulted in shifts in species composition, abundance and biomass production of ecosystems, moving from the equator to the poles. These altered interactions between species cause cascading impacts on ecosystem structure and functioning. In most marine ecosystems species are impacted by both the effects of fishing and climate change (IPCC SROCC 2019).

As a result, the combined effect of maximised capture fish production, IUU fishing and climate change threatens marine biodiversity.

The ocean as a discharge site – the polluted ocean

The second core issue identified is marine pollution, which threatens marine biodiversity and human health. Indeed, over 80 percent of the landmass on Earth is in a watershed that drains directly to the ocean, making it the ultimate sink for anthropogenic pollution. The heaps of garbage along some coastlines are a problem visible to all. Other types of pollution, such as: untreated wastewater, discharges from agriculture or industrial chemical discharges, oil spills from exploitation and shipping activities, marine litter and noise pollution, are just as serious, but may be less evident to the untrained eye. Figure 12 provides a rough overview on the multiplicity of different pollution sources that influence the ocean.

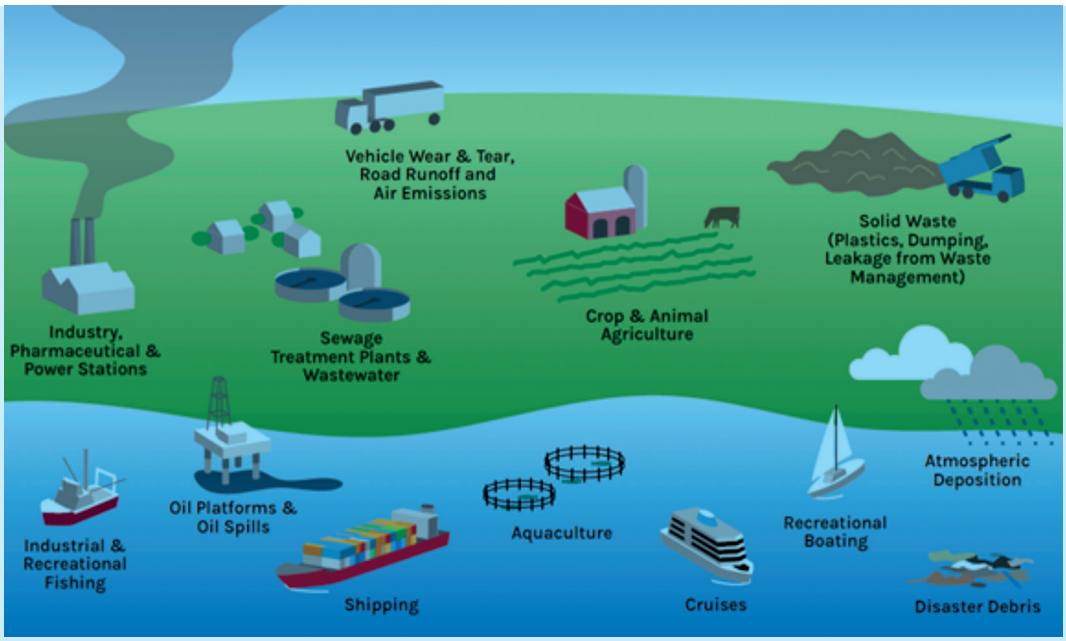


Figure 12: Sources of ocean pollution. Source: Jambeck et al. 2020: 5

The World Ocean Assessment stresses that in considerable parts of the world the lack of adequate disposal of human bodily wastes has imposed major pressures on the ocean. Together with nutrients run-off from agriculture, these discharges cause eutrophication and toxic algal blooms which lead to anoxic areas (i.e. dead zones) that cause serious consequences to marine biodiversity (WOA 2016: I: 27f.). This link is emphasised by the World Ocean Assessment (2016), noting how the agricultural revolution has *"brought with it problems for the ocean in the form of enhanced run-off of both agricultural nutrients and pesticides, as well as the airborne and waterborne inputs of nutrients from waste from agricultural stock"* (WOA 2016: I: 27). In addition, the 'Global Programme of Action for the Protection of the Marine Environment from Land-based Activities' of 1995 highlighted the need for action to deal with sewage, including industrial wastes. In regard to the latter, the concentration of industries has led to intense levels of heavy metals input into the ocean. With the development of organic chemistry, new substances are used in managing electricity and as pesticides. According to the World Ocean Assessment (2016) many of those chemical products and processes have been proven to have a wide range of hazardous side-effects

and adverse effects on the marine environment. The case of oil spills are the most visible sign of these negative effects.

WOA contains estimates that the total input of marine litter into the oceans, worldwide, reaches scales of approximately 6.4 million tons per year (WOA 2016: 25: 1). It is calculated that 275 million metric tons (MT) of plastic waste was generated in 192 coastal countries in 2010, with 4.8 to 12.7 million MT entering the ocean (WOA 2016: 25: 1). Plastics are estimated to represent between 60 percent and 80 percent of the total marine litter (WOA 2016: 25: 12). Plastic waste has been identified as a global problem alongside other key issues, such as climate change, ocean acidification and loss of biodiversity (WOA 2016: 25: 3). Its density varies greatly among locations, influenced by anthropogenic activities, hydrological and meteorological conditions, geomorphology, entry point, and the physical characteristics of debris items (WOA 2016: 25: 1). The IPBES GA points to the fact that *"[m]arine plastic pollution in particular has increased tenfold since 1980, affecting at least 267 species, including 86 percent of marine turtles, 44 per cent of seabirds and 43 per cent of marine mammals. This can affect humans through food chains."* (IPBES GA SPM 2019: 15).

The oceans' role in climate change

The ocean plays an essential part in climate regulation, which encompasses buffering heat and absorbing CO_2. At the same time it is greatly impacted by climate change due to sea-level rise, extreme weather events and ocean acidification.

One the central climate regulating functions of the ocean is absorbing significant amounts of CO_2 emissions and heat from the atmosphere through its currents and mixing processes. These overturning circulations are the driving forces behind the oceanic sink for CO_2. Without it, the CO_2 concentration in the atmosphere would be significantly higher and human-made climate change considerably more severe (WOA 2016: 5: 16–18). Indeed, the amount of heat that the ocean stores is extremely large when compared to the land or atmospheric capacity. The ocean stores excess heat for periods of time in its deep-ocean currents before releasing it back into the atmosphere causing weather phenomena such as El Niño (WOA 2016: 5: 7f.).

While buffering CO_2 an increase in ocean acidification occurs. The IPCC cautions that the ocean is currently acidifying rapidly and at an unprecedented rate in the Earth's history (IPCC SROCC 2019). Moreover, the climate-driven increases in water temperature and vertical stratification of the upper ocean are of strong concern (UN WOA 2016). All of these have repercussions on marine biodiversity and maintenance of food provision from seafood sources, such as northward migration of fish stocks by changing ocean currents. This is particularly worrisome for regions highly dependent on seafood protein, such as tropical developing countries.

The most obvious effects of climate change however relate to sea-level rise. Some small island States are predicted to become submerged completely and some heavily populated deltas and other low-lying areas face impending inundation. The World Ocean Assessment identifies another negative effect stemming from the poleward extension of major areas of storms and alterations of ocean currents, which is likely to lead to cyclones, hurricanes and typhoons in areas previously not seriously affected by them. Changes in patterns of variability of oscillations (such as the El Niño-Southern Oscillation) will bring climatic changes to many places and affect new areas, hence increasing coastal vulnerability. This underscores the importance of ecosystem services of coastal vegetation (e.g., dune vegetation, reed-beds, mangroves, salt marshes) which supports the reduction of erosion, buffering the effect of storm surges and wave attack (WOA 2016: 26: 6), and thus serves as natural protection. Removing the vegetation for coastal development can increase coastal erosion and may add to the amount of sediment moving along the shore, causing siltation of harbours and burial of coastal and coastal sea habitats (WOA 2016: 26: 6).

The global character of marine and coastal ecosystems being a highly unregulated common good obviously has extremely grave consequences, especially with regard to its negative repercussions to marine biodiversity composition and functioning. The global assessments show that they are – as was stated in 4.1.1 for biodiversity in general – inseparably linked to the issue of climate change with detrimental reciprocal effects (IPCC SROCC 2019).

4.3.2 Challenges for the sustainable development of the ocean

The above presentation of three major categories in which the ocean provides services and is used illustrates the multiple dimensions and extreme complexity of sustainable development of the ocean. Similar to biodiversity in general (see 4.1.2.), excessive resource use, the reinforcement of inequalities, and the need for coordinated action play along more or less prominently in all the problems described for marine and coastal ecosystems. Below we identify major challenges for sustainable use of the ocean and of coastal ecosystems.

Challenge 1: Interconnectedness of marine ecosystems and their interactions with socio-economic systems are disregarded

As stressed by the World Ocean Assessment, the ocean is characterised by its fluid nature that results in a high interconnectedness of marine and coastal ecosystems. This interconnectedness does not only relate to the biological properties, but is as pointed out by the FAO, strongly linked to socio-economic dimensions of i.e. food security and human well-being.

One of the prominent examples of such interlinkages across different coastal and marine ecosystems relates to mangroves. Next to providing manifold goods and services, i.e. as a natural buffer against waves, mangrove ecosystems are an important nursery ground for juvenile fish which as adults move into high sea waters. Therefore, clear-cutting of mangroves affects the amount of the total fish stocks.

Such often far-reaching interrelated impacts can be observed in almost all ecosystems in the ocean and are described in all global assessments. The resulting challenge is that any measure in coastal areas or the ocean is likely to evoke harmful unintended repercussions. For example, coastal development destroys coastal vegetation which stabilises and protects the coast against storm surges. Hence, any action in the ocean has to be put into a broader perspective, as due to the interrelated nature it often entails negative impacts in other parts of the world.

Challenge 2: Excessive marine resource use and harmful discharges

The vast richness of the ocean has invited resource use all through human history. Over the course of time, this extraction of the multiple marine resources has, more often than not, reached its limits.

The current overfishing situation in many regions of the ocean is one of the central problems. It is driven by over-extraction supported by capacity-enhancing subsidies, illegal fishing, and a lack of alternative livelihoods, especially in small-scale fisheries. It results in a loss of marine biodiversity, an increase of vulnerability of the lowest income groups, as well as a loss in long-term global economic returns.

The ocean is not only a place of (often excessive) resource extraction, but at the same time it acts as a discharge site. For the latter, these do not only relate to marine litter and polluted river run-off, but also to CO_2. A big part of this pollution of the ocean is driven by the influx of discharges from agriculture production, next to untreated sewage, industrial waste(water), oil spills and plastic litter. This suite of terrestrial inputs heavily pollutes marine systems and negatively affects marine biodiversity. Overfishing, loss of biodiversity and marine pollution are part of the same challenge.

Thus, it is obvious that the century-long prevailing principle of "freedom of the seas", which allowed everyone unlimited access to the ocean and its resources, has reached its limits.

Challenge 3: Fragmented governance of the ocean

Addressing the multi-dimensional and highly dynamic ocean system under a use and protection lens is challenging.

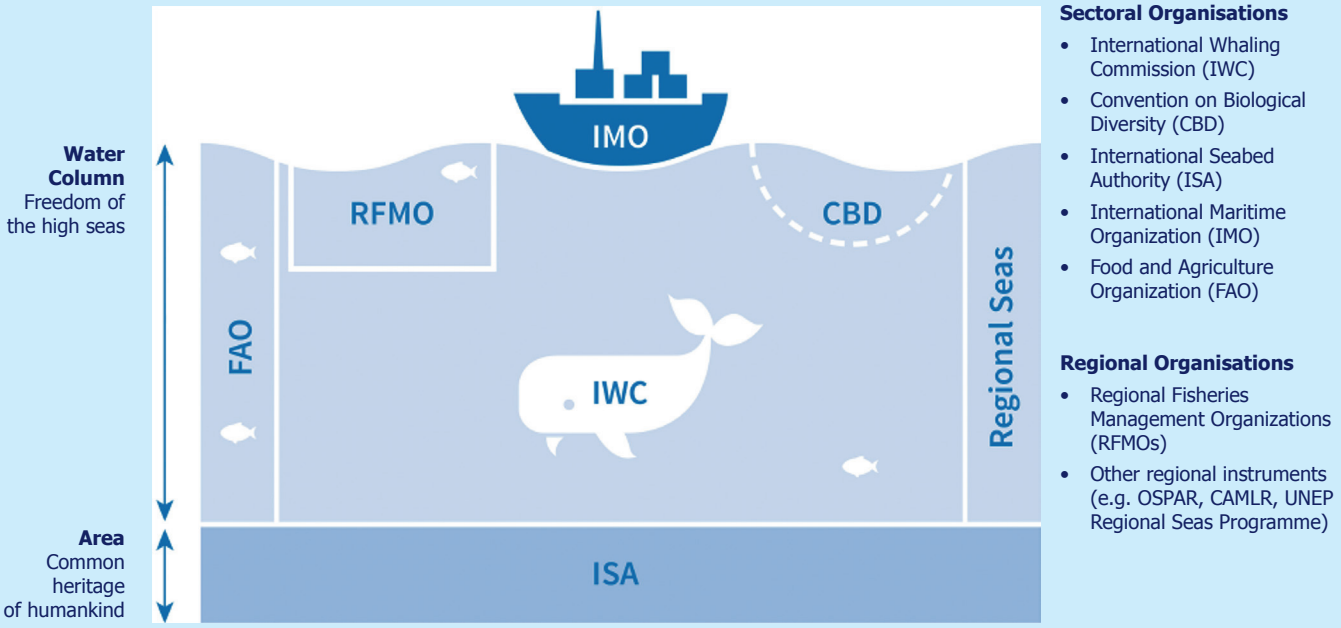


Figure 13: Patchwork of sectoral and regional organisations in the areas beyond national jurisdiction. Source: Tessnow-von Wysocki and Vadrot 2020: 6

Connected marine ecosystems are only very partially regulated under national jurisdiction while the high sea is a global common and under an open access regime with highly limited regulations agreed and enacted. In coastal areas and the exclusive economic zone (200 nautical miles from the shore) the use of the ocean, especially fisheries and rights on minerals in the seabed, is regulated under national jurisdiction. Some countries have extended their sovereign rights to further areas of the continental shelf (370 nm from the shore) regarding the rights on seabed resources.

Figure 13 illustrates the fragmented nature of current regulations of the areas beyond national jurisdiction (ABNJ). The water column in general is under the freedom of the high seas principle. Under the umbrella of the CBD, the conservation of biological diversity, the sustainable use of its components; and the fair and equitable sharing of benefits arising from genetic resources are addressed. Also in some geographical ocean areas, regional arrangements are in place. Regional fisheries management organisations (RFMO) are a type of international organisation dedicated to the sustainable management of fishery resources in a particular geographic region of international waters. The Regional Seas Programme from the United Nations Environment Programme (UNEP), is a regional mechanism for the conservation of the marine and coastal environment. It provides an intergovernmental framework to address the degradation of the oceans and seas at a regional level, initially focusing on pollution at sea, such as oil spills and movement of hazardous waste, as well as land-based sources of pollution, for example, plastics, wastewater and excess nutrients.

However, an overarching streamlined governance regime is missing.

4.3.3 Summary

The above described challenges of overexploitation and increasing pollution as well as CO_2 influx pose major threats to the ocean, the future conservation and sustainable use of marine biodiversity and its related goods and services. Effects of marine biodiversity degradation are far reaching, due to the interconnectedness of coastal and marine ecosystems. These challenges are poorly addressed by the current, fragmented governance of the ocean and will be further aggravated by climate change.

We will summarise the key recommendations given by the reports to address these challenges in Chapter 5.3 below, and further zoom in on recommended actions for transformative change in Chapter 6.3.

4.4 The urgency of rescuing the global commons

The global commons are defined as resources whose jurisdiction goes beyond country limits (United Nations 1997). These kinds of resources are recognised to be fundamental for the maintenance of resilience and dynamics of nature and humankind (Eser 2019). According to Mrema (2017: 3), the global commons include the ocean, atmosphere, outer space, and Antarctica. Lately, given their importance and value for human welfare, biodiversity and forests have also been included.

While biodiversity, forests and the ocean are not directly comparable and there is overlap between them, all three are global commons and constitute important parts of the 'natural capital' or 'life support system' that underlies all human activity and well-being. Assessments clearly show that, for all three, there is increasing and competing use. This leads to degradation and destruction of ecosystems and to biodiversity loss. Figure 14 summarises the most important drivers of loss. Underlying several of these are unsustainable production and consumption patterns as they drive land use change, climate change, pollution and in several instances invasive species. While all economic sectors contribute to loss and degradation of the commons to some degree the agrifood sector plays a prominent role, most notably as a main driver of forest loss due to conversion, but also affecting biodiversity in agricultural areas, adjacent areas and even marine biodiversity through nutrient run-off and other pollution.

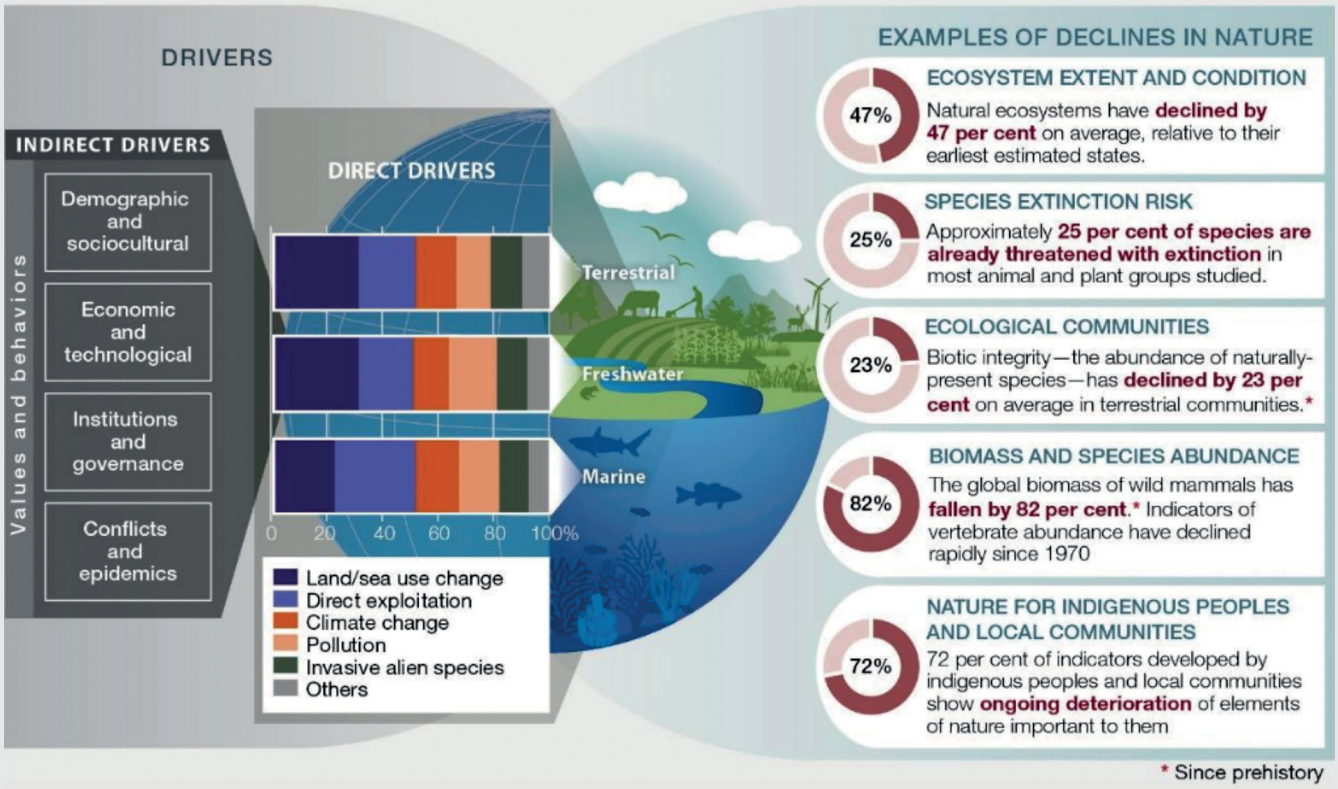


Figure 14: Indirect and direct drivers of biodiversity loss (left side) are causing declines in biodiversity/nature (right side). Land/sea use changes and direct exploitation are important direct drivers of biodiversity loss followed by climate change, pollution and invasive alien species (centre left). The negative impacts of climate change on biodiversity are expected to significantly increase in the future. Source: IPBES GA SPM 2019: 25

In addition, all three commons analysed in this report are detrimentally affected by climate change and, with increasing ecosystem degradation or destruction, are no longer able to function as buffers by capturing large amounts of CO_2. On the contrary, they further accelerate climate change by beginning to set free increasing amounts of CO_2. They are thus closely linked to and interact with the changing climate system which also has properties of a global commons. Assessment reports further highlight that the lowest income groups depend disproportionately on ecosystem services, provided by global commons for their livelihoods.

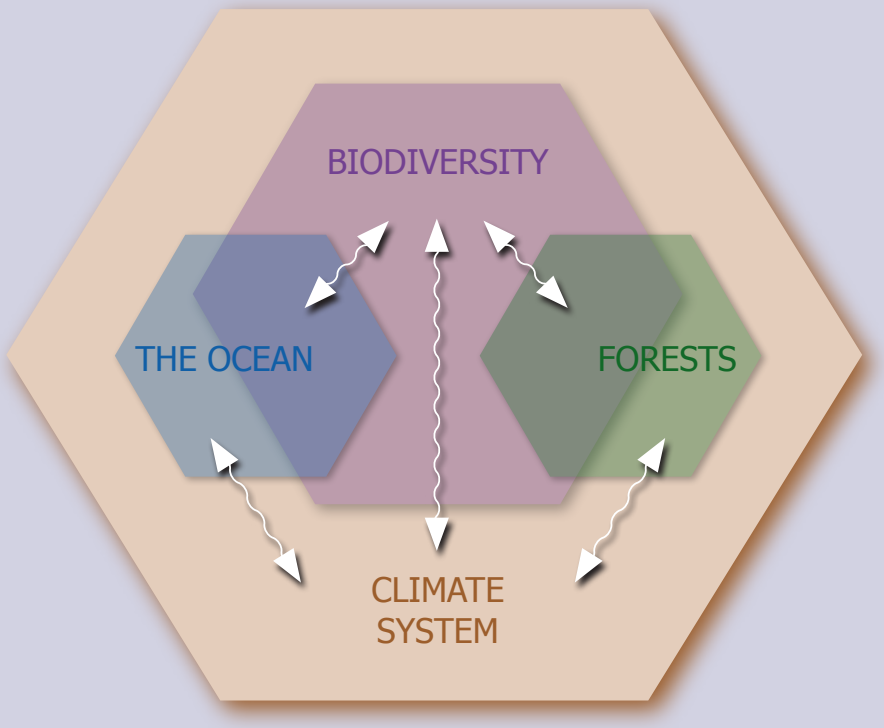


Figure 15: Global commons addressed by this report

Due to the connectedness of ecosystems, water and matter cycles and fluxes, these global changes are all interrelated and will have effects everywhere on the planet. Thus it is not only a question of solidarity with those most dependent on the commons who are more severely impacted, but it is in every country's and in every person's self-interest to preserve the global commons as foundation of human life on earth also for future generations. These problems are well-known and the urgency of addressing them is accelerating, so why do they persist?

From the beginning, humanity has depended on nature for fish, deer, timber, crops, etc., and largely took clean air, fresh water and flora and fauna for granted. Most contributions from nature were "non-excludable goods", and as long as they were available in abundance, possible rivalry remained locally restricted, such as in the example of common grazing land. The global problem arose when, with increasing world population and sharp increases in per capita consumption and resource use, especially in the global North and by better-off segments of societies, the earth's resources started to be overused and contaminated and at a certain point no longer able to fully regenerate. The "use" of biodiversity and the capacity of ecosystems to absorb and degrade pollution and waste, thus cleaning the world's water and air stocks, and the stability of the climate regime that has allowed humans to populate and live comfortably on Earth, these by and large non-excludable goods have now turned into being rivalrous. From a climate regulation perspective, if we want to limit global temperature rise to 2 degrees, the amount of CO_2 humanity can emit is limited. A country's or person's emission limits everyone else's; this is even more restrictive if

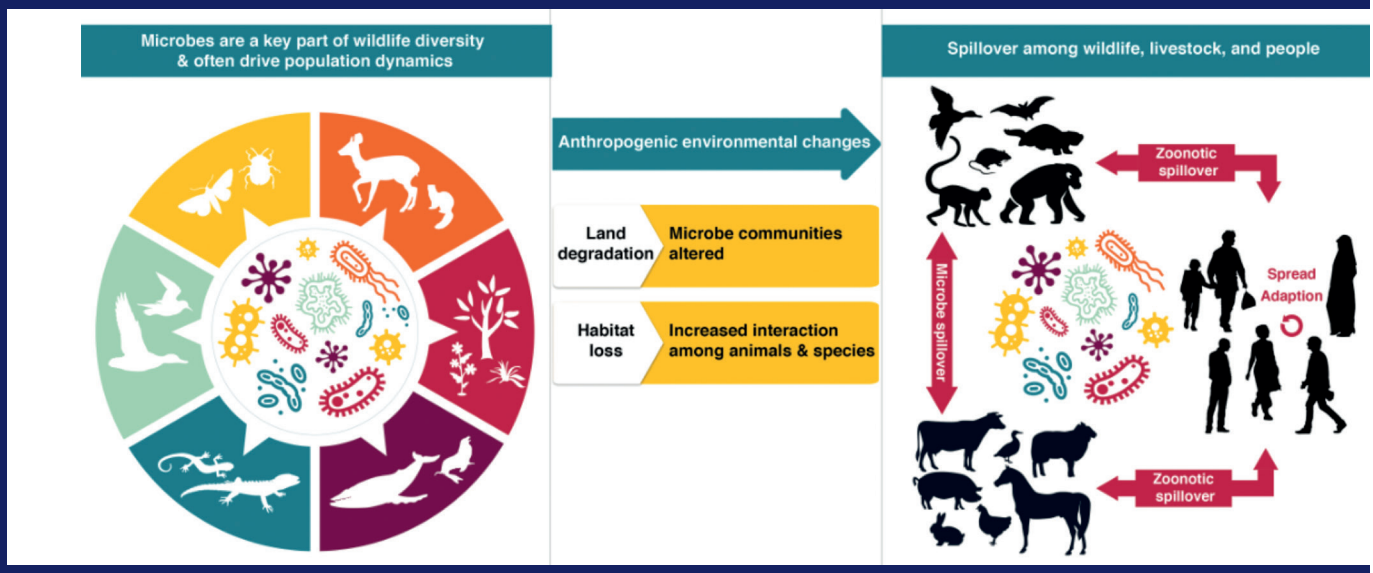
the increase is to be limited to 1.5 degrees. Using and especially degrading or polluting global commons costs the individual nearly nothing but creates costs for all the others – now and in the future. As natural systems are overused, their productive capacity and future potential decreases, a state already reached by more than $^{1}/_{3}$ of global fish stocks (compare Figure 15 above). As environmental systems degrade, their ability to filter air and water or their capacity to absorb CO_2 diminishes and ocean acidification increases. These losses imply costs for others and are not borne by the person causing them, and are referred to as "external costs" or externalities.
As at an individual level, the benefits of adopting pro-environmental behaviours are usually not immediately perceivable or apparent, and the individual has to bear all the costs of the behaviour, it is difficult to achieve sustainable management based only on a widespread change of the individual sense of responsibility. Now that formerly abundantly available goods and services provided by the global commons are scarce, the rules for using or affecting them need to be changed. Environmental and social costs need to be reduced and avoided where possible and all remaining costs included in the decisions causing them.

As a final point of stocktaking, we turn to the current situation of a pandemic, as infectious zoonotic diseases, which originally come from other species, are yet another effect where degrading ecosystems and decline of biodiversity play an important role. Very recent reports summarise the scientific understanding of the emergence of new diseases and the links between ecosystem and human health (see Box 5).

Box 5: Biodiversity and forest loss underpin disease emergence

Fostering transformative change has been recognised as a crucial step towards preventing disease emergence such as the current COVID-19 pandemic. The recently released IPBES workshop report on biodiversity and pandemic (IPBES 2020) and two UNEP reports on pandemics (UNEP 2021) and "Making peace with Nature" (UNEP MPN 2021) conveyed substantial evidence of the anthropogenic environmental changes and socioeconomic changes as underlying drivers of Emerging Infectious Diseases such as COVID-19.Disease emergence is not a new situation for humanity. It has been part of every step of society's developments with the domestication of wild animals and settlement expansion by increasing the contact required for pathogens to spill over into people. However, current global environmental emergencies, including biodiversity loss, climate change, pollution, and the planet's continuously deteriorating state, increase the risks of Emerging Infectious Diseases (EID) (UNEP MPN 2021). The IPBES report highlights a significant body of evidence suggesting that the underlying drivers of almost all recent EIDs affecting human populations (i.e., Ebola, SARS, COVID-19) are rooted in anthropogenic environmental and socioeconomic changes. These increases of human population and anthropogenic environmental change have altered contact rates among reservoir hosts, livestock, and people, driving the emergence of diseases (see below). For example, land-use change as a driver of biodiversity loss triggers a decrease in animal habitat together with activities related to deforestation (e.g., road building, mining, agricultural expansion). These contribute to the spread of disease vectors, lead to increased contact among wildlife, people and livestock, and provide pathways for novel diseases to spread (IPBES workshop report 2020). Overall zoonotic pandemics are a predicted consequence of how people source food, trade animals, and alter environments (UNEP MPN 2021). Unsustainable consumption patterns already mentioned in the biodiversity and forest sections are pointed to as the main drivers of environmental change and biodiversity loss, leading to disease emergence.

Box 5 cont.



The origin and drivers of emerging zoonotic diseases and pandemics. Microbes have evolved within species of wildlife over evolutionary time (left). They undergo complex life cycles of transmission among single or multiple host species, and often have significant impacts on host population dynamics. These microbes develop emerging infectious diseases (EIDs) when anthropogenic environmental changes alter population structures of their reservoir hosts, and bring wildlife, livestock and people into contact (centre). These interactions can alter transmission dynamics of microbes within their hosts, lead to interspecies transmission of microbes, spillover to livestock and people and the emergence of novel diseases (right). Source: IPBES workshop report 2020: 12

5 Recommendations and implications from global assessments – a synopsis

STEP 2.2

Analysis of global assessment reports
What are recommendations for transformative change?

The following summaries are based on the qualitative content analysis of the global assessment reports underlying this study. The content analysis revealed that most assessments make mainly implicit recommendations in their statements and conclusions. We summarise here what can be concluded and what follows from the assessments in terms of recommendations for addressing loss and degradation or their drivers for each of the global commons analysed: biodiversity, forests and the ocean. At the end of the Chapter we continue the conceptual discussion and explore if approaches for managing local commons can be transferred to the global commons.

5.1 Synopsis of main recommendations for biodiversity

We group the recommendations along the three core challenges threatening biodiversity identified in Chapter 4. This is followed by recommendations for international cooperation and for jointly tackling biodiversity and climate change, which is seen as crucial given that many negative impacts on biodiversity are exacerbated by climate change and vice versa (CBD 2019).

The assessments highlight the importance of a general paradigm shift in economic systems and advocate for far-reaching change to tackle the drivers of biodiversity loss, especially in sectors that are based on the use of natural resources (agriculture, forestry, fisheries).

"Since current structures often inhibit sustainable development and actually represent the indirect drivers of biodiversity loss, such fundamental, structural change is called for." (IPBES GA SPM 2019: 16).

Recommendations for addressing excessive resource use (challenge 1)

The assessment reports reach the conclusion that most biodiversity loss is a direct result of land-use change due to high and increasing consumption and resource-intensive production further aggravated by inauspicious incentive structures.

"In the short term (before 2030), all decision makers could contribute to sustainability transformations, including through enhanced and improved implementation and enforcement of effective existing policy instruments and regulations, and the reform and removal of harmful existing policies and subsidies (well established). Additional measures are necessary to enable transformative change over the long term (up to 2050) to address the indirect drivers that are the root causes of the deterioration of nature (well established), including changes in social, economic and technological structures within and across nations" (IPBES GA SPM 2019: 39).

The ways in which the unsustainable use of land and resource drives biodiversity loss is most obvious in the world's agrifood systems and the corresponding consumption patterns (e.g. IPBES GA SPM 2019: 30). A number of assessment documents therefore **emphasise the need for redesigning the agrifood sector and related branches.** Changing food production and consumption and related incentive structures (e.g. reducing harmful subsidies) are important leverage points and levers for halting biodiversity loss.

Regarding consumption of food and other products, the recommendations focus on **changes in diets, reduction of food waste, rethinking and adjustment of supply chains, the**

potential of circular economic models, and efforts to internalise externalities. Assessments also call for enhancing productivity while reducing the biophysical impact on nature, specifically using agroecology and agroforestry practices, restoring degraded agricultural land, and taking inter-sectoral approaches to agricultural and spatial planning: *"Pathways to sustainable food systems entail land-use planning and sustainable management of both the supply/producer and the demand/consumer sides of food systems (well established)"* (IPBES GA SPM 2019: 42).

A central recommendation is to **limit the demand for natural resources** and thus curb "overconsumption" (WEF 2020: 38). In the food sector, this can be achieved by adopting "sustainable and healthy diets with a greater emphasis on a diversity of foods, mostly plant-based, and more moderate consumption of meat and fish" (SCBD 2020: 164) as well as the reduction of food waste (SCBD 2020: 142). Engagement with the public and actors in the food system on these issues "... could help to reduce food waste, overconsumption, and the demand for animal products that are produced unsustainably, which could have synergistic benefits for human health" (IPBES GA SPM 2019: 42).

Assessments also point out that besides the agrifood system also "the consumption of other material goods and services affecting biodiversity, for example in forestry, energy and provision of fresh water" should be limited (SCBD 2020: 142). Reduced consumption demands, the reports argue, should be underpinned by **behaviour change**. IPBES calls for "visions of a good quality of life that do not entail ever increasing material consumption" (IPBES GA SPM 2019: 17), and the WEF recommends that "behavioural changes among businesses and consumers to increase willingness to recycle, refurbish and rent rather than own" should be turned into research and development priorities (WEF 2020: 14). This has considerable implications for business models that are today centred on increasing consumption rates.

Another prominent option to reduce pressure on natural resources would be to enhance land productivity while reducing harmful impacts. This could be achieved by "rapidly scaling circular and resource-efficient models of production" (WEF 2020: 14) under the banner of sustainable intensification, which "comprises a range of methods to achieve these objectives" (SCBD 2020: 160). Such a "transition requires greater understanding and adoption of the appropriate agronomic solutions" while being aware of possible trade-offs (WEF 2020: 11).

"Options for sustainable agricultural production are available and continue to be developed [including] [...] agroecological practices, soil and water conservation practices, conservation agriculture, agroforestry [...]. These practices could be enhanced through well-structured regulations, incentives and subsidies, the removal of distorting subsidies" (IPBES GA SPM 2019: 42).

The WEF report also emphasises that "transparent and **sustainable supply chains**" (WEF 2020: 12) are needed if "[n]ature-positive extractive activities" are to succeed (WEF 2020: 13). To achieve this legal regulation is seen as key, for example governments should "introduce mandatory procurement reporting standards for the private sector and sustainable sourcing requirements for public procurement" or establish "sustainable trade standards" (WEF 2020: 40).

Assessments frequently recommend policy instruments for biodiversity conservation and sustainable use and specifically the use of economic instruments such as payments for ecosystem services, biodiversity-relevant taxes, fees and charges. They should be implemented "through place-based governance interventions […] using strategic policy mixes and learning from feedback" (IBES GA SPM 2019: 40). Positive incentives are presented as "an alternative to governmental command-and-control measures" (IPBES Am 2018: 539), especially "mechanisms where the beneficiaries compensate the providers for the additional provision or maintenance of desired ecosystem services" (IPBES Am 2018: 539).

A key recommendation is related to the adoption of **more holistic views** on national assets and welfare. Views on nature-society relations that extend beyond nature as a means to production, as a means to use to increase human well-being but rather emphasise nature in humans and the connections between human beings and the natural environment. This shift is likely to go along with new economic metrics, extending "beyond standard economic indicators such as gross domestic product to include those able to capture more holistic, longterm views of economics and quality of life" (IPBES GA SPM 2019: 19). More specifically, authorities should increasingly "encourage and support the development and use

of standards, metrics and methods for quantifying, reporting and managing natural capital risks and opportunities" (GSDR 2019: 133). This also means that the private sector should be urged to **internalise and proactively manage environmental risks.** The Independent Group of Scientists insists:

"Financial institutions should ensure that, at the very least, they do no harm and do not support companies that deplete natural capital. Financial risk management should treat natural capital as an integrated whole, not as a series of stand-alone components." (GSDR 2019: 133).

Some assessments also call for a **change of narratives** related to human-nature relationships and especially with regard to developing economies a potential is seen in **leapfrogging harmful development steps**.

Recommendations for addressing inequalities (core challenge 2)

Regarding the challenge "Biodiversity loss reinforces inequalities which at the same time reinforce biodiversity loss" assessment reports formulate the need for reducing inequalities from local to global scales. Furthermore, recommendations stress the need for more inclusive approaches, in particular related to **indigenous and local communities**. The **interlinkages** between biodiversity and inequality in various fields should be better understood and addressed.

Prominently, the reports recommend "action to **reduce inequalities** within and among countries" (which corresponds to SDG 10) as "essential to achieve biodiversity objectives" and other development goals as well (SCBD 2020: 29, our emphasis). The objective to "eliminate deprivations and build resilience", as the Independent Group of Scientists points out, requires special "targeted attention where poverty and vulnerability are concentrated" (GSDR 2019: 127). Fighting inequality and its environmental impacts also "implies incorporating the reduction of inequalities into development pathways" via "a mix of policies" (IPBES GA SPM 2019: 19).

Offering strong **support to small-scale producers is regarded as a strong lever for change**. This could in part be achieved through "agri-food value chains and pro-poor markets for nutritious foods" (GSDR 2019: 130), given that "much of the increase in food production will have to come from the 750 million smallholder farmers that estimates show will be operating in 2030" (GSDR 2019: 65). Infrastructure investments, which tend to "benefit larger production units, particularly those involved in global supply chains" (ibid.: 65), should be designed in a way to more strongly include needs of smallholders. In addition, the often deficient institutional involvement of "small-scale producers, and women and youth in particular, in decision-making processes" should be improved (FAO SWBFA 2019: 450).

Last but not least, the legal status of **indigenous and local communities**, along with their role in sustainability efforts, should be recognised and strengthened according to the assessment reports. Better law enforcement and "ensuring universal and effective access to justice" should be priorities (GSDR 2019: 44). The Independent Group of Scientists gives a specific example: "Latin American countries might focus on measures that reduce gaps in education attainment and access to justice between indigenous women and the rest of society" (GSDR 2019: 45). It is also made clear that "national recognition of land tenure, access and resource rights" would facilitate more "positive contributions of IPLCs to sustainability" (IPBES GA SPM 2019: 18). IPBES further recommends abiding by principles of free, prior and informed consent, along with "improved collaboration, fair and equitable sharing of benefits arising from the use [of nature], and co-management arrangements with local communities" (IPBES GA SPM 2019: 18).

Recommendations for more determined, integrative and multilateral responses (challenge 3)

There are numerous recommendations addressing biodiversity conservation, many of them highlighting the need for more integrative responses. They include the strengthening and differentiation of protected area networks and other effective area-based conservation measures, **better cross-sector coordination, integrated planning, and policy mixes for incentives and regulations**. The recommendations address specific sectors – namely agriculture and energy – and different governance levels and actors including international collaboration, the private sector, and re-search institutions. The assessment reports promote nature-based solutions for addressing development, climate change and biodiversity conservation in an integrated manner (see also below).

Assessments point to the need that "strengthening the sustainable use and conservation of [biodiversity] often requires actions on a large geographical scale (e.g. across watersheds or along migration routes) and involving a wide range of different stakeholders" beyond regional or national boundaries (FAO SWBFA 2019: 395). Similarly, countries are "interdependent in their use of genetic resources in the crop, livestock, fishing, aquaculture and forest sectors" (FAO SWBFA 2019: 395). Improved cooperation across and within countries would increase the effectiveness of measures "in mitigating undesirable cross-scale impacts on biodiversity and ecosystem services" (IPBES ECA 2018: 20).

IPBES Americas points out that "sustainable use and management outside protected areas remains a priority", too, given the relatively small percentage of areas under protection in many places (IPBES Am 2018: XVI). This should be agreed upon at international level stressing the need for a biodiversity conservation vision that clearly goes beyond protected areas.

With regards to protected areas and their future role as well as the inclusion of OECMs under a new global framework for Biodiversity conservation, the OECD recommendation to reinforce "direct public involvement in policy making" through "innovative methods [such as] digital public consultations and deliberative polls" points to a potential for better ad-dressing societal involvement (OECD 2019: 18). In light of the multiple high and increasing demands of often competing land uses, wider societal debates are crucial to legitimise choices and aim for broadly accepted solutions.

Directly **confronting drivers of biodiversity** loss is highly recommended by multiple assessment reports studied here. One way to do this is through "taking pre-emptive and precautionary actions in regulatory and management institutions and businesses to avoid, mitigate and remedy the deterioration of nature" (IPBES GA SPM 2019: 17). Environmental regulations should be expanded and better enforced (IPBES GA SPM 2019: 17), making sure "that fiscal incentives and subsidies stop encouraging ecosystem conversion but rather spur restoration" (WEF 2020: 11). Furthermore, "the monitoring of recognised threats to [biodiversity], such as habitat destruction, pollution, inappropriate use of agricultural inputs, overharvesting, pests, diseases and invasive alien species" should be improved (FAO SWBFA 2019: 445).

A call for more **sustainable farming practices** is evident across different global assessment re-ports. Suggestions include agroforestry (GSDR 2019: 129; see also next Section 5.2), "agroecological and other innovative approaches" (SCBD 2020: 160), techniques that range "from the holistic approaches of many IPLCs to the ecosystem-based approaches developed for sectorial management" (IPBES Am 2018: XVI), and a mixture of "traditional farming techniques, advanced precision technologies, and biobased inputs" (WEF 2020: 11) that could transform agricultural areas into multifunctional landscapes "supportive of biodiversity and nature's contributions to people" (IPBES Am 2018: XVI). In addition, "land degradation neutrality" should be widely adopted as a political target (GSDR 2019: 132) and restoration efforts could further "enhance biodiversity and the supply of supporting and regulating ecosystem services in agricultural landscapes" (IPBES Am 2018: 538).

The fifth Global Biodiversity Outlook (GBO 5) specifically advocates **integrated action** across sector boundaries. Ideally, actions "in one area will remove barriers impeding change in another, so that multiple interventions […] become more feasible" (SCBD 2020: 142). Examples of integrated approaches "applying the ecosystem approach" (ibid.: 148) include "spatial planning to reduce the negative impacts on biodiversity of urban expansion, roads and other infrastructure" (ibid.: 168), but also the recognition that "biodiversity and all aspects of human health" are closely linked and need to be addressed jointly (ibid.: 176).

Alliances between the public and the private sector should focus on accelerating research and development, "training the workforce on circularity models, and providing consumer education and **enhanced awareness** about materials recycling that are essential for behavioural shifts" (WEF 2020: 76). Moreover, if the ties between cities and their surrounding landscapes were to be strengthened, this could contribute to boosting "urban citizens' relationship with nature" together with efforts to promote "green space, urban biodiversity and urban food production" (GSDR 2019: 132).

The need for international cooperation

International collaboration is considered crucial; this is for example emphasised for Africa where "**new perspectives and collabo-**

rations" are necessary (IPBES Af 2018: 4). The report points out that "[m]ainstreaming biodiversity and ecosystem services into policies and actions at different levels is vital", which should bring together stakeholders "with different perspectives" and be "supported by **enhanced international cooperation and multilevel partnerships**" (IPBES Af 2018: XIX). Concerning the use of scenario analyses as decision-making tools, IPBES states:

"*Transformative outcomes will be fully attained if concerted efforts are taken to* ***mobilize financial resources and build the capacity of African researchers, policymakers and institutions***" (IPBES Af 2018: XIX).

More effective alliances will be needed around **global trade** "to harmonize standards, labels and trade policy in materials use, recovery and disposal" that increase "transparency for consumers" (WEF 2020: 76). Particularly "major trade blocs" should lead such efforts (WEF 2020: 76). The IPBES Global Assessment report points out: "Trade agreements and derivatives markets could be reformed to promote equity and prevent the deterioration of nature" (IPBES GA SPM 2019: 43), but also cautions that the best way to implement such reform is not completely clear. Stronger business alliances for specific regions or supply chains could "accelerate the deployment of in-novative financing models and technological innovation to catalyse change at the required scale" (WEF 2020: 14).

The threats to biodiversity brought by the introduction of **invasive species** into ecosystems requires intergovernmental sharing of information and collaboration (IPBES Af 2018: 31), which would require "additional funding and capacity-building" (IPBES Af 2018: XVII). Similarly, the GBO 5 highlights "the importance of international cooperation to support **restoration**" (SCBD 2020: 151).

Multilevel partnerships and adequate means of implementation are seen as crucial to fulfil a number of **international targets**, including "the Strategic Plan for Biodiversity 2011–2020 and its Aichi Biodiversity Targets, the SDGs and targets, the 2-degree centigrade commitments under the 2015 Paris Agreement on climate change and Agenda 2063 aspirations for a prosperous Africa" (IPBES Af 2018: XLII).

Jointly addressing climate change and biodiversity

Multiple assessment reports emphasise that biodiversity loss and climate change need to be addressed together. This is driven by a full recognition of "the role of biodiversity in sustaining the capacity of the biosphere to mitigate climate change through carbon storage and sequestration and in enabling adaptation through resilient ecosystems" (SCBD 2020: 172), and of "**synergies between these two demands**" (IPBES Am 2018: 557). Among the multiple benefits of mutually supportive climate and land policies, the IPCC points out "the potential to save resources, amplify social resilience, support ecological restoration, and foster engagement and collaboration between multiple stakeholders" (IPCC SRCCL SPM 2019: 29), which can moreover "contribute to poverty eradication and more resilient livelihoods" (IPCC SRCCL SPM 2019: 35).

The IPCC Special Report on Climate Change and Land diagnoses that restoration activities and "**sustainable land management** can contribute to reducing the negative impacts of multiple stressors" (IPCC SRCCL SPM 2019: 7); it can have multiple benefits for climate change mitigation (e.g. enhancing soil carbon storage), adaptation and biodiversity conservation and at the same time benefit agricultural production and food security (IPCC SRCCL SPM 2019: 24). "[T]he importance of international cooperation to support restoration" (SCBD 2020: 151) can be reiterated here.

Great emphasis is placed **on nature-based solutions** – e.g., "reducing deforestation and other land-use change and degradation, restoring degraded lands and ecosystems and enhancing soil management in agricultural and range lands" (CBD 2019: 13) – by several assessment reports. These solutions "offer immediate and cost-effective benefits to both mitigate climate change and to adapt to its unavoidable effects" (CBD 2019: 13), hold "substantial opportunity for protection and restoration of nature" (WEF 2020: 15), and should be accompanied by "a rapid phase-out of fossil fuel use" (SCBD 2020: 172).

A further related argument made by some reports is that "[a]gricultural practices that include **indigenous and local knowledge** can contribute to overcoming the combined challenges of cli-mate change, food security, biodiversity conservation, and combating desertification and land degradation" (IPCC SRCCL SPM 2019: 31).

Summary

Recommendations for transformative change to cope with biodiversity loss range from local to national to international actions responding to the role of biodiversity as the underpinning fabric for human well-being. More integrative and holistic policy responses are called for ranging from more participative and socially inclusive actions to address inequality, revising the use of policy, fiscal and market instruments to eliminate incentive structures that benefit wasteful and destructive use of natural resources, to more purposefully integrating biodiversity loss and climate change action in decision making. For all this, collaborative and intersectoral cooperation and reoriented (development) targets are necessary. Nationally and internationally it is crucial to reorient what public money is spent on and to involve private stakeholders more directly in preserving biodiversity and eliminating negative effects of public and private action.

5.2 Synopsis of the main recommendations for forests

Recently published, the GBO 5 names four key components in its "land and forests transition": the adoption of integrated approaches to land use and land-use change; biodiversity conservation; ecosystem restoration and rehabilitation; and landscape management (SCBD 2020: 148–149). These aspects are largely reflected in the forest-focused reports studied here. However, these reports offer a number of additional recommendations regarding the regulation of finance and timber production on the one hand, and necessary changes in consumer awareness and community empowerment on the other, thus emphasising a policy scope much larger than the forest landscapes themselves.

This summary of recommendations is based on our qualitative content analysis of the reports underlying this study (see Appendix 10). While many of the biodiversity-related recommendations outlined in the previous section apply to forests as well, we focus here on the specific set of issues that are emphasised most frequently regarding forests around the world, including implicit and explicit recommendations. Some of them have clearer transformative potential than others; we will examine this in Chapter 6.2 below.

Most of the reports include recommendations that directly address the two core challenges outlined above, which also integrates governance and policy implementation. According to the material, we grouped the main recommendations into four categories. Two of them correspond to the core challenges and two go beyond them, addressing additional problem areas: stop de-forestation (this is to face the first core challenge: deforestation/degradation); governmental policy; coordination and participation (this is in response to the second core challenge: conflicts between sectors); and behavioural/value change.

Recommendations for addressing deforestation and forest degradation (challenge 1)

The evident answer to the central problem of deforestation and forest degradation is to slow down, stop, and eventually reverse these processes. Thus, reducing or ideally halting deforestation is a central recommendation put forward in the reports we analysed. The reports also high-light the benefits this would entail: from lowering greenhouse gas emissions, "with an estimated technical mitigation potential of 0.4–5.8 Gt CO_2 yr-1" (IPCC CCL SPM 2019: 29). Comparing the results of these scenarios shows that conserving undisturbed natural forest is a low-cost option for reducing greenhouse gas emissions (IPBES Af 2018: 441). It would help achieve multiple biodiversity goals, "improving the well-being of people whose livelihoods depend on forests, water and soil conservation" (GSDR 2019: 169) as well as the SDGs (FAO SWF 2020: 23).

As stated in the United Nations Strategic Plan for Forests, goal 1, there is a **range of different actions available to reverse the loss of forest through sustainable forest management**, including increasing protection, prioritising restoration, afforestation and reforestation (under certain conditions), as well as increasing

efforts to prevent forest degradation (FAO SWF 2020: 11). The assessments provide more detail on central forest restoration activities, which "are likely to include restoring connectivity between forest fragments and restoring forest cover in areas that are important to the supply of hydrological and erosion-control ecosystem services", depending on location (FAO SWBFA 2019: 492).

Given the significance of forests in carbon storage, **afforestation and reforestation are listed as important carbon-dioxide removal measures** by the IPCC (IPCC 1.5 SPM 2019: 18). However, indiscriminate **afforestation is not a panacea**, as IPBES warns against large-scale bioenergy and afforestation initiatives: "Land-based climate change mitigation activities can be effective and support conservation goals [...]. However, the large-scale deployment of bioenergy plantations and afforestation of non-forest ecosystems can come with negative side effects for biodiversity and ecosystem functions" (IPBES GA SPM 2019: 18).

In the context of forest conservation and management efforts and beyond, the development and improvement of **monitoring techniques** is emphasised as they are considered crucial to identify and account for forest gains/losses at varying scales, and only "what gets measured gets managed" (NYDF 2019: 8). The FAO underlines that countries "need additional support to improve their capacity to collect and report data on a number of key forest indicators" (FAO SWF 2020: 143).

Generally, there is a call for increasing funds available to combat the causes of deforestation, support reforestation and afforestation to actively increase forest densities worldwide, and en-courage more sustainable forestry practices in general (EU 2019: 11).

One highly recommended approach to reducing deforestation hinges on consciously redirecting finance flows toward "green finance" and ensuring "deforestation-free" production chains. This concerns multiple actors: national governments should ensure that special consideration is given to agricultural subsidies and their potential to profoundly influence land-use patterns be-cause "agriculture is the biggest driver of deforestation" (FAO SWF 2020: 167). Development funds are another important steering mechanism that should be repurposed according to the New York Declaration on Forests report (NYDF), given a huge imbalance today: "development finance for agriculture amounts to 15 times more than climate mitigation finance with a forestry objective" (NYDF 2019: 17). Payments for successful conservation and forest management are one way of supporting this (e.g. results-based payments, certifications, etc.). Finally, the assessments call upon the private sector to reroute its substantial financial flows into deforestation-free activities (EU 2019: 7).

As in GBO 5, where landscape management is considered as one of the transitions necessary to "bend the curve" of biodiversity loss, the other assessments also highlight the importance of managing agricultural and forest landscapes in order to ensure and restore multiple functions and uses. To achieve this, a range of approaches are recommended: from increasing agroforestry to integrated landscape planning (e.g. jurisdictional approach). Agroforestry could "substantially reduce erosion and nutrient leaching while building soil carbon" (IPCC 1.5 SPM 2019: 29) and "strengthen resilience by diversifying income, particularly in developing countries" (GSDR 2019: 166). Sustainable forest management in a broader sense also benefits communities and has the potential to curb forest conversion, lower greenhouse gas emissions, and contribute to climate adaptation (IPCC 1.5 SPM 2019: 29). Specific actions oriented to a more sustainable forest management mentioned in the GBO 5 include decentralisation of forest management, improving forest governance frameworks and capacity-building, promoting restoration, encouraging forest certification, updating and reviewing forestry licences, compensating or incentivising landowners not to cut forests, and to promote silvicultural practices (SCBD 2020: 66).

Integrated land use planning, supported by broader programmes of capacity building and technological innovation, is seen as vital. This includes *"scenario development, the identification of priorities for additional protected areas – keeping in mind the need to target under-represented ecosystems or forest types, areas with high-biodiversity significance and intactness and key species or groups of species – as well as priority areas for restoration, creation of biological corridors and sustainable management of existing forests"* (FAO SWF 2020: 167).

Recommendations regarding: The role of governmental policy

All assessments, in some way or another, call for a **substantial change of the incentive structure**, as the NYDF report exemplifies: "Governments should also phase-out countervailing fiscal and other incentives and replace them with smart subsidies that support ecological restoration, while creating additional incentives for forest and ecosystem conservation" (NYDF 2019: 82).

The reports find that **useful governance instruments and regulations** to protect the world's forests are often in place but **insufficiently enforced**. Their recommendations emphasise that this should be improved, "including increasing transparency and addressing deforestation through trade regulations" (NYDF 2019: 52). To rein in two interrelated drivers of deforestation that might become paramount in the future, "strong safeguards around [...] infrastructure and mining investments" should be put in place (ibid.: 65).

Measures recommended to improve enforcement and implementation range from broad **calls for good governance, good policy design and reconciling conflicting interest in regulating agencies** to the expectation that **monitoring**, particularly against environmental crimes, will make a difference, especially when combined. The NYDF names many examples:

"Together with finance, good governance provides the foundation for policies to be developed, laws to be enforced, and the conditions for investment and implementation to improve. Improvements in forest governance, including land titling, transparency, adoption of policies, and strengthening of enforcement, remain too slow relative to the accelerating threats faced by forests. New and existing policies and tools, such as sectoral agreements and certification schemes, can be used to minimise the impact of commercial activities on forest. However, their effectiveness is subject to the conditions around their implementation." (NYDF 2019: 18).

Responsible production and accounting for the full costs is also recommended for managed forests. This is highlighted in the report of the Independent Group of Scientists, where "responsible production, minimizing damage and integrating the cost of damage into business plans should also guide forest owners and businesses using forestland" (GSDR 2019: 168). Such a change of approach is highly unlikely unless governments change the incentive structures.

Another highly recommended approach for governments is **securing the tenure rights** of indigenous groups as well as local communities, smallholders, and marginalised groups, which would also help establish an "enabling environment for biodiversity conservation" (FAO SWF 2020: 167).

"However, a successful transition will rely on finding just and equitable solutions that ad-dress the land rights of indigenous peoples and local communities, who have demonstrated themselves to be the best stewards of forests." (WEF 2020: 11).

Strong emphasis and hope is placed on improved **certification and product traceability schemes** in order to enable consumers, especially at the end of value chains in the global North, to play an important role by increasing demand for certified deforestation-free products. Policy should "make it easier for suppliers, manufacturers, retailers, consumers and public authorities, to identify, promote and purchase such products" by strengthening standards and certification schemes (EU 2019: 7). This necessitates "studies on their benefits and shortcomings" and the development of guidelines with unambiguous "criteria to demonstrate the credibility and solidity of different standards and schemes" (ibid.: 8). These suggestions are linked to a "societal vision for the protection of forests" (GSDR 2019: 169) which the Independent Group of Scientists deems necessary.

Companies, in turn, "need to assume ambitious commitments" as "current company commitments are not enough to reduce global deforestation from agricultural production" (NYDF 2019: 43). Their commitments should be flanked by "sectoral initiatives" that furthermore "need to be replicated in other threatened ecosystems" (NYDF 2019: 43). Another suggestion from the EU is to develop "an early warning system" for supply chains based on an enhanced use of research and monitoring data (EU 2019: 15).

Recommendations regarding coordination and participation (challenge 2)

In response to the challenge, identified above, of missing coordination between stakeholders and agents affecting forests in different sectors and on different scales, all reports recommend enhancing

coordination. The proposals range from coordinated or cross-cutting to integrated and comprehensive forest strategies, all the way to "**new multilateral agreements**" (GSDR 2019: 168) regarding the remaining large natural forests.

One rationale is that policy instruments and strategies can only be effective when they "rely on cross-sectoral thinking" (NYDF 2019: 9) and "**include a goal-focused policy alignment between sectors and administrative levels**" (FAO SWF 2020: 167). In other words, the currently observable fragmentation means that "horizontal coordination between the different sectors [...] is required as well as vertical coherence of policy targets and institutions at the different governance levels" (IPBES ECA 2018: 785). This coherence would also lead to "sound and sustainable policy making" (NYDF 2019: 9).

Regarding how such coordinated efforts should best be pursued, a partnership approach and close collaboration between producer and consumer countries as well as with business and civil society is suggested (EU 2019: 6). Moreover, "potential trade-offs implicit in the SDGs with respect to forests and other land uses" need to be understood and "fully accounted for in societal and policy decisions" (FAO SWF 2020: 162).

To make progress on cross-sector coordination and integration, local stakeholder involvement and conflict management are emphasised and successful examples are featured.

Thus, it is advisable **to supplement the current policy framework with a bottom-up process, including broad participation and conflict management processes** at the different governance levels (Sotirov and Arts 2018; Ulybina 2014). As an example, Veenman et al. (2009: 202) analysed the process of "de-institutionalisation" in the Netherlands, which led to a nearly complete integration of forest policy into nature policy. They identified the four dimensions of "discourse, power, rules and actors", which have been working in the same direction, as an explanation for this development. However, such a convergence is an exception rather than the rule (IPBES ECA 2018: 785).

"Decentralisation and participatory approaches have become important issues in the forestry sector, and are seen as measures to increase the effectiveness of forest policy. As a means to bring decision-making closer to the implementation level, four variables are most important for achieving sustainable forest management via nation-wide Forest Programmes: participation, collaboration, inter-sectoral cooperation, and long-term iterative adaptive approaches [...]. At the local level, participatory approaches such as forest collaborative arrangements or partner-ships seem promising, but have so far often been underutilised (e.g., between forestry and rein-deer husbandry) [...]" (ibid.: 786).

Several reports underline the general need for participatory approaches, and some go a step further by recommending **empowering local communities** – often without specifying how exactly this could be achieved. Participation is seen as potentially beneficial to people's livelihoods as well as forest conservation when "combined with incentives to develop alternative re-sources" (FAO SWF 2020: 163). Inclusive policy approaches should include the integration of multiple voices "civil society, local communities (including indigenous peoples) and governments" as key actors (GSDR 2019: 169). To become truly effective, one report argues, such policy instruments must also "pinpoint uneven power relations that result in injustice and inequalities, and incentivise both individual responsibility and collective action" (NYDF 2019: 9). The NYDF argues that a full-scale change in values is necessary to achieve genuine empowerment:

"A change of overall societal and governmental attitudes toward underrepresented and often marginalised communities is a prerequisite to enacting real, swift, and durable improvements in legal recognition, empowerment, and self-determination. The empowerment of rural communities has only slightly increased in recent years and livelihoods are under increasing stress." (NYDF 2019: 81).

Specific recommendations for international cooperation are mainly found in the European Commission communication (EC 2019). This communication lists two main points the EC has committed itself to: first, strengthening "cooperation on policies and actions to halt deforestation, forest degradation and restore forests in **key international fora**" (EC 2019: 12, emphasis ours). A list of these fora includes numerous examples ranging from FAO to G7/G20, various UN conventions and assemblies, OECD, and WTO, underlining how many organisations work in areas related to forests. Evidently, the issues of forest loss and degradation need to be tackled from many sides at the same time. The EC's focus here is on promoting the idea of "sus-

tainable supply chains" (ibid.). Secondly, the EU strives for future **trade agreements** to "include provisions on the conservation and sustainable management of forests and further encourage trade of agricultural and forest-based products not causing deforestation or forest degradation", accompanied by **incentive mechanisms** for trade partners to address deforestation (ibid.).

Regarding development cooperation, the Independent Group of Scientists recommends that governments should "**explore new multilateral agreements** to guarantee the **protection of the largest tropical rainforests** of the planet (in Africa, Asia and South America)" (GSDR 2019:132, emphasis ours); and generally, as mentioned earlier, more development funds should be directed into "climate mitigation finance with a forestry objective" (NYDF 2019: 17) according to the NYDF report.

Recommendations regarding: Realigning valuation systems and consumer behaviour

A considerable set of recommendations in the reports studied identify the root causes of forest loss and degradation and call for a profound re-orientation of values and behaviours. The NYDF, for instance, explains how "our systems of valuation" should change and argue that this will re-structure the economy:

"*It is evident that a fundamental realignment of our systems for valuation is needed – a restructuring of the economy to value forests for the benefits that they provide over the long-term rather than for the superficial and short-term gain that comes with clearing them.*" (NYDF 2019: 83).

The reports allocate special responsibility to wealthy consumers in the global North, who ought to "move to sustainable, plant-based diets" and significantly reduce "overall food waste and losses" (ibid.: 18). The consumption of products from deforestation-free supply chains must be encouraged, e.g. in the European Union, and the effects the consumption of raw materials has on forests worldwide need to be better accounted for (EU 2019: 15). These links should be more clearly communicated to consumers in order to encourage sustainable lifestyles (ibid.: 8). A related idea, implicitly recommended by the IPCC, is to promote the use of wood products which are able to store carbon over the long term and thus function as a "substitute for emissions-intensive materials" (IPCC 1.5 SPM 2019: 29).

Summary

The sustainability challenges faced by natural forests globally have prompted four groups of recommendations in the assessment reports studied here. First, to stop deforestation and forest degradation, efforts of restoration and conservation should be combined with the promotion of green finance and more effective forms of landscape management. Second, regarding govern-mental policy, better enforcement of regulations and improved land tenure are recommended, alongside the establishment of certification and traceability schemes for supply chains. Third, improved coordination and participation are called for, across sectors as well as in international cooperation. Participatory approaches should be strengthened. Fourth, the reports point out the necessity of behavioural and value change, not least among consumers in the global North.

5.3 Synopsis of the main recommendations for the ocean

This summary of recommendations is based on our analysis of the three reports on marine and coastal ecosystems underlying this study (see Appendix 3) with additions from the IPBES Global Assessment where it refers to marine topics. As noted in Chapter 4.3, the global environmental assessments vary in the explicitness of their recommendations, reflecting their different objectives. It is therefore not surprising that the (first) World Ocean Assessment (2016) excludes far-reaching policy recommendations (Evans et al. 2019) and mainly makes recommendations on capacity development and technology gaps. However, such implicit and explicit recommendations are found in the IPCC and FAO assessments and are discussed below. Some have clearer transformative potential than others, which we will examine in Chapter 6.3 below. The

following summary of recommendations is based on our qualitative content analysis of the reports underlying this study (see Appendix 11) and is presented along the three main challenges identified in Chapter 4.3.

Recommendations for acknowledging interconnectedness of marine ecosystems and their interactions with socio-economic systems (challenge 1)

The World Ocean Assessment (2016) notably recommends **viewing ocean and coastal management and marine governance through an integrated social-ecological system lens**. It is argued that this enables the simultaneous consideration of multiple uses or industries, as well as the livelihoods and other social aspects connected with this ensemble of activities. By considering trade-offs among different uses and beneficiaries, the range of policy options enlarges. This knowledge is needed for instance to permit an economic valuation of the choices for action that may have repercussions on non-marketed ecosystem services. The World Ocean Assessment (2016) states that ecosystem services are not constrained by national and international boundaries, **necessitating an integrated approach. Furthermore, this requires a trade-off between adjacent regions**. If not accomplished in a transparent manner, existing regional conflicts will be exacerbated or new ones created. To date, however, ecosystem consistency across scales and across terrestrial and marine environments has not been achieved. This is often highlighted as a research, policy and management priority (WOA 2016: 3: 8). Furthermore, it is recommended to understand how cascading links between individual "ecosystem services vary region-to-region and culture-to-culture" (ibid.: 3: 25).

The World Ocean Assessment (2016) acknowledges the connectivity between different ecosystems and stresses that ocean protection must include governance, sustainable planning and management for coastal areas and regulations on pollution of rivers. It is critical to understand human impacts on marine ecosystems to "[s]ample, analyse and interpret land-based inputs to the ocean" (WOA 2016: I: 48). This is also reinforced by the GBO 5.

In particular, coastal ecosystems are at threat from climate change and at the same time play a fundamental role in CO_2 sequestration and storage (Blue Carbon habitats). The assessments therefore recommend the use of management tools that **protect the coasts through Ecosystem-based Adaptatio**n (EbA) and measures to directly protect the Blue Carbon habitats. According to the IPCC, EbA is expected to bring a wide range of co-benefits that include increasing ecological complexity and economic co-benefits. For example, coral reefs and salt-marshes performed best at reducing wave heights, whilst salt marshes and mangroves were two to five times cheaper than submerged breakwaters for wave heights of less than half a meter. Therefore, EbA is recommended as a cost-effective approach for securing climate change-related ecosystem services with multiple co-benefits (IPCC CCL SPM 2019: 86).

Measures to protect and restore coastal blue carbon habitats provide many other societal benefits in addition to climate regulation. Several studies referred to in the assessments concluded that regarding restoration and regeneration projects for mangroves "natural regeneration in-creases the likelihood of long term survival; higher success rates are achieved with strong stake-holder engagement; and it is critical that the (human) factors causing original loss and degradation have been properly addressed" (IPCC CCL SPM 2019: 78).

Integrated coastal management is strongly recommended since it helps to manage the interactions between multiple climate and non-climatic drivers of coastal ecosystems and sectors (IPCC CCL SPM 2019: 92). The improvement of integrated coastal management and better planning for Marine Protected Areas (MPAs) can **increase resilience of habitats**, but the assessments alert that MPAs may also reduce access for subsistence fishers, **increasing their vulnerability to food insecurity** (ibid.: 90).

Recommendations for regulating excessive marine resource use and harmful discharges (challenge 2)

The use of the oceans for excessive resource use but also pollution of the oceans are identified as a major challenge to the loss of biodiversity. The reports call for a reduction in overfishing and the discharge of polluting substances such as fertilisers, pesticides, heavy metals, plastics or untreated wastewater into the oceans.

Since recommendations for uses other than fishing (such as deep-sea mining, etc.) are only implicitly addressed in the assessments, we fo-

cus here on recommendations on overfishing. Given the loss of biodiversity and the critical importance of fisheries to global food security and nutrition, it is urgently recommended that overall **unsustainable exploitation rates be reduced, sustainable fishing practices be adopted, and overfished stocks be rebuilt** (FAO SOFIA 2020: 70; IPCC SROCC 2019: 402, WOA 2016: 16). Reducing the overfishing of wild fish stocks is tightly linked to addressing illegal fishing, capacity-enhancing subsidies, the lack of alternative livelihoods, and the lack of incentives to protect the underlying resources, poor local and institutional governance and suboptimal management. In this context, the World Ocean Assessment (2016) stresses the importance of improving ecosystem-based approaches to fisheries management.

Efforts to rebuild capture fishery resources requires reducing harvests below the net growth rates of the fish stock to allow fisheries resources to recover and potentially increase (WOA 2016). Thus, for many ecological reasons, the concept of "maximum sustainable yield" (MSY) is but an over-simplified reference point for fisheries (Larkin 1977; Pauly 1994; WOA 2016: 11: 7). However, to understand the status of fisheries, assessment and monitoring of individual stocks are needed (FAO SOFIA 2020: 193). To do so novel stock assessment methods need to be developed and implemented that require less detailed data and less technical expertise, especially in developing countries (ibid.). Besides, the FAO report (ibid.) recommend to "[m]obilize resources and provide financial support for continued capacity development programmes aimed at **strengthening stock and fisheries assessment and monitoring systems**" but also to incorporate multiple types of available information, including local knowledge and expertise, into assessment and management approaches. The World Ocean Assessment (2016: 32: 13) points out that **human capacity and infrastructure should be developed on a continual basis**. Furthermore, this knowledge need to be communicated across all actors for improving decision-making, but also to raise "awareness about the impact of illegal fishing on overfishing and fish stock recovery." (FAO SOFIA 2020: 194). **Market mechanisms and subsidies that encourage over-capacity and overfishing should be removed** whilst improving subsidies for sustainable management of fishery resources. The World Ocean Assessment (2016) also recommends developing **tools for managing small-scale fisheries** efficiently, particularly in view of the competing industrial-scale long-distance fleets. **IUU fishing** becoming more prominent has exacerbated the situation. It is necessary for developing countries to build the **capacity to develop sustainable industrial fisheries** and to develop stock assessment capabilities for small-scale fisheries balancing food security and conservation objectives (WOA 2016: 11: 18). As noted in the World Ocean Assessment (2016: 11: 4), the "FAO continues to encourage the **establishment of fishers' organizations and cooperatives as a means of empowerment** for small-scale fishers in the management process to establish responsible fisheries policy". Calls for action on by-catch and discards have been raised at the United Nations General Assembly. This was reinforced by a recent global review of practices by regional fisheries management organisations and arrangements (RFMO/As) for deep sea fisheries (WOA 2016).

Not only is marine biodiversity threatened by overfishing, but rising water temperature and acidification are also important variables for marine fish stocks. FAO report states, that this re-quires urgent changes in fisheries and transformative adaptation of fishers and aquaculture farmers, as well as institutions and policies, to the impacts of climate change (FAO SOFIA 2020: 195). Fisheries management should be improved in this regard through "multi-sectoral, holistic and precautionary approaches" and mechanisms for adaptive spatial management should be developed (ibid.). In addition, the FAO report (ibid.: 195-196) emphasises the need for diversification of value chains and markets, and investments in innovative fishing and fish farming practices, modern insurance alternatives, early warning systems, communication, and the use of real-time industry data are recommended.

The ecosystem approach to fisheries management should not only address ecological issues and governance but also socio-economic issues of human well-being (WOA 2016: 53: 1). Enhancing the traditional subsistence type of fishing commonly practiced in the developing world requires addressing fishing in terms of commerce and profit and thereby creating employment and sup-porting livelihoods. Advanced capacity-building for appropriate skills will be required to be able to use advanced technologies to create wealth from capture fisheries and aquaculture in a sustainable way (ibid.: 32: 15).

Indeed, as stressed in the FAO report (2020), fish farming (aquaculture) allows greater control

over production processes than capture fisheries, and it is more conducive to vertical and horizontal integration in production and supply chains. Despite the fact that aquaculture has expanded fish availability to regions and countries with otherwise limited or no access to the cultured species, often at cheaper prices and leading to improved nutrition and food security, surprisingly little attention is given to this sector and its impacts on ecosystems in the World Ocean Assessment (2016) to date. This is in stark contrast to the situation that at the global level, since 2016, aquaculture has been the main source of fish available for human consumption (FAO SOFIA 2020).

However, the ocean is not only a place of marine resource extraction, but also a **pollution discharge site**. The global assessment reports outline recommendations for different types of discharges. They are in agreement that a big part of the pollution in oceans is due to **agricultural production increase and change in practice**. Measures recommended range from broad calls to "promote the proper handling of agricultural waste and slurry and the proper use of agricultural fertilizers and pesticides" (WOA 2016: I: 49) to more concrete measures such as, e.g. **reducing fertilisers**, but also "educating farmers, promoting good husbandry practices that cause less nutrient run-off and monitoring what is happening to agricultural run-off alongside sewage dis-charges" (ibid.: I: 27). In the case of pesticides, the report recommends the **usage of newer less-polluting pesticides** (ibid.: I: 27).

In addition to inputs from agricultural practices, pollution of oceans is mainly caused by wastewater, heavy metals and other hazardous substances, oil spills and marine litter. In particular, a **proper management of wastewater and human bodily waste** is recommended "in and near large and growing conurbations without proper sewage treatment systems, such as found in many places in developing countries" (WOA 2016: I: 31). To reduce the discharges and emissions of heavy metals and other hazardous substances, the World Ocean Assessment (2016) calls for a better management of "solid waste placed in landfills" and the use of "cleaner technologies to chemical and other production processes" (WOA 2016: I: 48). To reduce ocean pollution from oil spills, the assessment further suggests "a good deal of organization and equipment" (ibid.: 17: 28). Most prominently discussed, however, is the significant issue of marine litter. This comprises various types of material, i.e. plastics, metal, glass, rubber, clothes and textiles, paper, etc., originating from a wide and diverse range of sources, the majority (approximately 80 percent) entering the ocean from land-based sources (WOA 2016: 25: 3). Strategies aiming at plastic bags, like taxes and charges, have proven to be successful in both developed and developing countries. Market-based instruments, such as bottle deposit refund schemes and container deposit schemes were also shown to be effective (ibid.).

Overall, the recommendations stress the role of capacity development *"to assess the environ-mental, social and economic aspects related to coastal, riverine and atmospheric inputs from land" and "to identify hazardous substances, which also includes ability to establish: thresholds of toxicity, persistence and bio-accumulation, a substance database with experimental data, monitoring and assessment programmes" (WOA 2016: 32: 19). The report suggests to "[d]eliver the organization, equipment and skills to monitor and control other human activities that impact on the marine environment"* (ibid.: I: 49).

Recommendations for integrating ocean governance (challenge 3)

Most assessments address the governance dimensions of the ocean rather implicitly via management recommendations. However, the inherent difficulties in **regulating the ocean as common property requires a minimum set of rules, defining access conditions and conservation measures** to ensure sustainability and economic returns (WOA 2016: 15: 7). The assessments point to the issues that formal regulations need to have inclusive elements of local communities. For many, the ocean also forms part of their traditional cultural identity that creates a feeling of "ownership", even though it rarely entails any established legal rights to exclude others from e.g. customary fishing grounds (ibid.: I: 25).

Any successful management addressing and conducting sustainable resource use and conservation measures will rely on a combination of good information about what is happening and the skills needed to integrate and apply a wide range of information. According to the World Ocean Assessment (2016: 27: 23) these should include: (a) knowledge about the main features of the local marine environment and their vulnerability to activities affecting these;

(b) information about the location, scale and economic significance of those activities; (c) the relationships between different uses of the marine environment in the locality; and (d) skills to evaluate what would be the most appropriate balance between the various interests involved (including the conservation of the local marine environment and any formally protected coastal or marine areas) and to broker or settle an acceptable agreement between all those interests.

However, **many local problems constitute a global problem core**, indicated by the recurrence of common issues across many marine ecosystems. Addressing them **requires international effort in building the capacities in infrastructure resources, organisational arrangements and technical skills** (WOA 2016: I: 42).

Existing **power asymmetries** and **socio-ecological conflicts** complicate the solution of ecological problem situations. The World Ocean Assessment (2016) cautions that any **unbalanced approach** focused primarily on **assigning monetary values can exacerbate those asymmetries and increase conflicts** and therefore recommends the use of Marine Spatial Planning "for analysing and allocating spatial and temporal distribution of human activities in marine areas to achieve ecological, economic, and social objectives that are usually specified through a political process" (WOA 2016: 22: 13). Giving equal focus to non-market/non-use services within the ecosystem services framework is both a desirable approach and a strength of this method for decision-making (ibid.: 3: 5). As a case in point, managing "space use conflicts" between large- and small-scale fisheries and with other sectors such as mining is an increasingly important issue in many parts of the world (ibid.: 15: 11). The World Ocean Assessment (2016) emphasise that "the collaborative processes at the heart of marine spatial planning foster relationships and linkages among ocean uses, stakeholders and resources managers to enhance the quality of scientific information and traditional knowledge available. This collaboration and information exchange can lead to better-informed siting decisions [e.g. for offshore renewable energy projects] and can minimise social and environmental impacts." (WOA 2016: 3: 27). According to the World Ocean Assessment (2016), putting conservation efforts under the umbrella of MSP is necessary as although protection from direct human uses of areas where important habitats exist (such as bans on converting mangroves to aquaculture or port facilities) can often produce immediate benefits. However, there are also pressures that do not originate from the specific area, such as runoff from the land, diseases and invasive species, which require coordinated efforts far beyond the specific habitats for which the protection is intended (WOA 2016: I: 34).

In relation to the three major challenges associated with climate change (ocean warming, acidification, and oxygen depletion), the IPCC report (2019: 35) highlights the importance of taking a long-term perspective in short-term decision-making to account for uncertainties of context-specific risks beyond 2050. The report further emphasises that existing "governance structures are not well-matched to the spatial and temporal scale of climate change impacts" and recommends building governance capabilities to tackle complex risks (IPCC SROCC 2019: 8). The FAO report further recommends that ongoing **adaptation actions should be transformative and implemented through multi-sectoral, holistic, and precautionary approaches** to achieve resilience (FAO SOFIA 2020: 195). The IPCC report, in addition to "intensifying **cooperation and coordination among governing authorities** across scales, jurisdictions, sectors, policy domains and planning horizons" highlights that "**[r]egional cooperation**, including treaties and conventions, can support adaptation action (high confidence)" (IPCC SROCC 2019: 34).

The World Ocean Assessment (2016) identifies the main capacity needs of MSP being directed to cross-cutting issues among the regions; these are summarised as follows: (i) Data accessibility and data sharing; (ii) The provisions for mentoring and training opportunities for less experienced scientists and practitioners; (iii) Data collection and marine habitat mapping to inform management of ecosystems, biodiversity and fisheries; (iv) Need to improve professional capacities to assess socio-economic issues; and (v) Capacity to conduct integrated and ecosystem-services assessments (WOA 2016: 32: 2).

"The areas where such information seems particularly closely related to management decisions are integrated coastal zone management (including marine spatial management), offshore hydrocarbon exploitation, offshore mining, shipping routes, port development and waste disposal" (WOA 2016: I: 46).

Summary

As the ocean covers 70 percent of the Earth's surface, hosts myriad ecosystems, plays a central role in climate change, and is used and overexploited by humans in a variety of ways, recommendations cover a wide range of topics. To acknowledge the interconnectedness of marine ecosystems and their interactions with socioeconomic systems, any approach to regulating and managing marine subsystems must be balanced with the realities of adjacent regions. In particular, measures to adapt to climate change impacts must follow holistic, cross-sectoral, and pre-cautionary principles. Concerning the regulation of excessive marine resource use, the assessments recommend strengthening sustainable fisheries practices and removing market mechanisms and subsidies which encourage overfishing. To reduce the input of harmful discharges, the assessments call for minimising the run-off of agricultural fertilisers, improving the management of wastewaters and reducing the production and distribution of hazardous substances and plastics. The recommendations from the assessments for integrating ocean governance address the topic rather implicitly via management recommendations. Nevertheless, a minimum set of rules are called for to regulate the ocean as a common property that defines access conditions and conservation measures. At the local to regional level Marine Spatial Planning is considered a tool for balancing and integrating environmental, economic, and social goals and for managing land use conflicts.

5.4 Global commons: from tragedy to opportunity?

In summary: Recommendations for all three commons, biodiversity, forest and the ocean, emphasise the need to transform and reduce consumption and to change our production systems. In particular, this applies to the global agrifood system, which considered to be one of the main drivers of biodiversity and forest loss, and also has a significant impact on marine and coastal areas due to increasing use of fertiliser and pesticides. Moreover, recommendations clearly state the urgency of behavioural and value change, that can be exemplified by change of diet, consumption and waste management (e.g. marine litter), as well as integrating all currently externalised costs into the prices of products we consume. Participation and representation of different visions are recognised as key in order to ensure inclusive actions to address inequality and natural resources degradation.

The sustainability challenges faced by the three global commons reinforce the crucial relevance of a more integrated management approach that acknowledges the connectivity and mutual dependence across adjacent ecosystems. Recommendations also highlight the crucial relevance of revising policy, fiscal and market instruments to correct incentive structures that currently benefit overuse and fail to prevent excessive exploitation of natural resources (e.g. land use change, illegal logging, overfishing). Assessments also stress the urgency for improving intersectoral coordination and participation as well as international cooperation.

A recently released UNEP synthesis report "Making peace with nature: A scientific blueprint to tackle the climate, biodiversity, and pollution emergencies" also highlights several of these points (UNEP MPN 2021). The report takes an integrated approach to managing biodiversity, climate and pollution. The recommendations build on the evidence from global assessment reports; key messages are presented in Box 6 below.

Box 6: Key messages from Making Peace with Nature: a scientific blueprint to tackle the climate, biodiversity and pollution emergencies report (UNEP MPN 2021)

This report comes from a group of scientists under the umbrella of UNEP, led by Ivar Baste (GEO, IPBES; Norwegian Environment Agency, Norway) and Robert Watson (IPCC, IPBES; UEA, UK). The report is based on evidence from global assessments, including the GBO 5. It makes a strong case about the common cause of the three environmental emergencies, climate, biodiversity, and pollution, and their interlinkages. They stress the fact that the only way to ad-dress them is together and in a holistic way.

The top five

- **Environmental changes are undermining hard-won development gains** by causing economic costs and millions of premature deaths annually. They are impeding progress towards ending poverty and hunger, reducing inequalities and promoting sustainable economic growth, work for all and peaceful and inclusive societies.
- The **well-being of today's youth and future generations depends on an urgent and clear break with current trends of environmental decline.** The coming decade is crucial. Society needs to reduce carbon dioxide emissions by 45 per cent by 2030 compared to 2010 levels and reach net-zero emissions by 2050 to limit warning to 1.5 °C as aspired to in the Paris Agreement, while at the same time conserving and restoring biodiversity and minimising pollution and waste.
- Earth's environmental emergencies and human well-being need to be addressed together to achieve sustainability. The development of the **goals, targets, commitments and mechanisms under the key environmental conventions** and their implementation **need to be aligned** to become more synergistic and effective.
- The **economic, financial and productive systems can and should be transformed to lead and power the shift to sustainability**. Society needs to include natural capital in decision-making, eliminate environmentally harmful subsidies and invest in the transition to a sustainable future.
- **Everyone has a role to play** in ensuring that human knowledge, ingenuity, technology and cooperation are redeployed from transforming nature to transforming humankind's relation-ship with nature. Polycentric governance is key to empowering people to express themselves and act environmentally responsibly without undue difficulty or self-sacrifice.

What can be learnt from the literature on managing the commons?

The process of rapid degradation that global commons are facing has often been referred to as "tragedy of the commons", implying a dilemma and lack of alternatives. However, by becoming aware of and acknowledging their importance for humankind, this "tragedy" can be turned into an "opportunity of the global commons" (Eser 2019: 3), as also illustrated by GEF and IUCN (2017) in their booklet with the same title. International conventions such as the CBD, UNFCCC, and UNCCD are examples of such acknowledgement. They have created momentum to act and design (more) effective governance solutions, albeit to date without sufficient success. Applying lessons from the design principles for the sustainability of local commons in the design of new governance solutions or the enhancement of existing international agreements for the global commons could be one of the ways of changing the path from tragedy to opportunity.

Buck (1998) has extended Ostrom's design principles derived from successful cases of management of local commons (1990), for the analysis of the global commons. Her framework is summarised in Box 7. We will use it to draw attention to missing elements for the successful management of global commons below.

Box 7: Buck's Analytical Framework for the Global Commons. Source: Eser 2019: 15

I. Levels of Institutional Choice
a. Operational choice: appropriation, provision, monitoring, and enforcement
b. Collective choice: policy making, management, and adjudication
c. Constitutional choice: formulation, governance, adjudication, and modification

II. Design Principles for Sustainable Regimes (principles especially important for global commons are indicated in bold)

a. Clearly defined boundaries
b. Operational rules congruent with local conditions
c. Collective choice arrangements
d. Monitoring
e. Graduated sanctions
f. Conflict resolution mechanisms
g. Rights to organise regimes
h. Nested enterprises

In addition, for multiple-use commons

1. Resource domain must be able to support all uses
2. All users must be represented
3. Knowledge of operational rules must be shared

Sources: Edwards and Steins, "Developing an Analytical Framework"; McGinnis and Ostrom "Institutional Analysis"; Ostrom, *Governing the Commons*

At the level of institutional choice (see Box 7), **the Ocean** (in particular the high seas) as one of the most emblematic global commons still **needs the formulation of constitutional rules**. So far there are no functional global agreements on sustainable management of resource exploitation or regarding the oceans role as sink. The atmospheric sink, on the contrary, already counts with an international convention and several agreements for the regulation of the GHG. Based on Ostrom's principles, Paavola (2008: 331) analysed the governance of atmospheric sinks and proposed "generic environmental governance functions". He identified several gaps of the institutional framework related to the lack of formalisation of "entitlements to the use of atmospheric sinks" and the "highly unequal distribution of benefits from the use of atmospheric sinks" (ibid.). He also pointed out the need for improving "participation in environmental decisions, particularly across the levels of governance in order to guarantee progress in and legitimacy of the governance framework" and the involvement of subnational levels of governance to "complement international and national levels" (bidi.: 332). In line with these conclusions, the recommendations of the assessments also address the need to approach inequality and to integrate stake-holders at all levels. This last aspect is reinforced in the UNEP's (2021) top 5 where polycentric governance is highlighted as a way to empower actors at all levels of action.

More recently, Eser (2019) in an analysis of international environmental agreements related to the global commons of biodiversity and soil (UNFCCC, UNCBD, UNCCD), identifies some of Ostrom's principles in their design: "'ad[a]ption of operational rules to the local level' is partly safeguarded by national strategies and action plans and 'monitoring' is provided by member states and the Secretariats of the Conventions" (Eser 2019: 17). But she also identifies some deficiencies related to the lack of "graduated sanctions" letting the non-compliance of the agreements without major consequences. Moreover, she points out the lack of "establishment of nested enterprises" (ibid.), in the sense that governance activities are not organised considering multiple layers and designed considering participation across governance levels (Ostrom 1990).

In addition, regarding multiple-use commons Buck's framework sheds light on the complex in-

terdependencies between the global commons and the socio-economic systems, and therefore on the urgent need to also analyse and adapt or change the rules governing these systems. Multiple-use commons are defined as "resources that are used for different types of extractive and non-extractive purposes by different stakeholder groups and are managed under a mixture of property right regimes" (Stein and Edwards 1999: 242). Biodiversity, forest and oceans are included in this category. Additionally, their use for different extractive purposes is directly related with other resource use, as is the case of forests and biodiversity, with land. One of the big challenges with the management of the global commons, is that contrary to single-use and local CPR, **users do not have a direct feedback of the effects of their activities on the state of the global common**. If we take as example the individual decisions of private owners to transform forest land into agricultural land, there is no direct feedback on the loss of forest's ecosystem services (habitat, carbon fixation, climate regulation, etc.) and the consequences at the regional or global scale for human well-being. The indirect impacts of consumption decisions on biodiversity are even less clear and only perceivable via research and extensive communication efforts.

In order to limit negative, usually indirect, often unperceived impacts on global commons new feedback loops need to be established. This **requires adaptation and change of the rules influencing decision making in the socio-economic systems affecting the global commons**. In terms of Buck's framework it means that we also need to look at the constitutional choice level: formulation, governance, adjudication and modification (see Box 7), and it confirms the necessity for a fundamental transformation of the current socio-economic system diagnosed by the global assessment reports.

International cooperation is necessary for such fundamental changes, as Mrema (2017) pointed out: due to the global scale of global commons, effective governance structures and monitoring are called for. Reaching international agreements, in particular when they involve constitutional choice, will be challenging, especially as such transformative change will cause resistance from powerful actors benefiting from the current setup. Therefore, it is crucial to address structural resistance, because otherwise necessary changes in regulation to enable biodiversity, forest, and ocean conservation will be hampered by special interest groups who are afraid that legal restrictions will make them worse off.

Opportunities lie in the fact that overall productivity of well-managed commons is much higher than of overexploited ones and that interlinkages with other development goals are becoming increasingly apparent.

6 Analysing and complementing the transformative potential of the assessments' recommendations

STEP 3

Analysing and increasing transformative potential
Analysis of targeted reports addressing gaps

How transformative are the recommendations?
How can identified gaps be filled and inconsistencies resolved?

In this section, we use the conceptual framework (see Chapter 3) to analyse in what ways the (sometimes only implicit) recommendations of the international assessments conceptualize and address transformative change, and to identify gaps. We then address gaps identified for each of the three commons by drawing on supplementary literature and our own experience and judgement. In Section 6.4 we summarise recommendations with transformative potential seeking to minimise current and future pandemic risks. Section 6.5 takes a step back and draws first conclusions across all three commons analysed.

6.1 Analysing and complementing biodiversity-related recommendations

6.1.1 Assessing transformative potential and identifying gaps

Transformative vision

International assessments (especially the IPBES Global Assessment) provide a **far-reaching critique of current production and consumption** patterns, especially, but not limited to, the agri-food system. This shifts an important part of required change to consumption patterns and demand, particularly from **wealthier consumers**. This is notably different from past assessments where increasing populations and growing demand for more resource-intensive food – such as dairy and meat products – were taken as unquestionable economic drivers. The reports outline further elements that need to be changed; in several places, they fundamentally challenge the current economic paradigm. Most reports further emphasise the urgency of addressing inequality and working towards participatory decision-making. International cooperation is seen as an effective lever for transformation, so there are numerous demands and ideas how it could or should be enhanced.

While reports recognise value plurality, diverse cosmologies and (indigenous) knowledge systems, they do not outline the transformative po-

tential of understanding other cultures explicitly. This could open the political space for radically different conceptualisations of a 'good life' and the role of nature for society. Besides modern resource exploitation and use systems, there are diverse further framings of human-environment relationships, some of which emphasise bio-cultural interdependence, or 'convivencia'. These differently conceptualised links between values and management practices could provide alternative narratives and inform a transformative vision. The assessments, however, rarely address this potential explicitly.

On how such fundamental changes could be brought about, the assessments provide an array of rather general suggestions such as a **change of values and visions of a good quality of life**, an **evolution of the global economic and financial system, inclusive decision making, and increasing international collaboration**. However, they do not provide a new narrative in terms of a compelling alternative to the current system, or novel paradigms beyond the need for transformative change and the belief that it can be brought about by an intelligent combination of existing policies and new initiatives as well as international cooperation in multiple fora.

Transformative knowledge

Most assessments also remain vague or silent on **knowledge needs for transformation**. This is surprising as many of them at the same time highlight the usefulness of policies, instruments, technical solutions and innovations (some of them in complex packages) that require an advanced technological and integrative understanding within and across sectors. Knowledge needs are mentioned for various areas, e.g. agriculture, yet what kind of knowledge would be conducive to enable transformative change remains unspecified. How to halt and reverse the continuously growing inequality is not well developed in the assessments and they **do not provide concepts on how to address** further **root causes** of biodiversity loss such as poor environmental accountability, e.g. in global finance, both corporate and intergovernmental.

The GSDR (2019) is most explicit and **outlines knowledge needs for transformation oriented towards achieving the SDGs**, albeit in rather general terms. Regarding how to trigger transformation, it contains more specific recommendations on how to address fundamental changes in the agri-food system, such as "value chains and pro-poor markets for nutritious foods, including through naturally nutrient-dense foods […] and through biofortified staple foods" (ibid.: 130). While the report warns that resistance to change should be anticipated it does not identify corresponding knowledge needs. For other issues, some specific transformative knowledge needs are outlined and there are elaborate recommendations on how such knowledge could be made more available by technology transfer and through additional funding. Generating knowledge on how to encourage transformation and making it universally accessible is certainly a global challenge that requires international collaboration. Although calls for increasing international collaboration are quite prominent, there is little on **transformative knowledge** concerning biodiversity as global commons to be found in the assessments.

Navigating the dynamics of transformation

Ideas for what should be phased-in or -out can be found in the reports, but an overarching conceptualisation of transforming systems is not presented. Important proposals for breaking with the prevailing socio-economic models are the phasing out of pesticide use in agriculture and of harmful subsidies more broadly. Instead, agro-ecological approaches and nature-based solutions should be scaled up. Regarding the challenge of inequality, the reports state that market mechanisms must be reformed, but do not provide many detailed proposals. On the third core challenge presented in 4.1.2 ('the lack of more determined, integrative and multilateral responses'), the expectation is that increased cooperation will create new opportunities for transformative change. While falling short of a full dynamic view, two important arguments are put forward in the reports: bottom-up initiatives should be encouraged, and private businesses can potentially become a motor of more vivid change dynamics.

While many assessments clearly identify current production and consumption patterns as root cause and therefore as the system that needs to be phased-out, the fact that there is **no compelling alternative narrative** (see above 'transformative vision') **makes it difficult to nurture, enhance, and accelerate alternative pathways**. Consuming less, reducing food loss and waste or producing in a more biodiversity-friendly manner is not sufficiently mobilising as an alternative to still prevailing highly eco-

nomic-growth-focussed development agendas in most parts of the world.

Most global trends in the agri-food sector contribute to biodiversity loss. The IPBES Global Assessment suggests developing incentive programmes, certification and performance standards "and to enable internationally consistent taxation, supported by multilateral agreements and enhanced environmental monitoring and evaluation" (IPBES GA SPM 2019: 21). While assessment reports mention that indigenous land use and traditional agricultural practices are often more biodiversity-friendly, the issue of persisting **systemic pressures displacing more diversified smallholder production systems** by increasing industrialised agriculture is not discussed in detail. The fact that supply and demand chains are often international and intercontinental makes tackling these issues extremely difficult. Vested interests in maintaining current patterns are **acknowledged as tremendous challenges**, without offering concrete ideas on how to deal with them.

Assessments say surprisingly little about this major impediment to transformative dynamics, namely **structural resistance** to change and on how it can be overcome. In the IPBES Global Assessment, resistance is mentioned in different ways but mostly implicitly. It contains the call to address the harmful indirect drivers of nature deterioration and to protect "environmental legal frameworks against the pressure of powerful interest groups" (IPBES GA SPM 2019: 41). The WEF report (2020) does not address resistance at all which seems surprising given that its target audience are companies and stakeholders in the financial markets who often represent businesses that rely on or impact upon biodiversity. By presenting the consequences of biodiversity loss as well as actions to prevent it and not addressing structural resistance, the WEF report (ibid.) seems to imply that structural resistance can be overcome by merely presenting more information about the significance of biodiversity for business as well as pragmatically listing solutions and pathways.

Emancipation and agency

The extent to which the global assessment reports elaborate on emancipation and agency is mixed. Several reports highlight **inequality** as an important issue that needs to be better addressed in any sustainability transition. The possibility of ensuring one's basic livelihood can be seen almost as a precondition to agency and emancipation; yet how to achieve this precondition does not feature very prominently.

While there is unanimous agreement that the involvement of indigenous and local communities in political processes needs to be improved, they are not explicitly regarded as stimulators of transformative change or for the elaboration of different visions for the world. There is some recognition that locally specific, customary governance and management modes are valid alternatives. Although land right issues are at the core of many environmental degradation problems, and mentioned in several assessment reports it is presented mainly in an instrumental way. However, how to achieve clear property rights (which may well be collective), and how to address inequality, also regarding the distribution of land and land rights, is only addressed at the margin. How **securing ownership and tenure rights**, particularly of the local population, creates incentives to conserve the land and how to prevent destructive short-term land use by large (foreign) companies, as well as how to significantly increase accountability in economic sectors with heavy environmental footprints are open questions.

Some assessments see participation in an equally functional way, serving mainly to increase the acceptability of necessary measures; at the other end of the spectrum, the IPBES reports strongly emphasise the benefits of diverse perspectives, democratic decision-making regarding transformative change trajectories, and the positive mutual reinforcement of poverty-reduction and biodiversity-conservation efforts.

Transformative governance: actions and solutions

Most of the recommended interventions are well-established and long-known. What is comparatively new is a strong agreement across reports that **diets, supply chains and agricultural production practices need to change** towards more diversified plant-based diets, less synthetic pesticide use, and more equitable access to supply infrastructure as well as increasing product certification. While there are many general ideas, there is often a lack of concrete proposals on how to get started or operationalise desired changes, and on which actors are in a position to do so (an exception here is the IPBES Global Assessment (2019), see Appendix 5). An avenue that would deserve further elaboration is the establishment of alternative economic measures and theories.

Similarly, there is an increasing focus on **nature-based solutions** providing win-win solutions for addressing biodiversity conservation, climate change mitigation, adaptation and sustainable development. For example, the CBD report (2019) states that "[s]ynergies exist among measures for climate change adaptation that prioritize ecosystem restoration, the transformation of agriculture systems and the strengthening of indigenous and community land rights. For example, community-based conservation and local governance can sometimes be more effective than formally established protected areas" (ibid.: 20). Across reports there are impressive lists of measures proposed, many of which have been proposed for years or even decades but it remains vague how these measures might lead to the desired transformative changes. Appendices 5, 7, 8 and 9 list the most transformative actions and solutions proposed.

Summary

Most global assessment reports analysed in this study are critical of prevailing production and consumption patterns and identify them as detrimental to biodiversity. This most explicitly applies for agricultural production and food supply chains. Assessments present long lists of potential measures, but usually without much detail on implementation and on how exactly they might contribute to transformative change. We did not find inspiring, coherent narratives about attractive alternatives in the reports studied. Knowledge gaps and research needs are identified for many fields, and elements that should be phased-in (such as nature-based solutions and agroecology) or phased-out (such as pesticide use and harmful subsidies) are usually named. However, these proposals usually lack the strategic thinking we claim is needed to get transformation dynamics going, especially at global scale. The urgent need for more inclusive and emancipatory politics is mentioned by most reports, including the acknowledgment of deep-rooted inequality, along with vested interests in the status quo, all of which are identified as important challenges for the sustainable management of global commons. Unfortunately, ideas on how to address these remain cursory.

6.1.2 Options to increase transformative potential

In this section, we present suggestions how the biodiversity-related recommendations could be complemented and gaps identified in Section 6.1.1 be filled based on additional scientific synthesis reports and policy-oriented literature (see Appendix 4) as well as our own experience and judgement. We do so by first compiling suggestions on **how the global economic system needs to be transformed** as a precondition for sustainable management of biodiversity as global commons. This need was clearly identified by the assessments but not fully developed. Secondly, we focus on a **possible transformation trajectory for agri-food systems** because, at global scale, they are considered one of the main drivers of biodiversity loss.

The need to transform the global economic system

In general, other literature is more outspoken (than the assessments) in the analysis and remedy of biodiversity loss. First, we compile what changes to the global economic system are being discussed, based mainly on the recent Dasgupta report (Dasgupta et al. 2021), a report arguing from an economic perspective. Afterwards we collate and discuss measures or at least first steps with the potential to actually achieve the transformation of the economic system outlined. The Dasgupta report (ibid.) directly addresses the first core challenge, the unsustainability of prevailing economic patterns, and emphasises that current economic models are depleting nature at rates that cause higher costs than benefits once public goods and services are included in the calculation. Conceptually, **we need to shift from** the paradigms of **economic growth** (with its mere focus on produced capital) **and resource efficiency towards** the ideas of **social well-being** (including produced, human and natural capital) **and resource-sufficiency**. As the Dasgupta report (ibid.: 69) explicitly emphasises there is a necessity to transform our economies and our institutions:

"The options for change are geared towards three broad, interconnected transitions, requiring humanity to (i) ***ensure that our demands on Nature do not exceed its supply****, and that we increase Nature's supply relative to its current level; (ii)* ***change our measures of economic success to*** *help* ***guide us*** *on a more sustainable path; and (iii)* ***transform our institutions and systems*** *– in particular our finance and education systems – to enable these changes and sustain them for future generations".*

The report further states that "[t]he changes needed in our institutions and our customary

behaviour will involve hard choices" (Dasgupta et al. 2021: 69), "[c]onsumption and production patterns will need to be fundamentally restructured" (ibid.: 72) and "large-scale changes will be required, underpinned by levels of ambition, coordination and political will at least as great as those of the Marshall Plan" (ibid.: 489). This implies we need change (i) of historic magnitude, and (ii) of basic economic structures.

Contemporary models of economic growth and development tend to consider only produced (and in some cases human) capital as primary factor(s) of production. New metrics and accounting frameworks, to better "appreciate the place of Nature's services in our economies, including the services that are usually overlooked" (Dasgupta et al. 2021: 75) are one important step. For this, the concept of 'natural capital' is promising, as it places environmental 'assets' on the same footing as financial or human assets (TEEB Agri-food 2015). However, the natural capital concept needs to be advanced to better account for the ecosystem dynamics such capital is subjected to. Similarly, it is important to better reflect the different property regimes of such capital. Land ownership can be public, private, or collective, but the global common property character of biodiversity is different, because of multiple, legitimate, but competing demands on the same landscape's ecological functions that are no longer abundantly available. The crucial next step is to consider who depends on which benefits from nature and in which ways – a key piece of information missing for shifting towards sustainable and at the same time more equitable landscape use.

Beyond measuring societal welfare, proposals for taking actions to reform the economic system are decisive. The **recommendations for *actions*** given in the assessment reports are summarised in Section 5.1 (and in Appendices 5–9). While many recommendations have transformative potential (according to our framework), the overall menu of suggested responses falls short of tackling the changes necessary in underlying economic structures.

The additional literature included in this section offers a range of actions and instruments that could help to **change the basic rules of how economic activities make use of global commons**. It offers some ideas on how to phase out unsustainable practices and thereby level the playing field for more sustainable alternatives. Principal leverage points include supply chains and trade, fiscal policy, redirecting finance, as well as securing basic human and environmental rights, and increasing corporate responsibilities by making companies more accountable for their social and environmental impacts. The following measures stand out for their transformative potential as they address root causes of persisting and increasing pressure on nature:

- **Regulating and redirecting finance:** The Dasgupta report articulates that "[a] significant portion of the responsibility for helping us to shift course will fall on the global financial system" (Dasgupta et al. 2021: 77). Banks, investors, and insurance companies should systematically assess "nature-related financial risks" and disclose their use of natural capital. Financial regulators and supervisors should promote this shift "by changing their own assessment horizons and using their regulatory powers" (ibid.: 78). Distorted regulations ignore where rent-seeking drives the loss of natural capital, or even incentivise the financing of unsustainable operations. These need to be reformed at all policy scales. An interesting proposal comes from Swiss Re, one of the world's leading re,0insurance companies, who urges insurers and reinsurers to systematically assess SDG outcomes and trade-offs of their financial decisions; "take BES [biodiversity and ecosystem services] fragility or intactness into account. […] **The price** the financial services industry charges **for providing capital** – be it via investments or re/insurance – **should reflect BES risk going forward**" (SRI 2020: 45, emphasis ours). The recently launched **EU taxonomy** on environmentally sustainable economic activities aims to provide precise definitions for companies, investors and policy makers which protect against greenwashing and **speed up the sustainable re-allocation of financial resources**. Regulations obliging to regularly disclose environmental and social impacts of the operations are a first prerequisite to allow investors and consumers to make informed choices.

- **Redirecting harmful subsidies** that use taxpayers' money to drive environmental degradation for private benefit – at huge societal cost. Eliminating or at least reducing subsidies for harmful activities and ideally redirecting funds towards environmen-

tally beneficial activities has been a prime objective for decades, but so far progress towards it has been minimal. One interesting proposal comes from the OECD finance report recommending to oblige countries to "identify, assess and track public expenditure harmful to biodiversity" (OECD 2020: 3). This is a useful first step towards operationalising the goal of reducing harmful subsidies and facilitates follow-up both within countries as well as between them.

- **Environmental taxation** is an effective, yet underused, management instrument (Dasgupta et al. 2021: 74). Notwithstanding possible leakage effects and concerns for appropriate targeting, tax policies "make a difference if they are applied widely and designed well" (ibid.), a promising example being Border Adjustment Taxes. In turn, **land taxes can** contribute to reducing inequality "by discouraging accumulation, reducing speculation, and constraining the intergenerational transmission of inequality" (Oxfam 2020: 53). **Green fiscal reforms (GFR)** which lead to price increases of harmful products and services, create a dynamic incentive favouring transformative change. Environmental taxation and fiscal reform often face strong vested interests, but they also have social consequences - reform efforts therefore need strong support, and a particular awareness for equity implications (Cottrell et al. 2019).

- **Public funding should be made contingent on corporate compliance** with transparency rules and "the principles of key international frameworks, including the UN Guiding Principles on Business and Human Rights, the OECD Guidelines for Multinational Enterprises, and the Principles for Responsible Investment in Agriculture of the CFS [Committee on World Food Security]" (Oxfam 2020: 66). The OECD (2019) gives examples of existing guidelines and laws for responsible business conduct. Clearly, guiding principles and voluntary standards are insufficient for ensuring the degree of liability and corporate accountability necessary but they do provide useful orientation for frontrunners and could be made compulsory in the future.

- How regulating **supply chains** can be leveraged for transformative change to protect global commons is explored in more detail in the forest Section 6.2.2 below.

For the successful implementation of such measures and reforms, our framework helps to identify further supporting action.

Knowledge on biodiversity often remains within disciplinary silos, e.g. when developing policies for sustainable urbanism or infrastructure planning. The assessments indicate that biophysical and socio-cultural interactions, in combination with climate and food security, require more flexible and integrative approaches to assessing risks, and to acting upon such knowledge (e.g. CBD 2019). Action will benefit from insights on the side effects and causal linkages across sector boundaries. Also, the relative importance of different drivers and linkages need to be specified, but the **biggest knowledge gap is** on understanding **which** type or combination of **interventions can unfold into self-sustaining system change toward sustainability**. We conclude that a meaningful integration of sub-system knowledge should focus on identifying the 'neuralgic points' in the 'bigger system', in order to fill that gap.

Taking **dynamics** into account requires understanding what traits of a system need to be phased-out on the one hand and identifying as well as carefully evaluating new alternatives on the other. Again, a shared understanding of this broader picture can be used to tackle resistance to change by powerful actors and set impulses to overcome structural and/or cultural inertia of institutions. It also helps to recognise political windows of opportunity especially in the global context. Encouraging examples include the recent agreements on minimum tax levels for international internet companies. There also is significant potential to **lead by example**. Ambitious transition projects or clear standards in some world regions can demonstrate how changes can be put into practice and encourage others to follow.

Understanding at what stage a system transition is, allows policy makers to select adequate measures of support and to tailor them to their country or regional contexts. In this process there is an important role for **bottom-up efforts for transformative action**. Assessments routinely include recommendations for enhancing recognition of local and indigenous capacities and rights. The additional reports emphasise the links between economic sovereignty (i.e. equity issues) of local communities and their political influence. Local and indigenous emancipation could lead to radical alternative visions to 'main-

stream development thinking' enriching the debate, such as the concept of 'Buen Vivir' (Gonzales and Mignolo 2020: 157). According to the Global Alliance for the Future of Food (GAFF) this constitutes a **more politicised view on participation and on local agency**, and goes beyond mobilising capacity for change (GAFF 2017: iv). Instead, opening and recognising spaces for collective bottom-up reflection on transformation will likely result in **more diverse imaginaries of desired futures**. A better engaged and more articulate civil society also vitalises democratic processes and their institutions.

We now turn to the agri-food system, as a main driver of land-use change and therefore biodiversity loss to illustrate how a sector might be transformed.

Transformation trajectories for the agri-food system

Response options on the supply-side (i.e., production and processing) and on the demand-side such as consumer culture, lifestyle, dietary change, have to be jointly explored, not only with regard to biodiversity, but also taking food security, equality, and climate change into consideration. Fragmented analyses (i.e. of sub-systems only) will likely lead to wrong conclusions, e.g. estimates on food production increases needed (50 percent by 2050) have been contested for their neglect of potential reductions in food waste and, even more significantly, do not consider dietary changes either (Rivera-Ferre 2020: 151).

In essence, transforming agriculture involves local/national issues on the production side including protecting access to land, to seeds and to knowledge, and maintaining the productive capacity of the land, but also international changes. Transformative change of the global agri-food-systems therefore requires action from actors at all scales and across the entire supply chain, from primary production and processing to trade, finance and consumption (Gardner et al. 2019, Wanger et al. 2020). With the words of the GAFF (2017: 24) "re-creating a food system that advances well-being will require global action, coordination across multiple sectors, attention to local and global equity and cultural lifeways, and a strategic focus on policy and systems to support sustainable change". Applying our framework, we sketch out options for supporting such transformations.

A **new paradigm for agricultural development** is called for, with **sustainability at its core** rather than productivity (Rockström et al. 2016). FAO judges that the standard model of modern agriculture, being "[h]igh-input, resource-intensive farming systems […], cannot deliver sustainable food and agricultural production. [...] Needed is a transformative process towards 'holistic' approaches, such as agroecology, agro-forestry […] and conservation agriculture, which also build upon indigenous and traditional knowledge" (FAO 2017: xi). For this, two agricultural technologies should figure prominently in such changed agri-food narratives: sustainable intensification and agroecology. Despite some knowledge gaps, increases in yield and in climate resilience seem feasible for locally adapted agro-ecological practices (FAO SWBFA 2019). Indeed, UNCTAD already in 2013 called for shifting the 'green revolution paradigm' to 'ecological intensification' and regenerative agriculture with a focus on small-scale farming (UNCTAD 2013: i). This call has been reiterated by several others, as agro-ecological approaches increase economic resilience, reduce dependency on agrochemical inputs, and provide more diverse and nutritious food. At the same time, they can reduce threats to biodiversity, mitigate greenhouse gas emissions, and reduce nutrient pollution (Wanger et. al. 2020). Therefore, they ought to be promoted "as alternatives to industrial agriculture" (GAFF 2017: 21) through locally organised communities and markets (ibid.: 18).

To pave the way for these much more sustainable approaches attention needs to be directed towards the high resource-intensity of most animal production systems and the destructive impacts this has on biodiversity. The Dasgupta Review proposes e.g. "changing the balance of crops intended for human food and animal feed" and reducing food waste (Dasgupta et al. 2021: 73). Changes in dietary choices, in particular less meat and other animal-based products and reduction of food waste are therefore central to transforming the sector.

New narratives also need to tackle the widespread – yet unconfirmed – assumption that (national) economic growth reduces poverty, and thereby alleviates food insecurity and associated pressures on the environment (World Bank 2018, FAO et al. 2019), as well as the claim that high-input resource-intensive agricultural systems are the only solution to eradicating hunger in the world. Hunger has not been eradicated so far in spite of more than sufficient levels of food production. Inequality is at the core of this, notably land con-

centration which continues to increase. While "the largest 1 percent of farms in the world (those larger than 50 hectares) operate more than 70 percent of the world's farmland" (Lowder et al. 2019: 6), "worldwide, farms of less than 2 hectares account for approximately 84 percent of all farms and operate about 12 percent of all agricultural land" (ibid.: 13). Since these farms produce "roughly 36 percent of the world's food" (ibid.: 32), agricultural strategies should account for the fact that smallholder agriculture still provides food security and food sovereignty of a considerable proportion of the world population, in particular many people that have few other alternatives to access affordable and nutritious food.

International agricultural companies (including agrochemical, animal pharmaceutical and commercial seed companies) are criticised for substantially concentrating their market shares, thereby accumulating significant influence in agricultural and consumer policy and for resisting change (Howard and Hendricksen 2020). Their technologies and products are often propagated as ideal solutions to global concerns ('we feed the world' narrative). This is challenged by the fact that the amount of production and the price that does not account for externalities, allow "**control over value chains** [which] gives these actors significant control over land, as well as over the distribution of the value of what is produced on the land, which in turn **contributes indirectly to land inequality**" (Oxfam 2020: 45, emphasis ours) and complicates achieving several other SDGs such as reducing hunger and poverty, and reducing inequality. So rather than 'feeding the world' such practices contribute to sustaining inequality and hunger. The Land Inequality Report also argues that "**land inequality is associated with environmental pressures** […], such as the growth of large-scale, environmentally damaging monocultures that maximise economies of scale" (ibid.: 29). At the same time holding investors "accountable for [...] economic, social, and environmental impacts [... is difficult] when the investors are geographically and institutionally distant from the operations invested in" (ibid: 47).

The above illustrates that transforming agri-food systems requires significant governmental assistance and structural changes while facing strong vested interests in maintaining the current unsustainable production systems. Societies will need to translate a generic vision of a sustainable agri-food system into nationally specific and relevant strategies and convincing narratives, involving answers or suggestions on how to address the following: What is the vision regarding small-scale or large-scale farming, cash crops or food crops, and regarding food sovereignty or engagement in globalised agri-trade? How to achieve national food security within global market dynamics, accounting for demographic developments and climate change?

Strengthening agency by reducing inequality

Within our framework, all of the above raises special concern. If agency and (local) emancipation are necessary for transformative change, increasingly unequal land distribution and land rights are counterproductive. The Land Inequality Report argues straightforwardly that in order to create emancipatory power land inequality needs to be addressed, e.g. to "recognise and **protect customary land claims**" (Oxfam 2020: 66, emphasis ours), especially of indigenous peoples, including hitherto undocumented rights as well as acknowledging collective land rights, stressing at the same time that reducing inequality needs the support of the majority of the population and engagement of all relevant stakeholders. Furthermore **reducing "land inequality** in a sustainable manner and to optimise land use in order to serve broad social interests, policies and mechanisms **must be tailored to each individual situation"** (ibid.: 49, emphasis ours).

Therefore, in addition to securing land tenure, striving for participation and inclusion of knowledge from IPLCs as identified by the assessments, a crucial role for the state is to protect the operating space of customary landholders and support the further improvement of small-scale production systems as well as the living condition of the billions of people depending on these, and thereby help to create agency and emancipation.

Land inequality as well as production systems on agricultural lands are tightly linked to principal questions like the **human right to food** as established in the UN Declaration on Human Rights. A panel of experts on international law, commissioned by an NGO (the Monsanto Tribunal Foundation), concluded in the so-called Monsanto Tribunal that a whole set of legal rules are in place to protect investors' rights in the frame of the World Trade Organization, as well as in bilateral investment treaties or in the investment-related clauses of free-trade agreements. These provisions tend to undermine the capacity of nations to maintain policies, laws and practices protecting human and environmental rights.

According to the experts, there is a considerable risk of a widening gap between international human rights and environmental law on the one hand, and international trade and investment law on the other. In order to direct the trajectory towards transformative change and away from such risks, the experts state that "UN bodies urgently need to take action; otherwise key questions will be resolved by private tribunals operating entirely outside the UN framework" (International Monsanto Tribunal Trial Expert Opinion 2017).

Concern is also expressed with regard to "the need to hold non-state actors responsible within international human rights law" (International Monsanto Tribunal 2017a: 4). Experts advise "to consider multinational enterprises as subjects of law that could be sued in the case of infringement of fundamental rights" (ibid.). They clearly identify and denounce a severe disparity between the rights of multinational corporations and their obligations. Therefore, they encourage authoritative bodies to protect the effectiveness of international human rights and environmental law against the conduct of multinational corporations (International Monsanto Tribunal 2017).

Transformation dynamics in the agri-food system

Additional reports do not consider transformative dynamics in depth. They confirm that sustainable production systems can and should be expected to effectively deliver multiple ecosystem services (Dasgupta et al. 2021) and that agriculture and food security benefit from landscape approaches. We therefore propose a possible sequence of actions for transforming agri-food systems, most of them specified above, and locate them along the phases proposed by Loorbach and Oxenaar (2018), as introduced in Chapter 3. For agri-food systems this could mean (in terms of phasing in): How to initiate and maintain momentum and movement towards 'multifunctional and resilient landscapes which provide accessible nutritious food for all' while maintaining healthy ecosystems that also provide a broad set of other contributions to people? And at the same time how to phase out practises with high environmental and social costs?

The phasing out pathway requires going beyond efforts that aim at optimising or incrementally 'greening' the current system. Better agrarian technologies, consumer labels that slightly improve some sustainability aspects, and voluntary corporate social responsibility efforts may well contribute to reducing pressures on ecosystems, but they do not fundamentally change the structures; rather they tend to stabilise current systemic functioning. We propose a **phasing out set of actions** for further exploration in Box 8.

Box 8: Actions to phase out practices with high environmental and social costs

- To support and/or oblige all countries to identify, assess, and phase out all subsidies harmful to biodiversity. Almost half of all agricultural subsidies provided by governments of OECD countries in 2010–2012 were classed as potentially most harmful to the environment and to mitigating climate change (OECD, IEA, NEA and ITF 2015). Phasing out harmful subsidies would reduce incentives to farm unsustainably and at the same time make available ~450 billion USD (in 2019) (Deutz et al. 2020), money which could be used for financing activities on the phasing in pathway.
- The establishment of strong accountability legislation for corporate actors along supply chains (Evans 2020) as a measure to destabilise and disrupt current practices.
- Concerning food and lifestyle choices, ways must be found to globally change values and notions of a "good life". The goal is to reduce overconsumption, food waste, and continuously improve current diets that contain unhealthy amounts of meat, dairy products, and sugar, all of which are agricultural products with big environmental footprints.
- To the greatest possible extent, social and environmental costs of production must be internalised locally, regionally and globally. 'No externalities by 2030' would be a target with transformative ambition. This is most difficult globally, where frameworks which reduce negative impacts of agri-food imports and exports in other parts of the world are needed, like regulation to minimise negative effects on biodiversity along the value chain.

At the end of the phasing out trajectory, harmful and unsustainable conventional agricultural practices would no longer present a business case and ultimately disappear. Many of today's multinational agri-food corporations would only stay in business, if they adapted their business models accordingly.

The phasing in pathway is essentially about exploring and establishing promising combinations of state-of-the-art knowledge and technologies with regionally attuned, tried and tested agri-food systems. This refers to production techniques (agro-ecological systems, sustainable intensification), organisational structures (small-scale, cooperative, large-scale), as well as to processing, logistics and marketing. While, for example, producer cooperatives have been successfully established in many countries for cash crops such as coffee or cocoa, their potential for also improving food production has been undervalued (Shumeta and D'Haese 2018). Learning from experimentation and pilot experiences will be key before accelerating dissemination of phase-in-actions. In Box 9, we outline avenues we consider promising along the phase in pathways.

Box 9: Actions to phase in a sustainable agri-food system

- Large-scale commercial agriculture must introduce production methods with very low carbon/water/soil/biodiversity footprints, looking for **sustainable intensification with ambitious standards** that increase over time.
- Simultaneously, small-scale agriculture in many areas of the world needs better support in terms of securing land rights, access to seeds, credit, extension and markets. Farmers' agency should be restored or improved, and particular support is needed for agro-ecological approaches to enhance both production and well-being (TEEB Agri-Food 2018).
- To make sustainable land management practices more attractive to farmers – especially those requiring high upfront investments – higher **incentives** should be offered to **scale up innovative ideas**. In particular, "Agri-environment schemes and Payments for Ecosystems Services (PES) are obvious candidates..." (Dasgupta et al. 2021: 71f.).
- **Redirect finance** to invest more in sustainable alternatives based on more comprehensive regulation and increased transparency of sustainability impacts of different investment, as recommended by several assessment reports. This can be an important component of agri-food transformation, especially for accelerating the spread of new production systems (see section on finance above).
- The establishment of certification, also recommended by the assessments, should be accompanied by legislation requiring traceability for supply chains, and making producers accountable for social and environmental impacts (see Section 6.2.2, where this is discussed for deforestation-free supply chains). In many instances **regulating against unsustainable practices** is more effective than certifying compliance with sustainable practises. In both cases, clear standards are needed that really make a difference rather than promoting marginal changes.
- All of the above requires **reorienting research capacities** to achieve sustainable intensification (internalising full costs), to adapt agro-ecological practises for different locations and to generate the transformative knowledge for system change.

At the end of the phasing in trajectory, we envision agricultural production without significant externalities, secured by the possibility to hold actors accountable for any remaining impacts they or a company in their supply chain generate.

The two complementary pathways for achieving transformative change face substantial challenges: Phasing out unsustainable practices means addressing the well-articulated, powerful, and often historically-justified interests of those who will lose out if change happens. There are different strategies to approach this from fully compensating any additional costs farmers may have to incur to obliging them to change by stricter regulation. Agro-industries may need an overhaul of business models and might need clear obligations as well as support to make the necessary transitions. The most challenging actors are the large multi-nationals providing the entire package of inputs needed for the current and largely unsustainable production practises.

In turn, phasing in sustainable alternatives is about scaling up and stabilising what turned out to be successful pilot studies or experiments. The Committee on World Food Security specifies principles that would support a move towards transformative change. These principles include the engagement and empowerment of young people as drivers of change in agri-food systems; respect of traditional knowledge, especially of smallholder farmers; support for diversity and innovation; participatory and transparent policy, grievance mechanisms accessible to all; and regular assessment of changes and impacts (CFS 2014). Both processes imply and require institutional changes and new and different rules. Such actions will bring major change – and with it come major risks. Therefore, overall sustainability conditions should be embraced and taken seriously as "bottom line" guidance for efforts aimed at changing the system. They should include at least: respect of planetary boundaries, provision of living wages or incomes, concern for future generations, and life in dignity. And they will have to be continuously reviewed and adjusted if necessary.

Box 10: Powerful resistance limiting the right to propagate seeds

Farmers, often women, have for thousands of years selected and propagated seeds that work well in their specific conditions. At the same time, selling seeds as well as the chemical inputs these potentially high yielding varieties require, is at the core of the business model of several multi-national companies. Especially regional free trade agreements and patents claimed by these companies, increasingly lead to legal regulations that no longer allow propagating seeds. This pressures farmers to accept and use seed material (International Monsanto Tribunal 2017b) which – at worst – prohibits conservation of agro-biodiversity and conditions farmers into seed varieties provided by large enterprises which require high amounts of chemical inputs and are not well adapted to their specific locations. This not only obliges farmers to take high financial risks but aggravates (agro-) biodiversity loss. In light of climate change not only local but global food security would strongly benefit from reversing this trend. Locally adapted varieties able to produce well under increasingly variable conditions can best be achieved and maintained by protecting the agency of local farmers, women, indigenous groups and others and by supporting them to (continue) "to adapt varieties to changing local contexts in a participatory manner, possibly as public-private-farmer partnerships where farmers take on the role as co-creators and partners" (GAFF 2016: 16).

Farmer-managed seed systems should be recognised as a viable and coherent alternative to corporate seed systems. For this, "national/regional networks of practitioners in the management of biodiversity for food and agriculture, [including] farmers' seed producer networks" (GAFF 2019: 16), require legal and logistical support. The intellectual property and trade laws and the limits these impose should be closely monitored.

Advocacy in form of an "independent Civil Society Mechanism (CSM) for the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA)" (Mooney and Global Alliance for the Future of Food 2016: 19) has been proposed and would allow farmers, women and indigenous people access to the relevant high-level international decision-making processes. This echoes recommendations in a number of international treaties and agreements, e.g. the UN Declaration on the Rights of Peasants and Other People Working in Rural Areas, the UN Declaration on the Rights of Indigenous Peoples, and Convention on the Elimination of all Forms of Discrimination Against Women (GAFF 2019: 11).

Knowledge for transforming the agri-food system

Transformative knowledge production implies **the pursuit of more issue-driven reflection and exchange**. Thus, knowledge needs to be (re-)connected to practice: For example, the Global Alliance for the Future of Food emphasises that "knowledge and practices of smallholder farmers, particularly those who are women and Indigenous Peoples, are central to the survival of local seed systems" (GAFF 2016: 5). Knowledge is not disconnected from agricultural practice: agricultural practice maintains the knowledge itself, but also the outcome of this knowledge in action, i.e. the survival of local seed systems. Similarly, **the integration of knowledge from different sources** is a central feature of future resilient systems: different aspects, but also different ways of knowing need to be brought together – both, in terms of procedures but also in terms of substance. This includes "new ways of collecting, analysing, and sharing evidence, as well as knowledge exchange based on transdisciplinary, cross-scalar, and participatory approaches" (GAFF 2019: 5). Both these requirements are starting to be met by an increasing amount of transdisciplinary and applied research, sometimes also involving indigenous knowledge. But in many countries neither research nor extension services are currently in a position to support the knowledge demands that will arise on the production side. Supporting such research but especially also knowledge exchange can therefore support transformation. In our view, this also includes the challenge of prioritising and specifying essential knowledge needs for transformation – in view of the potential overkill of research demands.

From the suggestions discussed above a set of questions specific to transformation arise, e.g.: how to address resistance and inertia to change in current agri-food systems?

- How to encourage value changes deemed necessary for consumers to change their habits?
- How to scale up successful pilots, niche experiments and pioneer land use models?
- How to combine and implement various policy instruments for transforming agri-food systems so that sustainable practises become the norm rather than the certified exception?
- How to address resistance e.g. avoid that powerful companies benefitting from the current system prevent changes?
- How to select interventions at different locations along international agricultural value chains in order to successively enable transformation of the global agri-food system?

Supporting local/regional **food sovereignty** (GAFF 2017) could be a promising avenue especially in the early stages of global transformation. For this, farmer organisations and social movements have to participate at policy fora at various levels and engage in policies that affect their food systems, including farmers' abilities to freely produce and exchange seed (GAFF 2019). Local producer initiatives should link up with urban activists – both to bridge knowledge gaps and to increase the potential for powerful alliances (Vecchio 2012). Consumers, who understand where their food comes from, are in a much better position to transform their habits and to help create the 'safe spaces' for experimenting with new alternatives.

The role of protected areas

The role of **protected areas** in the discourse on agri-food systems requires special attention. Several voices argue e.g. that protected areas "have an essential role in conserving and restoring our natural capital", should be "**extended** and integrated into the surrounding land and sea" (Dasgupta et al. 2021: 74). This is echoed by the current draft of the CBD's Global Biodiversity Framework, setting the targets for biodiversity conservation for the next decade. Protected areas generally require "[m]ore investment" (ibid.: 71) and their management should closely involve local populations (ibid.: 74). Demands are also made to establish "**clear boundaries for conservation and agriculture** (known as 'land-use zoning')" (ibid.: 73, emphasis ours).

The interlinkages of agricultural transformation and biodiversity conservation occur in several different ways and are embedded in broader land-use decisions. Conservation narratives so far have payed limited attention to the interactions in the broader landscape: neither how a more sustainable land use supports conservation nor how conservation can support sustainable land use. Similarly, the role of inequality has not been sufficiently addressed in both conservation and broader land-use planning. The currently envisaged target to effectively protect

30 percent of land- and seascapes by 2030 (CBD 2019) cannot be achieved by protecting nature without considering local needs much more explicitly. So far, 'pro-people conservation' has mainly focussed on improved buffer zone livelihoods and on the business case of nature tourism with mixed results in terms of both livelihoods and conservation outcomes. If 30 percent of national territories are to be placed under some protective regime a broader approach will be needed. Instead, conservation expertise should inform development ambitions more generally: **What should be protected** – species, habitats, ecosystem services, **how** – no use, limited extraction of wild products, sustainable agriculture/agroforestry, and how **is the local population involved** in deciding on the role of conservation for local development? Thus, we propose to reframe **conservation efforts as key inputs to** the much-needed societal reorientation towards **sustainable and equitable use of landscapes**.

For the tropics, plausible biodiversity scenarios suggest that land-sparing approaches (dedicated areas exclusively for conservation) may deliver better short-term results for biodiversity, while land-sharing (combining agriculture and conservation in the same area) may outperform it over time (Hill et al. 2015). Given that for example one third of Africa's human population lives either inside or within 10km distance to a protected area (Berghöfer et al. 2021), protected areas and in particular their expansion should be examined in terms of societal development, sustainable land use and local livelihoods.

Conclusion

While the global assessments analysed (see Section 6.1.1) emphasised that consumption and production patterns need to be fundamentally restructured, they do not elaborate how this can be achieved. Additional literature outlines the need to move away from the paradigms of economic growth and resource efficiency to ideas of social well-being and resource-sufficiency. In other words, we need to change the basic rules of how economic activities make use of global commons. This requires a transformation of our institutions and systems, with the financial sector seen as particularly relevant. Transformative knowledge is needed that transcends disciplinary silos to understand which combination of interventions can unfold into self-sustaining system change toward sustainability. Furthermore, not only the dynamics of system transformation must be understood, but also resistance of powerful actors to change must be overcome.

The agri-food-sector is identified unanimously as one of the most important drivers of loss and degradation and therefore in need of transformative change. Additional reports propose agro-ecology and sustainable intensification as options for significantly reducing negative impacts on biodiversity and the environment while at the same time increasing farmers resilience especially vis-à-vis climate change. We have identified and outlined ideas and recommendations on measures that can be expected to encourage such transformative change. The measures proposed are far-reaching and have implications from access to land over trade agreements to protected area policies. The aims are to radically change production practices to fully internalise social and environmental costs, to reconceptualise the role of protected areas in agricultural landscapes and to change and reduce demand. Particular attention should be paid to supporting smallholder farmers by securing their rights. This addresses several sustainability goals: securing access to nutritious food for a significant proportion of the world population, causing less harm to biodiversity, and reducing inequality. Gaps remain concerning how to best encourage the changes in consumption, identified as necessary preconditions.

6.2 Analysing and complementing forest-related recommendations

In Section 6.2.1, we first analyse to what extent the (sometimes only implicit) recommendations of the assessments for forests have transformative potential. We evaluate them using our conceptual framework and identify what elements are missing in each of the building blocks. Here we present a summary and appraisals, the full analysis can be found in Appendix 10. In Section 6.2.2, we then draw on supplementary literature to address the gaps identified.

6.2.1 Assessing transformative potential and identifying gaps

Generally, all assessment reports studied recommend some elements of transformative change to address forest loss. However, the most central recommendations can hardly be considered transformative by themselves: reforestation, increased conservation efforts, forest restoration, and an improved enforcement of existing laws and regulations would undoubtedly improve the state of the world's forests without transforming or even questioning the existing system(s). Yet, a successful sustainability transition without these elements is hardly conceivable.

There is a clear understanding that fundamental change is necessary to address the first core challenge, i.e. continuing forest loss and degradation – in particular by reducing demand for agricultural land. The suggestions of how this could be achieved chiefly consist in appealing to all involved parties' social and environmental responsibility. Consumers should change their diets, reduce food waste and buy deforestation-free products; producers and the finance sector should turn to environmentally and socially responsible business models. Three main strategies are proposed to policy makers: expanding certification schemes for deforestation-free products, promoting sustainable production, and redirecting harmful subsidies and incentives towards supporting the conservation and restoration of forests. While it is made evident that deforestation cannot be tackled by better forest management practices alone and that other sectors, in particular agriculture and food consumption in wealthier countries, need to change, the assessment reports do not outline a clear vision or formulate an appealing new narrative beyond a general call for responsible action.

In response to the second core challenge, i.e. competing interests around forests, the main proposal for changing the system is to improve coordination and integration across sectors (public, private, non-profit), disciplines/thematic areas (water, soil, climate, etc.) and industries (forestry, energy, agriculture, etc.). Thus, different spatial (from local to global) and temporal scales should be integrated. This includes the need for policy instruments that can operate across scales – such as international climate agreements that influence the implementation of different interventions at local scales – and points in time. In the reports, most recommendations remain general but some specify mainstreaming biodiversity concerns into forest management practices. Two reports suggest setting up "new multilateral agreements to protect the largest tropical rainforests of the planet" (GSDR 2019: 168) and a comprehensive global forest strategy that encourages all actors to jointly "preserve primary forests, sustainably manage production forests, and restore natural forests in degraded landscapes" (NYDF 2019: 82).

The reports, however, struggle to outline clearly how such change could be triggered beyond improving coordination and changing incentives. While all of the above-mentioned suggestions are useful, they will unlikely be sufficient to address the change in agri-food systems considered necessary in the calls for transformation. This finding is supported by our assessment of transformative dynamics, where all reports outline the first steps of what needs to increase and what needs to decrease, but do not offer comprehensive recommendations to policy on how to support this change beyond redirecting incentives towards more sustainable actions.

Our overall analysis also acknowledges the importance of not only improving productivity and access to resources for poorer groups (given their critical role in alleviating poverty), but also the need for honest and far-ranging involvement of local and indigenous communities (considering also a gender and age balanced representa-

tion) in forest policies and programmes (co-design). This is portrayed as crucial, even where it goes against the vested interests of more powerful actors. The reports point out that enabling rural, marginalised people to increasingly take their destiny into their own hands may benefit the world's forest ecosystems as well as helping to fuel the shift towards sustainability. However, beyond the important call for addressing land conflicts, securing tenure rights and access to forests, there is little indication of how agency could be achieved, nor of how the agency of currently marginalised interests can be encouraged to lead towards more sustainable outcomes for forests and biodiversity.

When analysing the concrete actions and solutions proposed in the assessment reports that appear to hold the highest transformative potential, the questions of "what" kind of instruments are needed and "who" should act are often answered, at least roughly or implicitly. However, "how" it should be done is mostly under-specified. Overall, and perhaps due to the generalising and political nature of these assessment reports, there are not enough operational suggestions – particularly to policy makers at all levels. Stronger awareness of the interlinkages between North and South is needed, and of the fact that structural change is a prerequisite for transformation dynamics to gain momentum. Most importantly, appeals to increase desired behaviour based on responsibility alone are unlikely to have sufficient effect as long as unsustainable behaviour is cheaper, easier, and continues to be allowed. Even if some privileged or highly responsible actors change their behaviour, others will presumably replace them in pursuing unsustainable practices. The analysis of several of the projects in Chapter 7 reflects similar findings, in particular the Unlocking Forest Finance project designed to significantly reduce deforestation in the Amazon (see the example of the project analysis in Chapter 7 Box 13).

Summary

In summary, our analysis shows a clear agreement across assessment reports that fundamental change is needed, and the recommendation sections contain numerous elements that could contribute to transformations for sustainability. Sufficient knowledge appears to be available on what needs to change, but little has been put into action; the final stages of transition remain under-conceptualised in the current assessments. The reports, by and large, fail to provide operational suggestions on the implementation level.

6.2.2 Options to increase transformative potential

In this section, we present suggestions how the forest-related recommendations could be complemented based on further literature and our own experience and judgement. We will follow the framework on transformative change once more, this time with an emphasis on concrete solutions (see building block 5 of our framework) that address supply chains, finance-related mechanisms, and international cooperation. These three leverage points most prominently emerged from our qualitative content analysis.

The analysis of more targeted studies, which – unlike the assessment reports – are usually not negotiated in intergovernmental settings, offers helpful suggestions for some of the identified gaps. One example is a series of global reports by IUFRO, the International Union of Forest Research Organizations. These reports result from the work of task forces and cover a broad spectrum of topics from a forestry perspective (e.g. alleviation of poverty, water, illegal timber trade, food security). Another example is the 2019 WPN report, commissioned by the working group "Global Commons" of Germany's "Science Platform Sustainability 2030" (short: WPN) and written by international forestry experts from the University of Freiburg, Germany (WPN 2019). Recommendations made in these studies often go in similar directions regarding each of the five building blocks of our framework (see Chapter 3.2), but are more concrete and detailed than those given in the global assessment reports.

Blocks 1–4: Vision, knowledge, dynamics, and emancipation

In their 2019 text on forests as global commons, the WPN authors mention the need for transformative change at several points, and it is stated quite prominently in the conclusion (WPN 2019). However, they decided to focus the report on concrete steps rather than developing a grand narrative, highlighting "possibilities with a realistic potential to at least push global forest governance a bit into the transformative change direction" (ibid.: 51). They advocate for international policy alignment, engaging the private sector "within a strong regulatory framework", and intensifying action on the ground (ibid.: 51f.).

Most reports from the IUFRO global series do not explicitly mention the concept of transformative change. Still, they explore the interlinkag-

es between forests and various topics showing transformative potential, for example, forests contributions to/impacts on SDG 1 ("No poverty"). In this context, the IUFRO world series vol. 39 ("Forests, trees and the eradication of poverty") references multiple strategies to achieve zero-deforestation commitments while maintaining or increasing the production of forest commodities by decoupling commodity growth and deforestation, which can be seen as a vision for a transformed economic system (IUFRO vol. 39 2020). Similarly, the vision for forestry developed in another report contains elements of transformation: governance actors should create a "framework that captures all forest values and cross-sectoral linkages and ensures that they are considered in decisions about forest policy and management", which are adapted to the realities of complex and fragmented governance from international to local levels, across ecosystems and policy sectors (IUFRO vol. 28 2010: 39).

Regarding the need to address the high demand for agricultural land which drives deforestation, the IUFRO vol. 33 report (2015) ("Forest, trees, and landscapes for food security and nutrition") suggests the promotion of local food systems as another visionary and potentially game-changing approach. Although food security is dependent on issues of sustainability, availability, access and utilisation, and not production alone, it is evident that a "new agriculture" (Steiner 2011: 28) needs to be found to feed the world's population both efficiently and equitably. It needs to produce food where it is needed, especially in areas where agriculture is dominated by small farms (e.g. according to Altieri (2009), two thirds of African farms are smaller than two hectares) and where negligible quantities of external inputs are used (where agriculture is "organic by default", Bennett and Franzel 2013). The United Nations' (2011) vision of an agro-ecological approach that combines biodiversity concerns with food production demands, provides a compelling vision of future food production (IUFRO vol. 33 2015: 122) (compare Section 6.1.2 above for further details on transforming the agri-food system).

On the topic of transformative knowledge, the WPN report declares that sufficient knowledge on forest protection is clearly available:

"There is no justification for policy makers, businesses and citizens to further postpone urgently required action with the argument that we have to wait for new scientific and practical insights. The facts are on the table." (WPN 2019: 49)

This sentiment is echoed by the IUFRO vol. 31 report (2012) ("Understanding relationships between biodiversity, carbon and people"). While the knowledge available about the impacts of REDD+ initiatives on biodiversity and forest ecosystems may be incomplete, they conclude, our "current understanding is sufficient to significantly improve efforts to minimize environmental harm and maximize multiple benefits" (ibid.: 140).

Nevertheless, the WPN experts recognise a need for "new knowledge systems" built on inter- and transdisciplinary practices (WPN 2019: 49). Promising "initiatives for the needed societal transformation" (ibid.: 50) should be systematically evaluated. This is based on the conviction that such transformation, if successful, will emerge from the combination of "a myriad of smaller actions in a large diversity of fields including all actor groups" (ibid.), in line with the notion of incrementalism introduced above (see Section 3.1). One IUFRO report explicitly emphasises the importance of "progressive incremental change" supported and directed by policy learning (Cashore and Howlett 2007; IUFRO vol. 28 2010: 38).

The WPN study makes the case for a profound realignment of how research is funded and evaluated. It should move "away from the support of disciplinary research principally aiming at academic merits[,] or technology-oriented programmes driven by job and growth needs of high-income countries, towards a funding that valorises long-term economic perspectives, environmental wisdom, and the needs and interests of local resource users" (WPN 2019: 50). This statement outlines a holistic transformative vision in which academic knowledge on forest ecologies and economies is embedded in grand narratives of societal transformation – something that is largely absent from the global assessment reports we studied.

An important aspect related to the building block 3 (dynamics of transformation) is the exploration of different approaches mentioned by WPN above, another is adaptive and reflexive learning. In this line, IUFRO argues that the type of policy learning needed (instrumental learning) would provide evidence about the effectiveness of particular policy instruments and would constantly be monitored and updated. However, current forest governance agreements are not oriented in this direction. If instrumental learning is to take place successfully, reformed international forest governance arrangements would need to bridge the wide gaps that have opened

up between high-level negotiation on one side of the divide and experimentation on the ground on the other (IUFRO vol. 28 2010: 138).

Knowledge gaps prevent us from fully understanding the dynamic links between people and forests, and with these an understanding of better inclusion and cooperation in transformative efforts. A continuous spatio-temporal database that allows the assessment of the relationship between forests and poverty is lacking (IUFRO vol. 39 2020). More "adequate monitoring" capacities would equally be required to keep track of dynamic changes "in forest species, processes and ecosystems" (IUFRO vol. 22 2009: 141). The IUFRO authors further highlight the need for an evaluation of forest and tree-related policies including synergies and discordances with other measures, which would allow continuously reassessing what measures are to be scaled up and phased-out, respectively. The IUFRO vol. 35 global report (2016) ("Illegal logging and related timber trade – dimensions, drivers, impacts and responses") points out that a dearth of precise and comparable definitions, metrics, and data largely "hampers efforts to tackle effectively illegal logging and related timber trade" (ibid.: 136) which ought to be destabilised and phased-out.

"To institutionalize and enhance the participation of forest dwellers [...,] instruments such as public hearings, local/rural councils, network approaches of NGOs and local farmers [...] are needed [...]. It might be useful to look [at] processes that already achieved a stronger participation of local stakeholders, such as the Committee on World Food Security and processes for the devolution of tenure rights including the Rights and Resources Initiative and the Tenure Facility." (WPN 2019: 49f.)

To support and broaden these processes, the IUFRO vol. 33 report (2015) suggests community participation, specifically in the form of institutional **decentralisation**, as an important tool of forest governance reform (ibid.: 133). Three forms of decentralisation are distinguished: transfer of rights to locally-elected governments (democratic decentralisation), transfer of power to local offices of the national government (deconcentration), and transfer of rights to local communities (devolution) (ibid.). Likewise, local actors should thus become engaged in decision-making "through locally-elected authorities to ensure accountable governance" (ibid.). In addition, IUFRO vol. 22 (2009: 198) advocates for "interdependent bottom-up policy networks" which should be better able to address local forest challenges given that "local authorities [...] have better knowledge of local needs" than central government agencies.

Blocks 5: Actions for supply chains, finance and incentives, international and development cooperation

The IUFRO vol. 39 (2020) on poverty recommends building on three core principles for sustainable intensification that, when combined with building blocks 1 to 4, may increase the potential for sustainability transformations in the forest sector:

- promote the certification of deforestation-free products, e.g. for palm oil and soy;
- increase funding for sustainable production (demand and financing);
- improved governance around property rights, jurisdictional approaches, illegality and enforcement (ibid.: 180ff.).

These principles are roughly reflected in the remainder of this section, as we address supply-chain approaches first, then turn to actions and solutions concerning the financial sector and changing incentives, and finally reflect on governance aspects as they should be addressed in international and development cooperation. All three aspects will be picked up and further developed in Chapter 7 where we reflect on lessons learned from past projects.

Supply chain approaches

Supply chains must be overhauled to address one root cause of unsustainable practices that endangers the global commons: the demand for commodities. In fact, the steps presented here apply to **all the global commons** discussed in this study. For both biodiversity and forests, agricultural expansion is a main threat; for marine and coastal ecosystems, overfishing and increasing mining are prime examples. A successful transformation of supply chains will require (1) a strong regulatory framework set by governments, complemented by (2) the establishment of standards and certifications, and jointly implemented through (3) reliable partnerships between different actors around all related supply chains.

The WPN study explains what governments can do to influence business practices in the first of these three steps, using regulation to guide the desired transformations to sustainability:

"States should create an enabling governance environment to stimulate the private sector to engage and invest in pro-sustainability activities by ***providing the operating framework for investors, multinational companies and medium sized enterprises****. This requires setting norms and connecting financial and legal regulations, as well as effective non-compliance sanctions. This should* ***be combined with parallel fiscal incentives to penalize non-sustainable resourcing****, at best at a global scale."* (WPN 2019: 50, emphasis ours)

The Dasgupta Review advertises another potentially transformative idea when it emphasises "that markets alone are inadequate for protecting ecosystems from overuse" (Dasgupta et al. 2021: 71) due to imperfect knowledge. The study recommends relying on "**quantity restrictions** (e.g. on extraction or pollution)" rather than taxation to better account for externalities; these restrictions should be "informed by science and supported by legislation" (ibid., emphasis ours).

In the WPN recommendations, the option of a "globally agreed **right of nature** as a basis for [bi-,] multilateral or transnational global forest governance" (WPN 2019: 50, emphasis ours) is brought up as an approach worth exploring between international organisations, NGOs, and the private sector.

Taken together, these statements amount to governments to support and guide a fundamental shift in how the private sector can operate, and simultaneously say what should be transformed by specifying desired future behaviour and making current unsustainable behaviour much less competitive. The aspect of enforcement mechanisms including sanctions, an important element of accountable governance, is also addressed in the WPN report (ibid.: 51). To motivate companies towards more forest-responsible behaviour, states should moreover

"formulate a demanding claim to business and trade, for developing sustainable finance, Corporate Social Responsibility and due diligence for sustainable agricultural commodities. In the long term, a corporate charter approach could be developed as an instrument of supporting environmental welfare public interests against private profit interests". (Ibid.: 51)

On the other hand, small-scale producers should not be overburdened with regulations and bureaucracy if the empowerment ideal of transformative change is taken seriously. To support them, more "appropriate market regulations" should be established, including:

a) low regulatory costs of market entry (e.g. no registration fees, low cost management plans, no bribes required);
b) no producer/consumer subsidies (and hence greater competitiveness for small-scale producers);
c) a low-cost regulatory environment (e.g. few permits required); and
d) secure local rights for forest products and environmental services (Scherr et al. 2004: 361).

In the international arena, **trade agreements** should (and do, in fact) increasingly include environmental sustainability provisions, and the same can be said about international aid spending (Dasgupta et al. 2021: 74). For instance, the EU has been urged to make sustainable food systems an explicit objective of its free trade agreements and to negotiate relevant sustainability provisions (IPES-Food 2019). The European Green Deal includes the ambition to lead by example and initiate important changes, which could greatly enhance prospects for transformative change. Innovation in trade practices "can support a shift to sustainability" (Dasgupta et al. 2021: 74) if costs along the entire supply chain are internalised.

As an example, from the forest domain, the European Commission has presented a legislative proposal on deforestation in the second quarter of 2021. This is related to an evaluation of two existing instruments (EC 2020): the 'Forest Law Enforcement, Governance and Trade Regulation' (FLEGT) and the 'EU Timber Regulation' (EUTR). The options discussed range from mandatory due diligence (deforestation risk assessment of products throughout the supply chain) to mandatory certification standards (which would effectively prohibit importing non-certified commodities and products) to mandatory labelling (telling consumers which products might be associated with deforestation).

The appeal to more responsible consumer behaviour at the end of supply chains, mentioned earlier regarding agricultural value chains, is echoed for the **mining** sector in a recent Chatham House research paper: "Raising the profile of forest-risk mineral commodities could help build consumer demand for low-impact, low-carbon metals. [...] GHG emissions associated with

forest loss and degradation should be incorporated into supply chain standards and market mechanisms, alongside impacts on biodiversity, land and water" (Bradley 2020: 2). The required "forest-smart" mining approaches and standards have not yet been developed or explored in detail (World Bank 2019: xii, NYDF 2019: 56). However, as an additional oversight mechanism, citizens could be better empowered to monitor companies that are "operating in agriculture and land-related activities" (Oxfam 2020: 55).

In general, actions needed to **effectively change the demand side** as a driver of deforestation and biodiversity loss remain ill-defined in the current literature. Increasing consumer awareness and a growing set of "niche markets" (Oxfam 2020: 59) are slowly emerging but will require political backing to develop sustainable alternatives at scales to have an impact. For example, some current visions of deforestation-free supply chains focus on developing "**short supply chains and local markets** [...] that draw on local and regional qualities" (ibid., emphasis ours). This is the case for the regionalisation of feed production in the livestock sector. While such regionalisation processes could significantly diminish deforestation pressure, a change in consumption patterns would also be needed to ensure adequate supply of the products when production costs increase (Deppermann et al. 2018).

Finance and incentive-based approaches

Finance and incentive-based approaches will similarly require a combination of regulation, standard-setting, and effective partnerships between government authorities, private companies, and non-profit organisations in order to make a difference for the world's forests.

Global Canopy, a think tank, targets financial actors (such as banks and insurers) as potential agents of change in the transition to deforestation-free economies. They argue that "financial institutions are exposed to deforestation in the Amazon via their loans and investments in companies that produce, trade or use commodities linked to deforestation, such as soy and beef" and point out that deforestation entails "physical, operational and reputational risks" to such investors (Forest 500/Global Canopy 2020: 1). In their own interest, such companies should therefore adopt and publish "clear [anti-]deforestation policies" (ibid.: 3).

In terms of investments, the IUFRO vol. 39 (2020: 77) argues that the influence of international investment and trade could significantly contribute to a better allocation of benefits obtained from forests, reducing the inequality in the global distribution of prosperity. IUFRO vol. 34 (2015: 62) underscores that, ''given the necessary scale of investment globally to counteract centuries of degradation, multiple funding sources are required".

IUFRO also discusses further developing **Payments for Ecosystem Services** (PES) schemes and market-based incentives (MBI) as possibly transformative financial instruments. The identification of specific ecosystem services and products to be restored (e.g., improved soil quality for increased productivity; enhanced water quantity and quality for human consumption; maintenance of biodiversity as basis for species conservation) could pave the way for large-scale investments. Potential benefits of restoration need to be identified and clearly communicated to and understood by decision-makers and society at large, so that concrete initiatives can be implemented (IUFRO vol. 34 2015).

Complementally, IUFRO vol. 22 (2009: 195f.) declares a need to strengthen the communication between agriculture, forest and energy sectors and overcome the usual sector-by-sector approach in favour of a more holistic one. One important intersection is the nexus between forests and water. As IUFRO vol. 38 (2018) points out, there is a need to address this relationship more directly.

"*To the best of our knowledge, no existing PES schemes or governance frameworks reflect the emerging broader understanding of forest-water dynamics. A next step in the MBI and PES discussion would be to try and classify existing forest-water strategies into different categories and to assess their effectiveness based on where they fit within this general framework, i.e. whether they are designed to address only the catchment or attempt to mobilise larger-scale (beyond-the-basin) visions of the hydrologic landscape, similarly to what has been achieved with international/global carbon-credit and REDD+ schemes.*" (ibid.: 164)

The report adds that market-based instruments and PES schemes are only one way to address the desired shift from profit-oriented towards sustainability-oriented strategies; thus, there is a need for different approaches (ibid.: 165). Similarly, IUFRO vol. 39 (2020: 180ff.) highlights the

need for careful design of PES and supply chain policies to **ensure they reduce poverty** and inequality and do not further exacerbate them.

Finally, some specific recommendations for **international and development cooperation** emerge from the additional literature, which we will briefly present and discuss here.

Addressing the topic of cooperation between governments, the WPN authors point out that "the Paris Agreement and the SDG framework provide a window of opportunity to put forests more centrally on the international agenda" (WPN 2019: 49). While multilateral action remains important, they specifically recommend **intensified bilateral efforts** in forest cooperation which may serve better "to push forward action", presuming a commitment to long-term presence on the ground (ibid.: 51). Moreover, these experts call for better coordination across ministries, "especially with the financial, economic, environmental and agricultural sectors. It is crucial to achieve coherence at both a strategic policy level and at the level of implementation. This may require new forms of management and institutions" (ibid.: 49). Once again, compared to the global assessment reports on forests, the WPN (2019) paper displays a more comprehensive idea of how the participatory and inclusive aspects of transformative change could actually be achieved.

One clear recommendation for international cooperation and social development projects is having **more experts on the ground**, especially regarding the protection of tropical forests. This is related to the observation that Germany's bilateral forest cooperation has mainly been focused "on large-scale forest management schemes" and has tended to neglect local forest users and the informal sector (WPN 2019: 42).

"*Sustainable forest management and forest conservation require highly qualified personnel working, in particular, at the local level on the side of the local resource users. A greater presence and the long-term engagement of the organisation's staff at the local level are crucial for success. This requires staff training and the development of capacity and facilities at the local level. Experts are needed who are willing and qualified to work under the difficult conditions of the rural tropics.*" (Ibid.: 51f.)

Apart from regular contact with local settings, the WPN authors remark, institutions and project staff require "space and support for continuous reflection" about project impacts, which "can be facilitated through partnerships with local grassroots and academic organizations" (ibid.: 49). The IUFRO vol. 33 (2015: 135) adds that, to reach transformative change in forest governance (and thus eventually food security), there is a need of "identifying and nurturing" local champions of change due to their high potential as engaged agents of change.

Conclusion

From our analysis, we conclude that there are gaps left open by the global assessment reports regarding how political actors and institutions can facilitate transformation. Other available literature (such as the WPN and IUFRO reports proposes ideas that address these gaps.

A comprehensive transformative vision may not be provided, but the calls for a more holistic and integrated view of forests are loud and clear. Zero-deforestation commitments are presented as the most feasible way to reduce pressure from agricultural conversion and improve the economics of forest commodities; the promotion of local food production and agro-ecological approaches is recommended to restructure the global food system and with that reduce pressure for forest conversion.

Knowledge is thought to be somewhat incomplete and fragmented, but clearly sufficient to support immediate action to save the world's forests. A key proposal to transform knowledge provision is brought forward by WPN (2019): to change funding priorities and evaluation metrics of academic research to better reflect sustainability-related (long-term, equitable, and "wise") knowledge needs.

Transformation dynamics could be bolstered through continuous learning and monitoring, including in the context of innovative experiments. Improved data bases would also boost efforts to phase out illegal timber trade, which is seen as a priority challenge.

The reviewed literature demands explicit and unambiguous support for local communities in and around forests, also where this goes against the vested interests of more powerful actors. The maintenance of diverse knowledge systems is recognised as a crucial ingredient of transformative change, and institutional decentralisation is recommended as a political instrument to empower local citizens in this sense.

Regarding actions, the additional literature provides specific recommendations on **how to tackle challenges in supply chains, funding mechanisms, and international and development cooperation**. Specific measures that include a jurisdictional or landscape approach, sustainability provisions in trade agreements, and tighter regulation of supply chains, could have a great impact on transforming trade structures and the socio-ecological impact of consumption – in agriculture, but also in mining and other sectors. Promising innovations described in the literature include the setting of restrictions on resource extraction and the establishment of globally agreed rights of nature. Likewise, a more comprehensive regulation of finance and investment could lead to transparent investment approaches and provide guidance for the private sector, financial institutions, and non-governmental organisations, ultimately turning them into motors of desired change. Payments for Ecosystem Services and market-based incentives should be further explored. In the case of international and development cooperation, the intensification of bilateral efforts, better coordination between ministries, and new forms of management and institutions are suggested to improve the coherence of these initiatives, highlighting the relevance of groundwork and continuous reflection. Long-term engagement with local "champions of change" holds high transformative potential.

Knowledge and guidance to encourage decisive transformative change for the world's forests is abundantly available, but has not yet been consolidated and systematically transferred to all relevant levels (i.e., the different actors in national and international policy and development cooperation). However, **some open questions remain largely unanswered**: How can consumer behaviour, especially in the global North, be effectively steered towards demanding deforestation-free products? Could a full-fledged dynamic conception of transformation trajectories (as proposed by Loorbach and Oxenaar 2018) change the current situation where unsustainable forest-related practices are often the most lucrative? Which principles or approaches could orient future development and international cooperation programmes? Our project analysis in Chapter 7 will discuss some of these remaining issues and enrich the generic recommendations with context-specific experiences.

6.3 Analysing and complementing ocean-related recommendations

In this section, we first analyse to what extent the (sometimes only implicit) recommendations for marine and coastal ecosystems of the assessments have transformative potential by evaluating them based on our conceptual framework and identify gaps. Here, we present a summary and appraisals, the full analysis can be found in Appendix 11. In Section 6.3.2, we then draw on supplementary literature to address gaps identified.

6.3.1 Assessing transformative potential and identifying gaps

Transformative vision

In the marine area, the evaluated assessments are less explicit regarding the need for society-wide transformative change. Especially recommendations on fisheries seem to suggest that sustainable fisheries management, as envisaged albeit not achieved over the past decades, is possible by supporting sector capabilities, management and rule of law within the sector. Overall, after analyzing the recommendations, we reached the conclusion that fisheries are discussed under conditions of optimising yield with current management approaches and without proposing far-reaching or radical changes, nor outlining an overall different approach. This is evident also because – unlike in the two other sections – there are hardly any calls to consumers apart from reducing waste, in particular we have not found calls to reduce consumption of fish. When summing up the lists of recommended measures concerning ocean use (as source and sink) it becomes clear however, that achieving sustainable use of the ocean requires changes that are at least as profound and complex as in the terrestrial realm.

With regard to climate change, there is more emphasis on the needed changes in different economic sectors, but recommendations are not very detailed. Particularly the IPCC report outlines how synergies between biodiversity conservation and especially ecosystem-based climate change mitigation and adaptation strategies could be achieved. Across all three challenges, we found neither a 'new vision' for managing oceans nor compelling new narratives.

Transformative knowledge

The analysis of knowledge needs and gaps focuses on extending the 'sustainable management approach' to so far unmanaged fisheries, a basic understanding of sources, spread and impacts of waste and pollution including its effects on ecosystems and human health, and on adaptation, particularly ecosystem-based adaptation to climate change. In line with the fact that the assessments do not outline visions of transformative change, the knowledge needs are very management-oriented. Only when climate change is addressed, comprehensive knowledge needs aspects are included, such as how societies operate and how societal change can be better understood and enhanced.

Navigating the dynamics of transformation

For fisheries, as mentioned above, the discussions seem to revolve around the concept of 'optimisation'; there are a few calls to better link fishery management to food security and to climate change. Regarding ocean pollution, there are a few phasing out proposals to reduce some of the most obvious issues, such as oil spills from single hull tankers. But there are only few proposals on how to reduce pollution at source or how hazardous substances or practices could be replaced in other words what should be increased or phased-in. Climate change is the only policy area where some steps are outlined for both phasing out and phasing in. Synergies between climate change mitigation, adaptation and biodiversity conservation are highlighted and conserving and restoring so called 'blue carbon ecosystems' is identified as an excellent option for achieving progress towards all three goals.

Emancipation and agency

All assessments highlight the need to include local communities as well as indigenous people and their respective knowledge in decision-making and management across different challenges, often for instrumental reasons of improving the effectiveness of policy implementation but also with the objective to increase access of less well-off groups to resources and decision making. Inequality, including gender inequality, is considered an issue and there are general pleas to address and reduce it but few, if any, specific ideas or measures. All assessments acknowledge the importance of involvement and to a limited extent also of empowerment, community development and socio-institutional adaptation. But they lack concrete ideas in terms of enhancing agency, or opening up deliberation on different pathways or sustainable futures.

Transformative governance: actions and solutions

The global assessments provide very detailed suggestions for actions and recommendations on how to improve fisheries management, for example in optimising the monitoring of fish stocks. The overall need for marine spatial planning or rather prioritisation of different uses in different areas and the need for increasing marine protected areas is acknowledged and action called for.

Overall the ocean seems to be perceived as the receptor of many of the negative impacts of human activity on earth and the focus lies more on managing or addressing the impact rather than addressing the root causes. As the paradigm in fisheries management is already oriented towards achieving sustainability, and important progress has been achieved in some fisheries, the current approach is not fundamentally questioned.

Summary

In summary, our analysis revealed that the assessments on the ocean are less clear about the need for society-wide change. The assessments do not outline a "new vision" for ocean management or compelling new goals. The outlined knowledge needs (except when it comes to climate change) are very management-oriented. Recommendations from the assessments regarding transformative dynamics often remain either rather generic or very sector-specific and hardly address the root causes; climate change is the only policy area where global assessments outline some steps for both phasing in and phasing out. And while the importance of involvement of local communities and indigenous people as well

as the need to reduce inequality are acknowledged, the analysed reports present few, if any, concrete measures.

6.3.2 Options to increase transformative potential: Does the ocean also need transformative change?

In this section, we consult further literature to assess if there is a need for transformative change regarding the ocean and present suggestions how the ocean-related recommendations could be complemented and gaps identified in Section 6.3.1 could be filled based on further literature and our own experience and judgement. We follow the framework on transformative change with an emphasis on the fifth building block, concrete actions and solutions to address the interconnectedness of marine ecosystems, marine resource use and harmful discharge and ocean governance.

Blocks 1–4: Vision, knowledge, dynamics, and emancipation

"As they are a global public good (in the 1970s they were called a Common Heritage of Mankind), the accounting rents from the issue of fishing rights and charges levied on the use of the oceans for cruises and the transportation of goods could be collected and shared among nations. A lively discussion took place in the 1970s of the amount of global rents that could be collected in the form of a tax on ocean resources (e.g. manganese nodules on the sea bed), the idea being that the tax could be used as development aid. The proposed Global Ocean Treaty, currently under negotiation among UN members, presents an opportunity to fill gaps in governance within existing supra-national arrangements to address biodiversity monitoring and conservation." (Dasgupta et al. 2021: 76)

This quote from the first Dasgupta Review illustrates that unlike the terrestrial environment, which is largely defined and regulated by extensive multi-level governance structures and institutions, the marine areas such agreements are still under negotiation. As our analysis has shown, a transformative proposal for ocean management is largely lacking in the global assessments. This is surprising as the oceans are prototypical global commons we should all care about, currently however, beyond the exclusive economic zones of individual countries, they are managed largely as open access resource. With increasing knowledge and opportunities to exploit additional resources, such as oil and minerals, building materials, or wind for energy, the overall pressure on and competition for ocean resources is intensifying.

We therefore draw on supplementary publications, especially by the High-Level Panel for a Sustainable Ocean Economy (HLP or the Ocean Panel), which was formed in 2018. The HLP is a unique initiative of 14 serving heads of government, committed to catalysing bold, pragmatic solutions for ocean health and wealth that support the SDGs. The Panel consists of the heads of government from Australia, Canada, Chile, Fiji, Ghana, Indonesia, Jamaica, Japan, Kenya, Mexico, Namibia, Norway, Palau, and Portugal, and is supported by an expert group, an advisory network, and a secretariat. The HLP commissioned a comprehensive assessment of ocean science and knowledge that has significant policy relevance and gives practical recommendations. This assessment includes a series of 16 Blue Papers and Special Reports. In our analysis, we integrate recommendations from the Blue Papers, which deal with the following topics: food from the sea (HLP SOE FFS 2019), expected impacts of climate change (HLP SOE ICCOE 2019), ocean finance (HLP SOE OF 2019), ocean transition (HLP SOE OT 2020), ocean pollution (HLP SOE PP 2020) and ocean equity (HLP SOE OE 2020). Together they outline a transformative proposal taking equity issues into account.

One of the fundamental problems for sustainable development of the oceans lies in unequal access to ocean resources and subsequent benefits on the one hand, and exposure to harm on the other. Transformative change towards sustainable use of the ocean will necessarily come into conflict with existing unsustainable practices. Therefore, any governance approach needs to address and account for vested interests and power asymmetries (e.g. of powerful entrepreneurs). As access to ocean resources and sectors is rarely equitably distributed, benefits are accumulated by a few, while most harms from development are borne by the most vulnerable. **Such inequity is a systemic feature of the current ocean economy**, resulting in overall negative effects on the environment and human well-being. The distribution of global fishing efforts and patents on marine genetic resource serve as examples to illustrate this:

Five high-income countries are responsible for 86 percent of total fishing effort (McCauley et al. 2018) and 64 percent of fishing revenue (Sala et

al. 2018: 2). Figure 16 shows the density distribution of global industrial fishing, for higher-income countries (A) and lower-income countries (B). On the high seas and in national waters industrial fishing is dominated by vessels flagged to higher-income nations that account for 97 percent of fishing effort, leaving less than 3 percent to vessels flagged to lower-income nations.

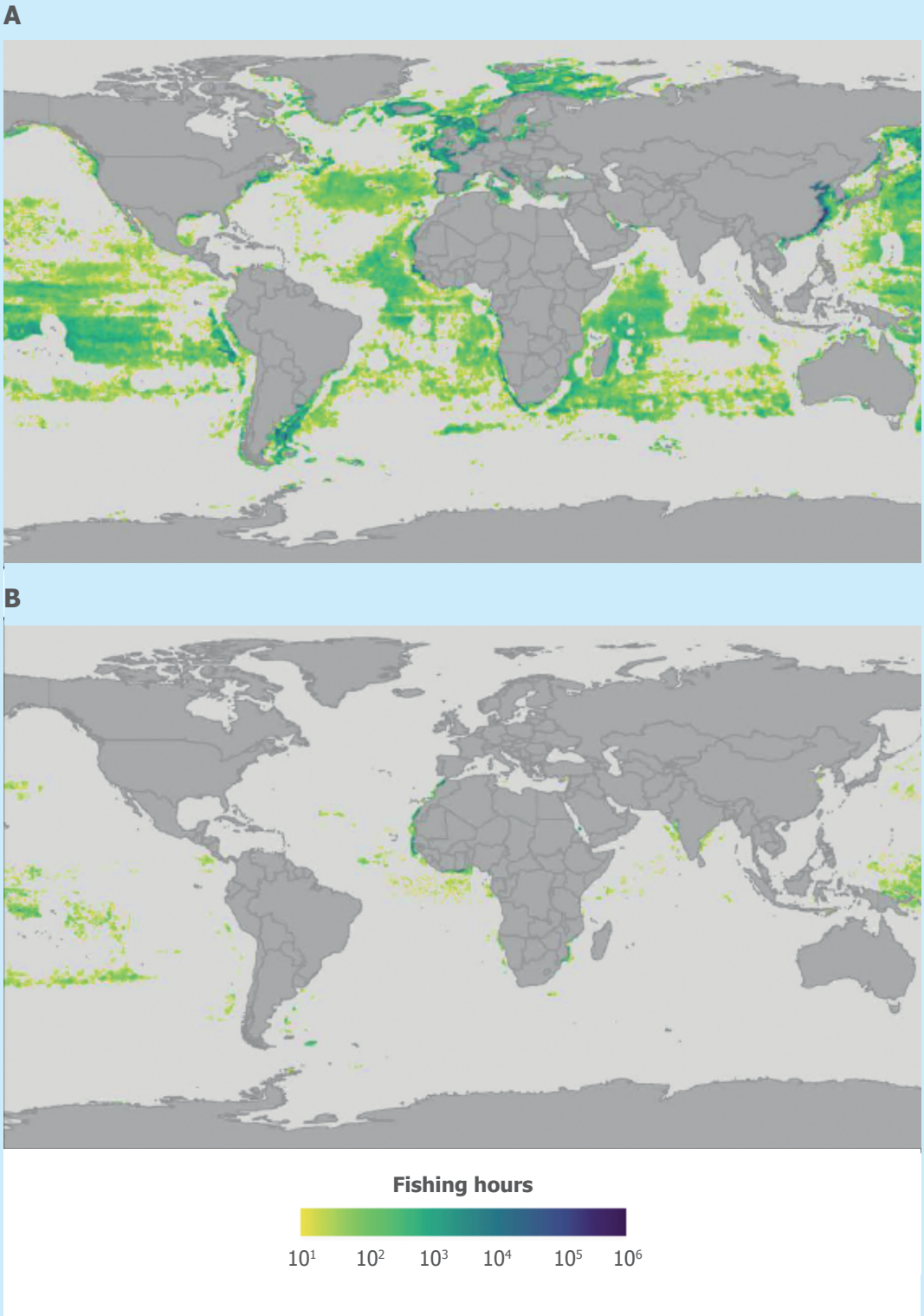


Figure 16: Density distribution of global industrial fishing effort, (A) vessels flagged to higher-income countries and (B) vessels flagged to lower-income countries. Source: McCauley et al. 2018: 3

Furthermore, it must be taken into consideration that around 97 percent of all small-scale fisheries (SSF) are located in developing countries, 90–95 percent of SSF's catch are for direct local consumption, and 90 percent of employees in the fisheries sector are employed in SSF, around 50 percent are women (FAO 2020: 177).

The distribution of the benefits from marine genetic resources is even more imbalanced: ten countries hold 98 percent of patents associated with marine gene sequences (Blasiak et al. 2018: 2), and a single company (BASF) has registered 47 percent of all marine sequences included in gene patents (see Figure 17).

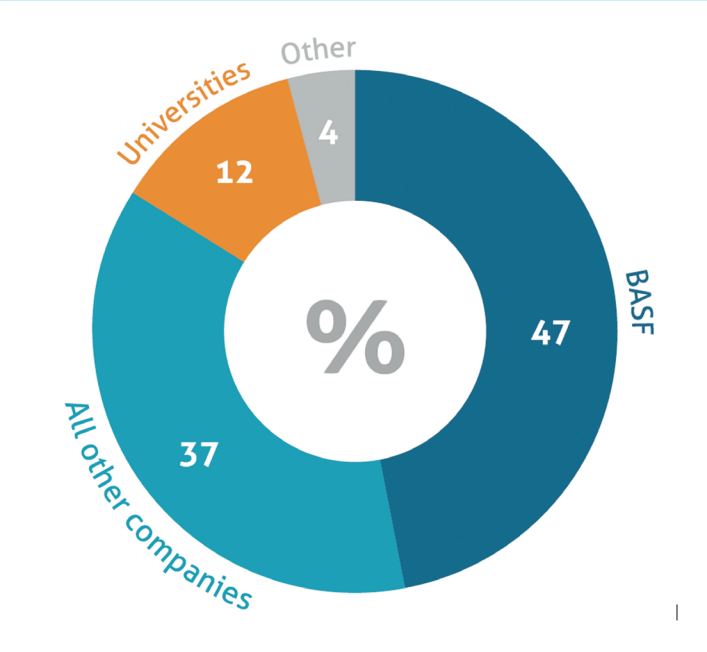


Figure 17: Percentage of patents with international protection associated with marine genetic resources registered over the period 1988–2017. Source: Blasiak et al. 2018: 3

Furthermore, it must be taken into consideration that around 97 percent of all small-scale fisheries (SSF) are located in developing countries, 90–95 percent of SSF's catch are for direct local consumption, and 90 percent Challenging this inequality directly threatens powerful interest groups that benefit from existing arrangements. Nevertheless, increased scientific attention to inequality is starting to shape debates associated with the ocean. The FAO highlights that especially "climate change will almost always result in winners and losers. This requires negotiating trade-offs and building on climate justice, equity and ethical considerations when making decisions on the allocation of and access to fisheries resources" (FAO SOFIA 2020: 211). One vision that addresses this problem is the idea that the ocean is a 'common heritage of mankind' which was put forward as early as the 1960s by Arvid Pardo and Erika Mann Borghese in the negotiations on the United Nations Convention on the Law of the Sea (UNCLOS). Although it was then not enforced as a principle of international law of the ocean as a whole, it was codified for the mineral resources of the seabed in areas beyond national jurisdiction. According to the German Advisory Council on Global Change (WBGU), "it follows from the **common heritage of mankind principle** that global public goods must be accessible to all people and not be fully at the disposal of any state, individual or company. The conservation and sustainable use of the common heritage of mankind **requires stewards, a management regime** for conservation and sustainable use, **and rules on sharing** to ensure that the costs and benefits of the regime are distributed fairly" (WBGU 2013: 2, emphasis ours).

The question of what needs to be known to change the system cannot be answered easily in the realm of the ocean. Knowledge gaps exist at various levels, from a lack of data on remote marine environments and the deep sea to deficiencies in technology transfer. As mentioned in Section 5.3, the knowledge needs indicated by the assessments are very management-oriented.

However, the HLP Blue Paper on Ocean Transition (HLP SOE OT 2019) mentions an institutional gap with more transformative potential: the need to share information on the ocean and coasts through a **knowledge commons accessible to everyone**, also called the democratisation of ocean knowledge. Digitalisation is believed to spawn the highest transformative potential since the industrial revolution, it is even called the "Fourth Industrial Revolution" (WEF 2020: 16).

Currently, however, possession of knowledge in the marine sector and the sovereignty of its interpretation are not coordinated. Therefore, expanding access to knowledge, also in digital form, and enabling all countries and affected communities to make meaningful use of this information is a global task with transformative potential. Opportunities to propel digitalisation in the marine realm relate to e.g. surveillance, spatial ecosystem monitoring, fisheries, more transparent market access, tracking of fish along the value-chain, etc. While information is increasingly available this does not mean it actually leads to improved implementation and enforcement. Similarly, the increasing data availability does not mean all relevant stakeholders can interpret and make use of it. While access to (digital) information can change power relations, it is a necessary albeit often not sufficient condition. A process towards sustainable ocean development must therefore include connecting the variety of stakeholders and making the existing knowledge accessible to enable empowerment and agency for transformation.

Given the wide scope of challenges for sustainable development in the marine realm, recommendations from the global assessment reports and other publications are either rather generic or very sector-specific. Since sustainable measures usually compete with less sustainable practices, phasing out the latter is a prerequisite for long-term success, but often not explicitly addressed. For example, concerning marine pollution, the global assessments recommend the **management of pollutant input pathways** – for instance by "educating farmers, promoting good agricultural practices that result in less nutrient runoff, and monitoring what happens to agricultural runoff alongside wastewater discharges" (WOA 2016: 20: 74). However, such measures leave the decision largely to farmers' goodwill and focus on only a portion of the root causes. The HLP Blue Paper, "Leveraging Multi-Target Strategies to Address Plastic Pollution in the Context of an Already Stressed Ocean" (HLP SOE PP 2020), goes further and recommends both the adoption of green chemistry practices and new materials but also the **phasing out of unsustainable practices with regulatory measures** like banning/limiting the use of chemicals of concern or hazardous and hard-to-manage materials. Thus, stronger measures than educating producers or consumers are listed, for example imposing fees on single-use plastics or other high leakage items, or supporting policies that allow personal container use in shopping and dining, and measures which support recovering and recycling of materials (for example through implementing extended producer responsibility laws) in order to reduce the solid waste in the first place.

Assessments and reports agree on the usefulness of creating **inclusive governance processes** by incorporating local voices and visions into plans for sustainable ocean development at all scales and the support of bottom-up collectives and local initiatives is strongly recommended. In the HLP Blue Paper on ocean transition, such initiatives are seen as the places for niche innovations which "can demonstrate through trial and error that alternatives [to existing non-sustainable practises] are possible" (HLP SOE OT 2020: 14). Empowerment can also take place in moving towards rights-based fishery management, including frameworks that provide a platform for co-management, cooperatives and local ownership and stewardship. To integrate property rights with stewardship responsibilities through local use rights programmes is seen as a strong measure to claim agency over marine ecosystems from regional and local stakeholders. Positive examples are the Chilean Territorial Use Rights in Fisheries (TURF) and, in Brazil, the concept of Marine Extractive Reserves (WOA 2016), which present the solution of 'protection by use': in defined areas of the coast and coastal sea long-standing inhabitants are allowed to continue to benefit from the resources of the reserve, applying their traditional knowledge and practices, while protecting the area against non-traditional, new exploitation, and protecting the environment (Chamy 2002). In Brazil today, at least 113 RESEXs (extractive reserves) are implemented, 24 of them coastal or marine (IBAMA 2014, ISA 2020). In addition, inclusive approaches in collaboration with the private sector, incorporating the 'polluter pays' principle, are also seen as a powerful means of strengthening sovereignty in communities. of employees in the fisheries sector are employed in SSF, around 50 percent are women (FAO 2020: 177).

Block 5: Actions and interventions for transformative governance

The **management of ocean use** is currently occurring at multiple levels – from the direct relationship between people and nature at the local level to global environmental governance frameworks. The ocean connects everyone – what a local fisherman thinks and does is not independent and disconnected from the global relationships that encompass the financial system, supply chains, and broader regulatory frameworks.

The **legal framework for the use and the protection of the ocean** is very fragmented. One of the overarching instruments that can regulate processes in this highly connective ecosystem is the United Nations Convention on the Law of the Sea (UNCLOS) which provides the legal framework for action at sea. So far, the protection of biodiversity has not been explicitly included in the regulations. When states committed at the 2012 UN Conference on Sustainable Development (Rio +20) to "address, on an urgent basis, the issue of the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction, including by taking a decision on the development of an international instrument under the United Nations Convention on the Law of the Sea" (United Nations 2012: 31) several intergovernmental sessions were held to develop an international legally-binding instrument. Ongoing discussions and negotiations are addressing four important topics:

1. marine genetic resources, including benefit-sharing issues;
2. measures such as area-based management tools, including marine protected areas;
3. environmental impact assessments, and
4. capacity building and the transfer of marine technology.

They also address issues such as general principles, definitions, responsibilities and compensations, and institutional and financial arrangements. This agreement could provide a framework to strengthen transformative and sustainable practices. However, even if the UN can provide a legal framework for sustainable ocean development, their ability to implement sustainable practices and shift economic procedures is limited. The need for multi-level governance approaches in the marine realm is a sine qua non condition to managing the ocean as a global common good. Therefore, the authors of the HLP Blue Paper on Ocean Transition (2020) recommend several opportunities for action that could strengthen transition processes whilst acknowledging the complexity of ocean governance:

"*[1.] support current UN ocean processes (e.g. ratification of UNCLOS);*

[2] reconfigure nationstate authority as it relates to the ocean (e.g., establish a global 'ocean agency' that supports polycentric, 'bottom up' governance innovations);

[3.] support civil society's ability to play a more significant role (e.g. by recognising access to a healthy environment as a human right and establishing a new 'wiki-type' interactive ocean knowledge commons for co-creating solutions); and [4.] integrate property rights with stewardship responsibilities (e.g. establish local user rights programs)" (ibid.: 2). In this sense, local, national, and regional agreements and cooperation are important vehicles by which ocean governance can be significantly improved and transformative change could be initiated. Especially at a supranational level "coalitions of the willing" may support transformative change in providing role models also for ocean governance. Good experiences exist for example with some of the Regional Fisheries Management Organisations (RFMO), the OSPAR Commission, and the already mentioned High-Level Panel for a Sustainable Ocean Economy.

An important element for the governance of sustainable ocean development is adequate funding, as "[t]he best ocean policies and practices can be undone by inadequate financing and by economic externalities that undermine conservation and sustainable use" (Sumaila et al. 2021: 9). As an example, not all of the declared Marine Protected Areas, covering 7.3 percent of the ocean surface, are adequately protected: currently only 2.3 percent is effectively protected and most of the remaining 5 percent is not protected at all. To increase the share of fully protected areas to 10 percent an estimated $7.7 billion is needed (HLP SOE OF 2019: 23). The HLP proposes an effective and comprehensive funding mechanism to finance actions required for integrated ocean management. Current investments fall well below what is needed for a transition to a sustainable ocean economy. In the last 10 years, less than 1 percent (US $ 13 billion) of the total estimated value of the ocean has been invested in sustainable projects through philanthropy and official development assistance (ibid.: 4). One

problem with public and private sector investments that have already been made is that a significant portion are directed toward large-scale economic activities that are often unsustainable and run against achieving Sustainable Development Goal 14. To steer financial flows more in the direction of sustainable ocean development, improved policies, incentives, tools and approaches need to be designed and established. Currently, several barriers prevent the growth of finance for the sustainable marine economy (see Figure 18).

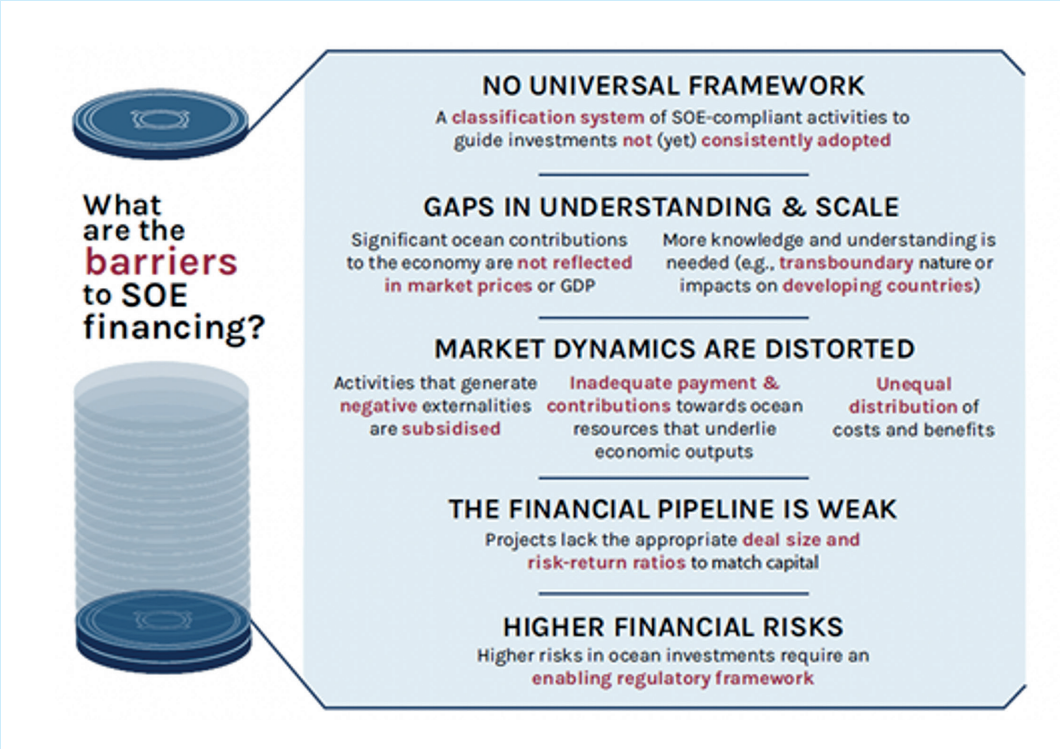


Figure 18: Barriers to marshalling adequate funding of the Sustainable Ocean Economy (SOE). Source: HLP SOE OF 2019: 7

The authors of the HLP Blue Paper on Ocean Finance make a number of suggestions how the challenges identified can be addressed through actions by governments, private entities and individuals (HLP SOE OF 2019). In order to set up a universal framework, new shared rules need to be defined and implemented. An essential element of a sustainable finance system will be the creation of an ocean-based finance taxonomy, providing classification systems of those activities considered to comply with strong principles for sustainability. This work can build on the Sustainable Blue Economy Finance Principles (WWF 2018), developed by the European Commission, the World Wide Fund for Nature, the European Investment Bank and the Prince of Wales' International Sustainability Unit. Also, the Sustainable Blue Economy Finance Initiative, launched by the United Nations Environment Programme, as well as the European Union taxonomy with its blue components are able to influence the creation of a common global taxonomy, which will be required to standardise decision-making across global markets. The correction of market distortions can be achieved through taxation, the pricing of services, and the redirection of subsidies from harmful to more sustainable and equitable uses. Especially for the fisheries sector the HLP Blue Paper "Future of the Food from the Sea" (HLP SOE FFS 2019) recommends removing capacity-enhancing subsidies, particularly in fisheries which lack sound management. To counteract climate change impacts such as shifting fish stocks the HLP suggests developing fisheries permits that are tradeable across political boundaries as these would give future resource users access to fisheries not yet in their waters and incentivise good management. In light of experiences with REDD+ or certification schemes to counteract deforestation, good management should not be assumed but will have to be carefully regulated. In general, the HLP

recommends taking immediate action to avoid funding practices that support illegal and harmful activities, such as illegal fishing and pollution, and to work towards incentives for positive behaviour at both the macro and micro levels (HLP SOE OF 2019). One example is an industry-wide statement against IUU fishing, which was launched 2017, confirming the commitment of insurers, brokers and agents to not knowingly insure or facilitate the insuring of IUU fishing vessels (Miller et al. 2018).

Considering food security, aquaculture is perceived as an alternative to traditional capture fisheries. However, the environmental trade-offs associated with aquaculture should be prevented as far as possible. Noteworthy is that there are diverging views on aquaculture, detectable in the international assessments. For instance, the World Ocean Assessment of 2016 expresses rather negative views on aquaculture, whereas the FAO views **sustainable aquaculture** as means to ensure long-term food security. Sustainable aquaculture combines environmental sustainability with the social and economic sustainability of coastal and inland fisheries communities in the long term. The FAO stresses its role for livelihoods, particularly among low-income rural populations, and a constantly increasing contribution to world fish production. The report identifies secure and equitable access to and management of aquaculture resources as central (FAO SOFIA 2020).

The authors of the HLP Blue papers propose strategies on how to trigger the missing systemic shift to a transformation towards a sustainable ocean development. Following a bigger vision, the HLP Blue Papers point to shifts in global economic paradigms when recommending "aware[ness] of environmental and social limits on growth and consider degrowth" as well as to shifts in global social justice practices when recommending to "create a shared ocean economy that facilitates redistribution of wealth and benefits" (HLP SOE OE 2020: 2). An important means of support for such shifts would be to recognise a '**human right to a healthy environment'** which has been discussed for decades and many countries are moving in this direction. By 2019, at least 155 states recognise, in law, the right to a healthy environment (Boyd 2019). The French legal think tank Club de Juristes, called for a Global Pact for the Environment including this human right in 2017 and in 2018 the UN General assembly adopted a resolution and opened negotiations to create such a treaty (HLP SOE OT 2020: 26). With this proposal, a human rights perspective on sustainable ocean development could be embedded in national and sub-national contexts and provide important opportunities for agency to defend sustainable development as the case of the West Coast Rock Lobster in South Africa demonstrates (see Box 11).

Box 11: The South African West Coast Rock Lobster case: WWF South Africa vs. the Minister of Agriculture, Forestry and Fisheries and Others in 2018

The South African Constitution, contains two important elements regarding environmental rights: 1) everyone has "the right to an environment that is not harmful to their health or well-being", and 2) the duty "to protect the environment for present and future generations through reasonable legislative and other measures that [...] ensure ecologically sustainable development and use of natural resources while promoting reasonable economic and social development" (Republic of South Africa 1996: 24). Based on this constitutional right, the Western Cape High Court made a landmark decision. In 2016 the Department of Agriculture, Forestry and Fisheries set the total allowable catch (TAC) on lobster at 1.934 tons for the 2017–2018 season, irrespective of the fact that a scientific working group set up by the Department itself had recommended a TAC lower than 800 tons to protect lobster stocks. The WWF sought to have this decision set aside. The court did so on the basis that it was unlawful and in contradiction to the constitutional right, as the harvest above prudent levels of the already depleted lobster stocks posed a threat of serious or irreversible environmental damage. The constitutional environmental right supported civil society's ability to play a more significant role and made it possible to ensure that the government departments adhere to principles of sustainable development (HLP SOE OT 2020: 26).

Conclusion

Our analysis of the international assessments for marine and coastal ecosystems (see Section 6.3.1) revealed little transformative ambition. Additional literature analysed, however, outlines the need for transformative change regarding ocean governance as well as complements and details the often generic or very management-oriented recommendations of the assessment reports. This analysis shows that required transformative changes are at least as profound and complex as in the terrestrial realm.

The idea of the ocean being a "common heritage to mankind" can be viewed as a cornerstone of a **transformative vision**. Such a vision entails the ambition to overcome the existing unequal distribution of ocean goods and services and of exposure to harm. The High-Level Panel publications outline some cornerstones of how to support what they call the ocean transition: to strengthen the supranational frameworks being negotiated under UN, develop governance innovations at multiple levels, support civil societies' role; and link property rights with ocean stewardship responsibilities.

Some concrete ideas to operationalise this include measures like moving towards rights-based fishery management, frameworks that provide a platform for co-management, cooperatives and local ownership and stewardship agreements. To integrate property rights with stewardship responsibilities through local use rights programmes is seen as a strong measure to enhance the agency of regional and local stakeholders regarding use and conservation of marine ecosystems. Regarding the ocean as a sink additional literature recommends not only the adoption of green practices but also the phasing out of unsustainable practices by regulatory measures like banning/limiting the use of hazardous materials and by redirecting harmful subsidies. The need to share information on the ocean and coasts through a knowledge commons accessible to everyone is emphasised, hoping this will lead to the democratisation of ocean knowledge and enable agency; digitalisation in particular is seen as promising. This is a necessary, albeit often not sufficient, condition for transformative change, as the increasing data availability does not mean that all relevant stakeholders can interpret and/or have means or rights to make use of it. Knowledge needs for transforming the system are not clearly outlined.

Specific recommendations are provided on how to address the fragmented governance and regulatory frameworks for ocean use and protection. One of the overarching legal frameworks is the United Nations Convention on the Law of the Sea (UNCLOS), nonetheless, as a framework its ability to implement sustainable practices and shift economic procedures is limited. In addition, regional alliances and "coalitions of the willing" could act as pioneers that are able to develop, test and thereby demonstrate tailored legal solutions for the sustainable use and protection of the ocean as a global commons; the HLP SOE OE (2020: 26) calls for creating "a shared ocean economy that facilitates redistribution of wealth and benefits". If sustainable management is included, this could be considered a transformative vision. Finally, the literature discusses the human right to a healthy environment as a means to protect both biodiversity and the rights of local communities by legal measures.

6.4 Synopsis of recommendations for minimising pandemic risks

The current pandemic situation and the potential emergence of new diseases highlight the crucial relevance of **transforming our systems**, not only for conserving global commons but **also for human health** due to the interconnection between people, animals, plants, and our shared environment. Here we present a summary of recommendations with transformative potential from three recent reports and initiatives seeking to minimise current and future pandemic risks.
A transformative vision is shared across the IPBES workshop report (2020) on pandemics and the two UNEP reports "Preventing the next pandemic" (2020) and "Making Peace with Nature" (UNEP MPN 2021) recommending a broader system view following the One Health approach as a guiding principle for pandemic prevention policies. The One Health approach recognises that the health of people, animals and the environment are inextricably linked and that measures in all three sectors are needed to better address proximal and underlying causes of health issues. The "Making Peace with Nature" report explicitly specifies that "the current mode of development degrades Earth's finite capacity to sustain human well-being" (UNEP MPN 2021: 14) and calls for "transforming humankind's relationship with nature as a key for a sustainable future" (ibid.: 28). The three reports identify unsustainable consumption patterns as direct driver of biodiversity loss and disease emergence, as these entail environmental change, land-use change (e.g. environmental degradation, deforestation and land conversion for agricultural production), as well as climate change, pollution, and others. Moreover, it mentions that "the economic, financial and productive systems can and should be transformed to lead and power the shift to sustainability" (ibid.: 13), also highlighting that natural capital needs to be included in decision making, and that it is important to eliminate harmful subsidies and invest in the transition to a sustainable future.

The IPBES workshop report (2020) recommends launching a high-level intergovernmental council/panel on pandemics to better collaborate and coordinate among sectors and agencies, nationally and internationally. This One-Health High-Level panel (OHHLEP) was actually launched by a tripartite international organisation (FAO, WHO, OIE) plus UNEP in May 2021. The OHHLEP has an advisory role by providing policy-relevant scientific information on the links between human, animal and ecosystem health as well as contributing to foresight on emerging threats to health. The report includes further specific policy proposals such as the institutionalisation of the One-Health-approach within governments fostering collaboration among ministries including a strong interaction with ministries of finance; mainstreaming the economic cost of pandemics into consumption, production, government policies and budgets; generating green corporate or sovereign bonds and designing green economic recovery from COVID-19 and possible later pandemics.

Another point stressed by the reports is that investing in biodiversity conservation may reduce Emerging infectious diseases' (EID) risk and build economic resilience for the future. This can be done by integrating health impacts into protected areas policies, land-use planning, and restoration programmes, and by mandating pandemic risk impact assessments for major development projects. Such measures would contribute to understanding potential consequences (e.g. altering habitats, creating corridors, etc.) for human and environmental health.

The IPBES workshop report (2020) also stresses the need for new intergovernmental partnerships for health and animal trade surveillance, particularly relevant for wildlife trade that lacks the regulation and protocols established for livestock. It suggests that organisations such as CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) could amend how disease spread is monitored and expand it to cover health issues. Furthermore, strong partnerships between CITES and OIE (World Organization for Animal Health) could provide a legal mandate to better control international trade (e.g. inspect shipments), and create expert group guidelines on monitoring, among other actions. Especially relevant is that this partnership should cover species not regulated by CITES. Pertinent other measures to transform the current animal trade include: en-

hancing sanitation in farms (and along the whole supply chain), particularly in live animal markets, and designing behaviour change programmes to disincentivise wildlife meat consumption.

All societal actors could develop initiatives and actively contribute to these measures, as the "Making Peace with Nature" report illustrates (see Box 12 below).

Box 12: Key actions to transform humankind's relationship with nature: who could do what?

1. Address Earth's environmental emergencies and human well-being together

Governments at different levels should establish mechanisms for cross-sectoral coordination of assessments, policies, legislation enforcing, and finances considering integrated approaches such as the One Health Policy for humans, animals and the environment. Also, they should adapt and develop concrete plans to address climate change and biodiversity loss, e.g. by forming global coalitions for carbon neutrality, post-2020 targets, and the One Health approach. Financial institutions could commit to align their lending with global-zero carbon emission and sustainability objectives. Furthermore, they could disclose climate-related financial risks, natural resource use and the impact of their activities on the environment. The private sector could contribute by adjusting business models, aligning them with the global net-zero carbon emission objective, and help develop and comply with solid environmental regulations, internationalising production externalities. Moreover, the private sector should disclose climate-related financial risks and impacts, implement certified and traceable supply chains, and practice corporate social responsibility. Non-governmental organisations have the role of enabling different societal groups by supporting education and diverse movements (youth, citizen science) and community-level initiatives and helping to hold societal actors accountable for their environmental responsibilities. Society and media can also foster norms and behaviours that embody sustainable principles, engaging in participatory processes and holding governments and the private sector accountable for their actions. Making sustainable and climate-friendly daily choices is also relevant toward transforming our relationship with nature. Scientific and educational organisations can further develop tools, models, and monitoring systems to account for the complex interlinkages between environment and development.

2. Transform economic and financial systems so they lead and power the shift

Governments at different levels should reform national economic, financial, planning and tax systems to include natural capital and environmental costs in decision making, remove harmful subsidies, establish more regulated markets for ecosystem services, and invest in activities that increase natural stocks. International organisations could play an essential role by facilitating a global framework for natural capital accounting, reforming economic growth to integrate nature. This can be done by promoting a circular economy, offsetting nature, and supporting sustainable global supply chains. Financial organisations could boost the circular economy, internalise externalities, eliminate harmful subsidies, and use natural accounting in decision making, lending and grant-making policies. The private sector could contribute by integrating natural capital in decision-making, developing social risk registers, engaging in carbon trade and schemes for offsetting nature, and promoting behaviour change in customers. Non-governmental organisations could boost the natural accounting and circular economy, advocating for policies and regulations that create sustainable development investment. Society and media could support initiatives that foster economic and financial transformations, engaging in sustainable initiatives such as carbon trading and promoting fair trade companies with sustainable production models. Scientific and educational organisations are suggested to further develop the framework for natural accounting and relevant databases and assess the cost and benefits of mitigation, adaptation, and societal impacts.

3. Transform food, water and energy systems to meet growing human needs in an equitable, resilient and environmentally friendly manner

Governments are called to integrate sustainable, biodiversity-positive production and management practices into food and water production at different levels. They should promote healthy diets and reduce extractivist conducts such as overfishing. Intergovernmental and financial organisations could promote and found programmes focused on improving access to affordable and nutritious food, clean energy and safe water for all. Furthermore, they could play a relevant role in promoting and financing the sustainable intensification of agriculture and fisheries. The private sector is suggested to develop and invest in a system to store and produce power, food, and water, minimising waste, and promoting sustainable production. Non-governmental organisations could advocate for and implement initiatives oriented to the ecological intensification of multifunctional landscapes. Furthermore, they could promote dietary transitions by participating in community-led initiatives. Society and media play the role of engaging and supporting, respectively, local production and distribution of food, water and energy, and foster conscious daily decisions regarding a healthy and environmentally responsible diet. Scientific and educational organisations could help develop and monitor systems to produce and distribute clean water, nutritional food, and clean energy, promoting the education and awareness of sustainability within agriculture, fisheries, forestry, water, and energy systems.

Source: summarised from UNEP MPN 2021

6.5 How can the transformative potential be enhanced and what gaps remain?

The analysis has identified several proposals for actions and solutions with high transformative potential: in particular to address the challenge of current production and consumption patterns exceeding biophysical capacities of the planet. These include redirecting finance, changing incentives, mandatory supply chain legislation, and ensuring that rights of investors do not limit the possibilities of states to enforce human and environmental rights. The agri-food system is a good place to start as it directly impacts all of the commons analysed, and is characterised by persisting global and local inequalities. Regarding the first four building blocks for transformative change, the following gaps remain.

Vision: There is a need for a set of mutually compatible compelling new narratives to motivate and guide transformative change conducive to the global commons. These cannot rely mainly on biodiversity but need to address economic and social concerns.

There is a clear understanding of the transformative challenge; especially the fundamental criticism of the 'old model' is well developed, but we were unable to identify a compelling new narrative in the assessment reports. Given the scope of the problem (global restructuring of many core production systems, agri-food, energy and infrastructure, and the need for far-reaching changes in consumption) makes it difficult to formulate one compelling alternative. More specific new narratives formulated at different levels appear better suited to support the required changes. Such a set of compelling narratives is largely missing. Sustainable development at the global level can serve as a common goal, with the SDGs spelling out what is needed in different sectors as well as how to improve decision making. Specific narratives for subsets of challenges should ensure these are compatible with one another and conducive to the overall goal.

Knowledge: The most important gap is knowledge on system change, on how to support the transformation of global production and consumption patterns and to address inequality.

Assessment reports are clear and agree that the way we produce and the amounts we consume (and waste) at global scale are too high and destructive for the planet's ecosystems and biodiversity. Current levels of inequality make the sustainable management of global commons more difficult if not impossible. While some action on this can be taken at the national and local levels, it seems unlikely that transformative change will be possible without global efforts to change production and consumption systems and address inequalities. There are ideas on how to start the process, e.g. by 'coalitions of the willing' or regional initiatives (Bulkeley et al. 2020). However, there are few if any suggestions on how to build sufficient momentum for global changes fast enough and how to address the very well-organised vested interests that want to maintain the current unsustainable system. Research on systems change, experiments and enhanced exchange, the willingness to take political risks and build new alliances are some of the ideas that could help acquire this missing transformative knowledge.

Dynamics: The biodiversity agenda should be linked up with the agenda of managing the global pandemic and the climate change agenda; else, there is little hope for 'bending the curve' in time. The need for transformation is far-reaching and we have not found clear outlines of the overall challenge that could help navigate and nurture changes towards sustainability.

Despite increasing urgency, there have been few changes regarding the success of biodiversity strategies both at global and country levels. This is a strong indication that the biodiversity agenda in isolation is unable to address the issues on the table. Climate mitigation and adaptation strategies can be either biodiversity-friendly and lead to mutually reinforcing positive outcomes, or highly destructive for biodiversity and as a consequence lead to mutually reinforcing negative outcomes. The strong interlinkages, as well as much greater political awareness are strong arguments for joining efforts. All the issues of the global Covid-19 pandemic currently at the top of political agendas will make it practically impossible for biodiversity issues to capture

broad attention on their own but, given strong linkages, they could well be addressed jointly.
Halting loss and degradation of all three commons analysed as well as climate change and global pandemics require far-reaching changes in major economic sectors and lifestyles. While the literature clearly shows such a transformation cannot be anticipated or planned in detail, our framework suggests that shared system transition proposals can orient changes and make it more likely that transformations increase sustainability.

Emancipation and agency: Taking cultural diversity seriously and opening spaces for debate on how we want to live is essential to achieve much-advocated value change and to find ways for a good life and decent living for all without degrading the global commons. This is especially important in light of strong resistance to change to be expected from those who benefit from the current system.

Closer involvement of indigenous and local people is necessary, but not sufficient to achieve transformative change that safeguards the global commons. Far beyond functional considerations, reliable mechanisms must be established that guarantee full agency and decision-making powers for diverse groups of actors and their perspectives; the debates around food sovereignty are a prominent case in point. (Re-)opening spaces for debate and self-determined decisions on how to achieve a sustainable management of global commons and decent living conditions for all is essential to achieving the transformations considered necessary. Legal provisions are recognised as essential leverage points, especially regarding land rights. Not least for the coastal and marine realm, 'extractive reserves' offer an example of new, potentially emancipatory legal institutions for managing the global commons.

Another important point made here is building the capacity of stakeholders, decision-makers and institutional actors about what transition entails and what is needed with regards to their roles and positions. FAO-UNEP (2020) echoes this point and mentions the importance of enhanced environmental literacy specifically as a way to overcome resistance. The following Chapter 7 illuminates another perspective as it examines projects for their transformative potential, before Chapter 8 brings all the analyses together.

7 Experience from practice for inducing transformative change

STEP 4

Analysis of projects
Semi-structured interviews

What can be learned from practice?
How do projects reflect elements of transformative change?
How can projects be designed to be more oriented towards transformative change?

As global assessments often tend to provide abstract conclusions and a top-down perspective, we complement them by analysing two sets of specific projects.

A first set of six projects analysed were international cooperation projects in which several authors from the UFZ team were personally involved as scientific project partners within the last ten years. Five of the projects were funded by the German Ministry of the Environment's International Climate Initiative (BMU-IKI). The UFZ contribution to the projects builds on the insights of the international TEEB initiative (The Economics of Ecosystems and Biodiversity) and applies an ecosystem services perspective to strengthen environmental policy and planning and to mainstream biodiversity into other sectors.

The second set of nine projects and programmes are BMZ-funded and implemented by GIZ and/or KfW. The projects were selected by GIZ as relevant for transformative change based on key issues identified in our analysis of recommendations from international assessment reports. The information from these projects was obtained via semi-structured interviews with the project managers (see Chapter 2/ Appendix 1).

The main question for the analysis is what can be learned from the project experiences on how to increase the transformative potential of future projects that aim to conserve or improve the state of the global commons addressed in this study: biodiversity, natural forests, and the ocean. The projects were assessed along guiding questions that corresponded to the structure of the building blocks of our transformative change framework.

7.1 Projects analysed

7.1.1 Projects with UFZ involvement

ECO-BEST: ECO-BEST was a four-year project (2011–2015) that aimed at using economic and financial instruments to combat terrestrial biodiversity loss in South-East Asia and at the same time to empower and benefit local communities. For this, the Ecosystem service opportunity (ESO) methodology was developed. The project was financed by the European Union with co-funding from the Thai government. It was coordinated by GIZ Thailand, with UFZ and the Thai Department for National Parks (DNP) as project partners.

Methods for integrating ecosystem services into policy, planning and practice (ValuES): ValuES was a five-year project (2013–2018) coordinated by GIZ and funded by BMU-IKI. The project aimed at supporting experts and decision-makers in ministries and organisations in selected partner countries to consider ecosystem services and biodiversity in planning and policy processes. It developed an

inventory of methods and provided case studies and capacity building tools to guide decision-makers and practitioners in the selection and application of methods for policy-oriented ecosystem service assessments.

Unlocking Forest Finance (UFF): The goal of the BMU-IKI financed UFF project (2013–2018) was to develop innovative financing mechanisms for forest protection in three regions in the Amazon (Acre, Mato Grosso, San Martin) to support the region's sustainability objectives, focusing on the protection of biodiversity and ecosystem services through more sustainable land use and reduction of deforestation. The project was coordinated by the Global Canopy Programme (GCP) and implemented by several partners across Europe and Latin America.

Biodiver_CITY: The Biodiver_CITY project (2019–2021) is coordinated by the GIZ and financed by BMU-IKI. UFZ as project partner contributed by adapting ESO methodology and an interactive atlas approach. The project supports integrating ecosystem services and interurban bio-corridors into sustainable urban planning in Costa Rica, where rapid urban expansion in and around San José greater metropolitan area (GAM) is threatening natural ecosystems and biodiversity, there-by affecting public health, urban infrastructure, and economic sectors locally and nationally.

Transforming the Orinoquía by integrating nature's benefits into sustainability agendas (TONINA): The TONINA project (2018–2022) is funded by BMU-IKI and coordinated by GIZ Colombia, with the Colombian Ministry for Environment, Alexander von Humboldt Research Institute and UFZ as implementing partners. The project works together with national, regional and local authorities and the private sector to promote sustainable land use and agricultural practices in the Orinoquía region by integrating the benefits of nature into planning and decision making.

INTERACT-Bio: The INTERACT-Bio project (2017–2022) focuses on supporting the administrations of fast-growing cities in India, Tanzania and Brazil, where metropolitan regions are under particular stress due to high demand for water, air and land. The project provides guidance on demand- and user-oriented analysis of ecosystem services to enable policy makers to anticipate the socio-economic consequences of nature loss and to take necessary countermeasures to ensure more effective protection of their surrounding ecosystems. It is financed by BMU-IKI, coordinated by ICLEI with UFZ as project partner.

7.1.2 Projects implemented by GIZ/KfW

Pro2GRN – Cote d'Ivoire: Governance and sustainable management of natural resources in the Comoé and Taï regions: The project (2020–2024) supports stakeholders in rural, agricultural areas surrounding the two national parks Taï and Comoé. Commissioned by the BMZ and co-financed by the European Union, the project's aim is to increase household revenue and thereby to reduce pressure on the national parks and their resources. The project supports farmers introducing new agricultural techniques with the potential to improve agricultural productivity. It also supports farmers to better self-organise themselves and consequently raise their revenue. On the other hand, the project works with the protected area agency to improve their management capacities, specifically focusing on governance of local sustainable use agreements for the natural resources available. Special focus is put on the dialogue with stakeholders around the national park, communities and the private sector. Interestingly, the leading executing agency is the Ministry of Agriculture and Rural Development (MINADER).

REDD Early Movers: Launched at the Rio+20 Conference in 2012, REDD Early Movers (REM) is an initiative that rewarded pioneers of forest protection and climate change mitigation. It is funded by the German BMZ and BMUB and in parts by the "GNU coalition" of Germany, Norway, and the United Kingdom. It provides performance-based payments for verified emission reductions from deforestation, thereby piloting REDD+ in line with the decisions agreed upon under the United Nations Framework Convention on Climate Change (UNFCCC) and enables future emission reductions through results-based political milestone approach. At least 60 per cent of these result-based payments are reinvested at the local level in programmes for indigenous people, local communities, smallholder farmers and small and medium enterprises as well as for strengthening REDD+ institutions and policies. Local level actions supported deforestation-free and low-carbon livelihoods, aiming for a long-term transition of larger jurisdictions/countries towards sustainable deforestation-free growth.

The programme is active in four jurisdictions: Colombia, Ecuador, and the Brazilian states of Acre and Mato Grosso. New phases of the REM country programs have recently started or are under development to address rising deforestation trends worldwide.

Programme for Sustainable Agricultural Supply Chains and Standards: The Programme for Sustainable Agricultural Supply Chains and Standards (2017–2020), commissioned by the BMZ and implemented by GIZ, was a global transnational programme that focused on agricultural resources such as coffee, cocoa, bananas, soya, rubber, palm oil and cotton. The aim of the holistic programme was to ensure fair production and trading conditions, thus enabling people in global agricultural supply chains to lead a dignified life by earning a "living income". This initiative works with a jurisdictional approach to ensure that an entire area, instead of individual production units, has been transformed into a sustainable and deforestation-free resourcing region. Pilot initiatives that supported smallholders ran in different Westafrican countries, as well as in Ethiopia, Mozambique, Colombia and Rwanda, by strengthening cooperatives, creating producer associations and helping them in improving production. Objectives included positioning the agrifood sector as a modern and attractive field of employment, and to stop the destruction of forests. For this, national and international cooperation between actors from the private sector (businesses, science, civil society) and the specific local and national governments were supported: Specialist advisors improved working conditions, wages and processing standards by addressing all actors in the entire supply chain.

Conservation and Sustainable Use of Biodiversity in India: Following the international 'The Economics of Ecosystems and Biodiversity' (TEEB) study, the India Initiative (2012–2020) assessed the economic value of biodiversity and ecosystem services. TEEB India intended to mainstream biodiversity and ecosystem services as factors in development planning and decision-making and thereby enhancing the effectiveness of conservation and management of three priority ecosystems in India: forests, inland wetlands, as well as coastal and marine ecosystems. The project was commissioned by the BMZ and implemented by the Indian Ministry of Environment, Forest and Climate Change (MoEFCC), and GIZ. Twelve field-based primary ecosystem services assessments were carried out by multi-disciplinary teams. The results were then distributed and communicated in science-policy forums on a regional level, nationally and internationally.

Contribution to Peru's environmental goals (ProAmbiente): The ProAmbiente project (2014–2021) strengthens Peru's steering and implementation capacities for effective environmental and forest governance at national and regional level and promotes linkages between environ-mental policy and other relevant policy fields. The project funded by the BMZ advises mainly the Ministry of Environment (MINAM) and its subordinate authorities as well as the Ministry of Agriculture (MIDAGRI[6]) and its subordinate forest authority. The project focuses on the technical level and organisational development in order to improve the conditions for efficient environmental management (through, e.g., improving environmental impact assessment and enforcement), make progress in the protection and sustainable use of biodiversity, implement more efficient procedures for granting rights for sustainable use and tourism in protected areas, secure long-term funding for protected area management, and promote the sustainable use of natural resources in protected areas and buffer zones. Further, the project aims at strengthening sustainable forest management. Forest monitoring processes were made more effective and compliance with international standards was demonstrated as part of ISO certification.

Eco.Business Fund: The Eco.business fund initiated by KfW promotes business and consumption practices that contribute to biodiversity conservation, the sustainable use of natural resources, and the mitigation of climate change and adaptation to its impacts. By providing financing for business practices that conserve nature and foster biodiversity, the fund seeks investments with both environmental and financial returns. The fund raises capital from an initial base of public investors and from donors who provide a risk cushion for private institutional investors. It mainly provides loans for qualified financial institutions that act as intermediaries and on-lend the money to eligible borrowers. Intermediaries can be local financial institutions with whom the fund works to provide funding to businesses, producers, or commodity buyers seeking to enhance the sustainability of their supply chains. The fund supports sustainable operations in the sectors of agriculture, fishery (including aquaculture), forestry and tourism. Investees receiving financing must

[6]called MINAGRI until October 2020

either adhere to an eligible sustainability standard, implement one of the practices outlined in a "Green List" or support a practice fully aligned with the fund's mission. In addition, fund beneficiaries – whether intermediaries or directly funded businesses – can access technical assistance provided by the respective eco.business Development Facility.

Caribbean Biodiversity Fund (CBF): The Caribbean ecosystem is one of the five most important hot spots of marine biodiversity. To create reliable, long-term funding for conservation and sustainable development in the Caribbean region, the CBF was established in 2012. Endowment capital is provided by the German Government through the German Development Bank (KfW), The Nature Conservancy (TNC), the World Bank and the United Nations Development Programme (UNDP). In addition, investment projects are being prepared with other donors. The overall developmental objective is the conservation of natural resources and the protection of biodiversity as well as the strengthening of the resilience of the people in the Caribbean against climate change through long-term financing of measures. Eight countries and territories have joined together to form the Caribbean Challenge Initiative (CCI). One goal was to protect at least 20 per cent (7 million hectares total) of Caribbean marine and coastal zones of member states by 2020. These countries have already established National Conservation Trust Funds (NCTFs) that receive funding from the CBF to support their national protected areas. The investment returns generated from the endowment are disbursed to the CBF member NCTFs which select the measures to be funded through national calls for proposals. The CBF disbursements are counter-financed by matching grants from the NCTFs, aiming for a 1:1 match after an introduction phase. Thus far, disbursements have been made to eight NCTFs. Currently, there are three countries with "grants on the ground" where conservation measures are being implemented.

7.1.3 Additional marine conservation projects

Science for the Protection of Indonesian Coastal Ecosystems (SPICE): SPICE was a research project (2003–2016) funded by BMBF as a research cooperation between Germany and Indonesia. The projects overarching goal was to address the scientific, social and economic issues related to the management of the Indonesian coastal ecosystems and their resources. In addition to strengthening the existing scientific data base on coastal ecosystems, the programme promoted capacity and infrastructure building in the marine sector in Indonesia and Germany. The programme has been carried out in cooperation among partners from several Indonesian and German universities and government research institutions. SPICE made substantial inputs towards fulfilling regional and international obligations of the two countries as entailed in international conventions and treaties.

Coral Reef Rehabilitation and Management Program (COREMAP): COREMAP started in 1998. It is an ongoing programme now in its third phase, expected to end in 2022, called the COREMAP-Coral Triangle Initiative (COREMAP-CTI). The programme was proposed by Indonesia with a focus on development, capacity building and management for local and national stakeholders. It is financed by the World Bank, Asian Development Bank, and Global Environment Facility. COREMAP aims at establishing viable, operational, and institutionalised coral reef management systems in priority coral reef sites in Indonesia. The project focuses on capacity building, community-based management, and public awareness as well as on the creation of income-generation alternatives for coastal communities, and the involvement of villagers and non-governmental organisations (NGOs) in protected area management.

7.2 Findings from projects

Box 13 provides an example how we used the framework on transformative change to reflect on the projects. It provides the questions and summaries of the answers for the Unlocking Forest Finance project.

Box 13: Unlocking Forest Finance – how could the project be more oriented towards transformative change

General project information

• The Unlocking Forest Finance (UFF) project has, between 2013 and 2019, worked on developing innovative financing mechanisms for forest protection at jurisdictional level in the Brazilian states of Acre and Mato Grosso and in the San Martín Region in Peru. The UFF project was financed by the German government's International Climate Initiative (IKI), coordinated by The Global Canopy Program (GCP), an Oxford based NGO, and implemented by a consortium of 12 institutions. Local implementing partners, based in each of the three regions, were in charge of working with local governments, associations and other stakeholders, as well as data collection and analysis that contributed to the work of the academic project partners. Local partners also ensured that the project outcomes were aligned with jurisdictional objectives. Several project partners had specific technical mandates, such as for instance land-use change modelling, climatic modelling, cash flow analysis, or ecosystem service assessments. See Rode et al. (2019) for more information.[7]

Transformative vision

Does the project build a transformative vision?

• The project's vision was quite ambitious as it wanted to make notable contributions to halting deforestation by addressing one of its main drivers: agricultural production. The idea was to specify and help provide the financing for the regional governments' sustainable development agendas. While not explicitly transformative, the project constructed "transition plans" for more sustainable agricultural land use/management for different crops ("supply chains") such as beef, milk, soy, palm oil, Brazil nut, etc. This means desirable projections of how much more would be produced on which area and under which management. The transition plans are based on regional plans and stakeholder opinions, therefore quite realistic and with a tendency to extrapolate current trends.

What is the Theory of Change behind the project?

• The idea was to achieve implementation of the transition to sustainable land use and forest protection by raising finance from different (international) sources. Enabling policies are also taken into account.

• An important assumption was the possibility of "sustainable intensification", where more productivity and use of degraded land allows to spare natural habitat from agricultural use and decrease deforestation pressure.

• Underlying assumption of win-win possibilities with more economic gain of more sustainable agriculture (only initial investments for transition).

Does the project contribute to a change of narrative? How so?

• The new narrative was: "produce more on the same area to enable sustainable growth in agriculture without further deforestation" which entails a shift from 'growth based on expansion' to 'sustainable growth'.

What could the project have done differently to be more oriented towards transformative change here?

• Perhaps build more ambitious landscape level visions, how people would like to work and live from and with nature, based on a larger set of ecosystem services rather than prioritizing agricultural production.

• More emphasis on how to stop deforestation, which requires strong regulation or competitive other uses in order to stop conversion to agriculture.

Transformative knowledge

What measures for knowledge generation does the project promote, and do they have sufficient transformative potential?

• Building transition plans for single "supply chains" neglected interactions and constraints of the system.

• Focus on finance needs and how the finance sector can be convinced to contribute neglected other barriers to change (capacity, traditions, political situation, etc.).

In particular, have the relevant sectors been included?

• To some extent (farmer associations, companies, etc.), but mainly environmental authorities involved. Finance sector did not contribute to defining on-the-ground investment propositions and there was no.

Do they follow a strategic approach to knowledge for system change?

• Ecosystem services valuation as strategy to make the case for overall transition. Modelling scenarios to show impacts of transition to policy-makers.

What could the project have done differently to be more oriented towards transformative change here?

• Robust system understanding, then zoom in (but easier said than done...).

• Assuming that sustainable use (internalizing environmental costs) will compete with unsustainable use that can continue without this requirement could have

• Plausible assumptions with critical thinking about blind spots and unintended effects.

• More precise and honest account about expected yields of desirable agro-ecological management, which are probably lower than BAU production ("case for investment" assumed that yields will increase from sustainable management).

• More knowledge on how to transform the finance sector.

Transformative dynamics

Outline the two curves: what is to be replaced? What can possibly replace it?

• Ambition to replace unsustainable agricultural production (phase out) by providing finance for alternative more sustainable management.

[7]Rode, J., et al. (2019), Why ‚blended finance' could help transitions to sustainable landscapes: Lessons from the Unlocking Forest Finance project, Ecosystem Services 37, 100917.

Box 13 cont.

Has the project and/or recent political measures taken transformative dynamics into account? How so?

- Difficult to say. The project worked based on sub-national regional plans, which may include dynamic considerations. But the dynamics of a change process were not explicitly addressed in the project.

In particular, is anything done to destabilise.... phase out the unsustainable system?

- No, see first question, the idea was to replace harmful agricultural production with more sustainable management, using degraded land. It was assumed that switching would occur once finance is available.

What could the project have done differently to be more oriented towards transformative change here?

- Think more about making unsustainable agriculture less attractive and how to stop it.

Emancipatory power & agency for transformation

Whom does the project enable in the sense of political agency?

The projects supported with technical capacity, mainly information:

- Regional authorities: scenarios for future agricultural land use and ecosystem service assessments to help them make the case for sustainable development trajectories.
- Land users/agri producers: how to make investment proposals.
- Finance sector actors: green investment options.
- Peruvian agri-bank: how to design a green credit mechanism (which ultimately was not taken up).

Has resistance been anticipated and addressed? (or have measures been chosen that will not create resistance)

- Resistance was largely avoided by focusing on win-win options and by constructing scenarios that mainstream agriculture can interpret it in a way that is not seen as dangerous to their ambitions.

Did the project open up spaces for emancipatory (public) exchange?

- Probably rather not.

What could the project have done differently to be more oriented towards transformative change here?

- Indigenous people were only marginally included (was regarded as too difficult).
- Addressing those actors in the finance sector that might have been willing to take the risk and or forgo some income in order to make the sustainable option more viable could have opened spaces for enabling actors at the local level.

Actions & governance

Their impact/success depends on the right governance modes (how?), the right actors (who?) and instruments (what?)

How? Inclusive governance:

- Who? Key agents of supply chains were identified, but not power regimes, discourses, values. 'Losers' from sustainable production and their losses were not considered.
- What? Direction and goals were accepted, since not very fundamental change and in line with regional development plans. Means and instruments to achieve a broader transformation were not clear, but the instrument of directing finance towards sustainable production was accepted. Final outcomes in the sense of implications across society were not really considered. Processes were held manageable (sub-national level, no involvement of indigenous, no inclusion of illegal activities, avoiding conflict).

How? Accountable governance:

- Who? No, leadership from key agents in finance and agrisector missing. Regional governments have some mandate and some leadership, but cannot implement alone.
- What? Responsibility gap with big corporate players driving large-scale agricultural expansion. "Sustainability roundtables" (e.g. soy, beef) ambitions too low and no accountability (voluntary reporting). Little responsibility for adverse effects of agricultural expansion.

How? Informed governance:

- **Who?** While local information was included, the project did not contribute to enabling local decision makers to incorporate relevant knowledge and feedback in their governance.
- **What?** Social & environmental safeguarding were included alongside economic and financial calculations when developing options for sustainable agriculture.

How? Integrated governance:

- **Who?** Key agents interested in and knowledgeable about specific causes and dynamics at the local level were not included. So while the concept was integrative by addressing another sector (agriculture as driver of deforestation), it did not integrate across sectors in implementation.
- **What?** Nonetheless by integrating social & environmental safeguarding, there was some integration across sectors in terms of content.

How? Adaptive governance:

- **Who?** Attempts to involve important actors, but no focus on involving particularly powerful 'champions'. There were feedback loops in the project and lots of learning, but not so much related to learning in policy processes.
- **What?** In Brazil importance to build on and improve implementation of the Forest Code policy. With respect to finance, need for innovative experimentation. Enabling conditions unfortunately not met in most cases (e.g. farmer associations, local bank branches with direct contacts, technical capacity, etc.).

What could the project have done differently to be more oriented towards transformative change here?

- Analysing the governance part shows that while the project took several important dimensions into account on a content level: addressing the what? In a reasonably informed, adaptive and integrative manner, it failed to strategically involve the relevant actors and enable them to better take care of the "what" in their future work.

What can we learn from this project?

In project design a more convincing overall narrative, resolving problems such as leakage and an approach to make the unsustainable option less attractive (and thereby improving the competitive potential of the sustainable option) would have greatly improved both the transformative potential as well as the overall likelihood of achieving largescale success towards project goals. Identifying the venture sustainability actors in the finance sector in the project design would likely have unlocked additional potential. In project implementation focusing more on strategically involving and enabling key actors seems like a good option to enhance transformative potential.

1 Transformative vision

Developing a compelling transformative vision is of value, even if achieving this vision goes beyond the project's scope

Deliberative processes with key stakeholders can be used to create a common (transformative) vision and discourse on how people would like to work and live from and with nature [ECO-BEST, TONINA, Eco.Business Fund]. This deliberative vision building, for instance in a project's scoping phase, is essentially a 'social process' and not an expert output [ECO-BEST, TONINA]. If this process guides project implementation, project activities will fit into the wider vision of a transforming society. With a 'higher level vision' to connect to, a project may then focus on narrower aspects and still serve the overarching vision [REDD Early Movers]. As they sketch out or refine transformation visions and narratives, project partners may also become aware of their implicit assumptions and develop a shared understanding of the drivers of (e.g. land use) change, underlying root causes, and potential leverage points. Anticipating resistance can be a very useful reality check for a project's Theory of Change. Thereby, the transformative ambitions of the project itself also become clearer. An alternative vision such as 'conservation for development' instead of 'conservation to defend against development pressures' may seem weak as long as it is presented in abstract terms, but it can gain momentum when it is made more concrete and applied as joint pursuit of conservation, e.g. for eco-tourism or agriforestry in the landscape [ECO-BEST, Pro2GRN – Cote d'Ivoire]. It can be a large success in itself if a project achieves that key people come to adopt expanded visions and interdisciplinary or intersectoral framings aligned with sustainability, e.g. when national parks authorities recognise the importance of agriculture, or senior national policy advisors or policy makers themselves adopt an interdisciplinary scope on marine issues. The impact or outcomes of key people adopting expanded or transformative visions can be traced in subsequent actions/articulations, even much beyond the timeframe of the project [ValuES, TEEB India].

Transformative visions and narratives should seek to challenge dominant growth paradigms without directly opposing them

'Rapid economic growth raises people out of poverty' is a predominant paradigm in many countries. 'Ecosystem services are a lifeline to the poor' constitutes an alternative narrative. It can contribute to deconstructing that 'environment and economy are irreconcilable' and to support the argument that economic growth should 'become constrained' or 'be guided' by policies that ensure 'intact ecosystems' [TEEB India]. 'Natural capital is a key asset for economic development' does not directly question "growth", but strengthens environmental protection to safeguard long-term economic potential. The idea of 'necessary growth' will ultimately have to be replaced by the objective of 'meeting society's needs'. To resonate in public debates, transformative visions have to start from, or be connectable with 'mainstream realities', but they should offer diagnoses or framings that make alternative pathways attractive and feasible [ValuES].

Narratives can connect environmental issues to other societal objectives

Narratives should make use of the multiple connections between environmental commons and diverse other 'non-green' topics of societal importance. Connecting environmental issues with strong 'non-negotiable' arguments such as 'respect of human rights' and ensuring a 'living in-come' can considerably strengthen the sustainability narrative [Programme for Sustainable Agricultural Supply Chains and Standards]. The Covid-19 crisis involves an opportunity to connect environmental protection with public health [ProAmbiente]. In the marine and coastal realm in particular, social and economic conditions are closely linked to environmental issues and must be addressed together to achieve long-term, sustainable change [CBF].

2 Transformative knowledge

Taking a systemic perspective, and going deep where it is necessary

For understanding the entry points and levers of transformative change, a systemic perspective requires collective analysis across sectors, knowledge types and research disciplines. This could happen as early as the project design phase, for which longer lead times would help [SPICE]. Also, the dimensions of interests, political power, and agency needs to be (at least roughly) understood, because this is the decisive dimension for projects to drive transformative change. Especially under conditions of corruption and hidden agendas, understanding and mapping power relations is useful [REDD Early Movers, ProAmbiente]. Options are to involve political actors directly in the project, or to set up formats for trustful exchange with them.

Taking a systemic perspective also includes that prior to action attention is paid to examining the validity of underlying assumptions and to ensuring an appraisal of potential unintended side effects. This may be an 'uncomfortable task' in that it bears the risk of revealing necessary project changes. It requires more flexibility in project design and in project evaluation indicators. In case of such revelations, the systemic understanding should of course be refined based on new insights throughout project implementation [ECO-BEST].

Also, a balance needs to be struck between the desire for comprehensive system understanding and certain limits to understanding all the details of system elements, which may not be feasible in light of resource or time constraints [INTERACT-Bio]. Moreover, for many issues the degree of detail, precision and certainty of knowledge needed for decision-making can be much lower than scientific researchers would assume.

Organisational development and change management can provide tools and inspiration for wider systems change

Reforming institutions and improving policy implementation are essential parts of systems change. For this, knowledge is necessary on how organisations, in particular government organisations, function within their socio-political setting and identifying who is in a position to change how they operate and what motivates these actors to make such changes. Organisational development and change management can provide tools and inspiration for wider systems change. One example is force-field analysis with an iterative process of mapping actors, analysing their roles and power as hindering or promoting changes, as well as the external barriers and enablers (e.g. laws, resources, political setting). This helped to understand the widespread and systemic role of corruption and the consequences of political instability [ProAmbiente].

A multitude of different knowledge types needs to be integrated

Integrating the various forms of knowledge is key to achieving transformative change. For instance, local (academic and non-academic) organisations are highly relevant for transformation (projects), regarding their knowledge, their contextualisation skills, but also their influence on future administrators and discourses as teaching institutions [REDD Early Movers]. In addition, projects should promote exchange and facilitate collaboration between social and natural science experts to substantially revise and enrich a shared environmental problem framing (e.g. in scientific policy advisory structures as well as future research) [TONINA, TEEB India]. In many contexts, indigenous and experience-based knowledge is highly relevant, e.g. on traditional resource management, yet it should be kept in mind that the elicitation of such knowledge can be prone to biases and wishful thinking. Moreover, integrating local knowledge is in itself a political act, and the emancipatory potential of articulating such knowledge (and underlying framings] is sometimes as relevant for transformative change as the actual content of the knowledge [Biodiver_CITY].

Enhancing transformative knowledge is also about skills and communicative abilities

Generating and exchanging transformative knowledge requires enhancing the integrated strategic thinking capacities and communicative ability of many actors. Communicative ability includes "translating" between sector-specific "languages" (e.g. of different ministries in Germany, NGOs, ministries in partner countries, private sector representatives, EU institutions, and producer cooperatives – including simplification where necessary); it also includes networking, empathy, patience, and listening skills [ValuES]. Project partners have been introduced to – or confronted with – a series of promising concepts over past decades by donors and implementing agencies. Yet their role in co-shaping such concepts (which often provide the justifying framework for project interventions), was arguably limited.

To raise awareness about the role of intact ecosystems and their services for agricultural development, e.g., you need both systemic knowledge and the ability to co-explore with stakeholders in appropriate language how their own lives depend on them [TONINA, REDD Early Movers, Programme for Sustainable Agricultural Supply Chains and Standards]. For channelling finance to sustainable and conservation-friendly agricultural practices, finance institutions and farmers or conservation organisations need spaces and support to find a common language and come to mutual understanding [Eco.Business Fund]. Communication of programme benefits and a shared vision to the broader population in the partner countries (communication campaigns, using social media, etc.) will help disseminate transformative knowledge [REDD Early Movers].

3 Transformative dynamics

Don't shy away from phasing out unsustainable practices

Projects have a tendency to focus on phasing in innovative ideas and piloting or up-scaling sustainable practices [ECO-BEST, UFF, TONINA]. However, both phasing in and phasing out are necessary for transformative change. Projects should hence directly pursue both strategies and in particular also aim at phasing out unsustainable practices and their incentives and regulations. This also has implications for the choice of policy partners. Working towards 'phasing out' unsustainable practices requires anticipation and management of resistance from those who have an interest in maintaining the current system [Biodiver CITY]. The need to mobilise political momentum and to create alliances for driving transformative change processes that phase out the currently dominant paradigms or production systems, is often beyond the scope and timeframe of projects [INTERACT-Bio, Pro2GRN – Cote d'Ivoire]. Also, the cooperative 'spirit' of projects, as well as (donor) expectations of project success, lead to avoiding difficult terrain, such as challenging vested interests or profitable but unsustainable practices [ECO-BEST, TONINA]. Making the case for the need and usefulness of such approaches will probably require additional effort, but policy entrepreneurs can be found in many countries and actively searching for such alliances may well be worthwhile. Longer funding cycles are considered useful (6+ years), as are programme designs that allow for an explicit focus on tackling resistance to change from powerful interest groups.

In such programmes, scientific and policy advisory have to partly move out of their 'comfort zone' of established routines and partnerships, and combine or replace them with strategic support for structures which pursue civic articulation and emancipation [TEEB India]. This can bear risks for established work relations – and such risk needs to be weighed up against the potential of stimulating transformative momentum.

Support conditions for long-term transformative change dynamics

Transformative change requires careful management of dynamics and actual implementation depends on preconditions. In many countries this concerns planning processes and capacities as well as institutional or organisational changes. Particularly in highly volatile political situations with rotation of political and technical personnel, knowledge transfer and learning processes are hampered [ProAmbiente]. In these conditions, international cooperation can serve as institutional memory and is therefore in a good position to support change dynamics and the implementation of laws and regulations over longer periods of time [Biodiver_CITY]. Development collaboration can also help formulate clear roadmaps and support processes to put them into action. International cooperation can work with authorities to identify and tackle underlying barriers for transformation dynamics, such as corruption [ProAmbiente]. Importantly, not only governmental actors need to be included from the onset, also cooperation and coherence with the private sector is important to increase the acceptance of the initiated processes and thus to ensure the sustainability of their implementation [CBF].

4 Emancipation and agency

Facilitate societal dialogue and co-design on visions and strategies

Broad societal dialogue and co-design of visions and strategies are crucial both for the legitimacy of change processes as much as for increasing the probability of actual change to hap-pen [ECO-BEST, Biodiver_CITY]. Development cooperation can facilitate such dialogue and co-design. Yet, the most disadvantaged segments of society are often the hardest to reach and engage in a project (women, youth, unorganised smallholders, etc.). They are also highly vulnerable to bigger changes. Very deliberate, specific and sustained efforts are needed to involve them throughout programme design and governance [REDD Early Movers]. It is also important to explicitly consider agency: who needs to act, who has the power to change things? Grassroots level initiatives may have to be strengthened to not only advocate their cause, but also to open up spaces for political debate and for negotiating collective sustainability action [ECO-BEST, INTERACT-Bio].

Promoting cross-sectoral collaboration and strategic planning

The executive branch in many countries is vertically structured by sectors. The transversal claim made regarding environmental policy and thus its institutions is therefore often a serious point of conflict and is frequently met with a retreat to minimal core issues by the environmental institutions [ProAmbiente]. But as the 'force

field' for transformative change must extend far beyond the environmental institutions, this conflict must be tackled. Jurisdictional approaches are needed and imply coordination and strategic planning across sectors. The idea of establishing "sustainable sourcing regions", for example, is meant to ensure that production increases in agriculture actually prevent deforestation rather than creating leakage effects [REDD Early Movers, TEEB India, ProAmbiente]. Development cooperation can play a critical role in connecting sectoral authorities and facilitating constructive exchange. Exchange platforms to 'think outside the box' at the highest level (intergovernmental negotiations) can give a boost for in-depth change beyond sectoral boundaries [ProAmbiente]. Cross-sectoral collaboration (e.g. between conservation and agriculture) is often difficult to establish because of disincentives (extra efforts, unclear leadership and visibility, different sector objectives, concepts, jargons). The involvement of hierarchically superordinate institutions (Presidential Offices, Planning Ministries, etc.) can be very helpful for managing intersectoral coordination [Pro2GRN – Cote d'Ivoire].

Furthermore, inter- and transdisciplinary work (integrating different scientific disciplines as well as non-scientific actors) plays a crucial role in developing multi-track research approaches [SPICE, COREMAP]. Development cooperation can serve as a 'disinterested' convener or facilitator by providing platforms and events to help overcome these barriers. The collaboration between development cooperation and research should be further strengthened: it is mutually beneficial [SPICE].

5 Transformative Governance

Many aspects covered under blocks 1 to 4 above also relate to governance for implementing action and solutions. The following additional insights resulting from the project analysis deserve being mentioned or further emphasised:

- Who articulates a message is at least as important as the message itself. The selection of experts and communicators between science and policy influences the uptake of information. Renowned experts who are continuously committed throughout the project because they take on ownership are an important step for the transformative change idea to resonate with decision-makers.
- When the activities of local grassroots champions are supported as part of actions and solutions, elements of trans formative change can often be more aligned with the perspectives and aspirations of local communities, which can improve the acceptance of new solutions [ECO-BEST, Pro2GRN – Cote d'Ivoire].
- It often helps to build on and further develop traditional land use practices and institutions, as well as local knowledge or ways of dealing with issues, rather than imposing accepted and tested concepts from different contexts [Pro2GRN – Cote d'Ivoire].
- Special attention needs to be paid to understanding the effects of proposed solutions for the different social groups and to minimise the socio-economic risks, especially of the most vulnerable groups.
- Multi-actor partnerships that involve all actors along a supply chain take time and patience to build – but interviewees see no alternative. Continuous communication efforts enable understanding, build trust, and help identify solutions that work for all [Programme for Sustainable Agricultural Supply Chains and Standards].
- Especially in conflictual situations, cautious and detailed, possibly iterative steps have to be taken to try out new approaches before making fundamental changes. In protected areas, e.g., national legislation ('no-take policy') often stands in the way of developing local sustainable use regimes. Yet, without a strong local sustainable use regime the implementation of more flexible legislation for protected areas will back-fire as it lacks locally accepted implementing/monitoring structures.
- In terms of project and portfolio development in both initial design as well as in further developing these, several projects highlighted the importance of improving interministerial coordination in Germany, as well as between financial and technical cooperation. An interesting observation was that this coordination usually works notably better if third parties are involved, i.e. if Germany and another country collaborate in supporting a project or initiative.

Concluding remarks

International cooperation projects often seek to overcome boundaries and establish innovative actions. Thereby they challenge usual practices and support introducing/developing new ways of thinking, manners of practical implementation and policies. These new ideas – reflected in people's action and speech – can create precedents and pilots that are taken on in a wider context. Ideally, all these incremental steps lead to a change that includes new ideas which – ex-post – turn out to be transformative.

The projects analysed for this study address the five building blocks of transformative change to varying degrees. While most of them had not formulated an explicitly transformative ambition, all hold potential to contribute to sustainability transitions.

All projects work on governance and include elements of several if not all properties of transformative governance (inclusive, adaptive, informed, integrative, and accountable). Concerning transformative visions, we found that visions were at times global, but vague and therefore not very conducive to mobilizing people, whereas at other times, visions were more local and concrete. The challenge to link local actions to global visions remains important for any project with transformative ambition, where elements of transformative knowledge, dynamics, and emancipation are important to help orient local actions to address global challenges in addition to solving local issues.

Questions of transformative knowledge were not centrally addressed by most of the projects. Pro-Ambiente with its emphasis on understanding and addressing barriers for change with systemic organizational development methods stands out as an inspiring example. Most projects with UFZ involvement focus on making knowledge on ecosystem services and who benefits or depends on them available for policy development and thus serve to generate action-oriented knowledge to support change processes that at least facilitate sustainable management of biodiversity.

Regarding transformation dynamics, our main observation is that, overall, phasing-out plays a limited role in project conceptualisation. Rather than addressing the root causes that are most harmful to the global commons, projects tend to focus on phasing in and piloting new ideas.

The BMZ-funded projects routinely support cross-sectoral cooperation and increasingly use jurisdictional approaches. Several projects increase agency of weaker groups by supporting them to organise. In projects financed by other donors, agency and empowerment are rather less developed; the main instrument used was capacity building. An exception was the ECO-BEST project in Thailand, which actively promoted the creation of new institutional arrangements to overcome administrative boundaries (a sub-river basin committee) and conflicts (buffer zone co-management between the national park authority and local communities).

Figure 19: Conclusions of project analyses based on the first four building blocks of the framework on transformative change

We conclude that the transformative potential of projects often lies in the combination of a longer-term vision for the project's topic, and the establishment of practices, institutional arrangements, policy instruments, as well as the induced technical capacity and financial means that can eventually go beyond the project's initial (geographical and social) scope and support a longer-term transition process. Development cooperation projects as politically supported opportunities to try out, raise awareness and acceptance for new approaches can thus give an important impetus for transformation. And yet, they could be used even more courageously to support the local generation of transformative ideas and to address unsustainable activities. As our analysis of transformative knowledge shows, transformative change requires taking higher risks and dealing with powerful, often globally organised resistance to change.

What does the project perspective add to the assessment report findings? The recommendations of international assessment reports tend to remain vague and disconnected across different domains of change. The more bottom-up and implementation-oriented perspective of concrete projects added a more complete view on the challenges and gaps of addressing transformative change in practical contexts.

Transformative change in order to enable sustainable management of global commons can only be achieved if action is taken at many different levels across a range of sectors. Development cooperation is but one element in this endeavour. This underscores the importance of interministerial coordination within Germany also between the different Ministries involved in international cooperation, and between financial and technical cooperation mentioned above (block 5). Similarly, it is crucial to support international efforts to change ground rules, such as establishing supply chain regulation so that companies operating in Germany are made accountable for social and environmental problems throughout their supply chain.

Box 14:

How useful is the framework on transformative change for evaluating projects?

We used the framework to analyse different characteristics of projects important for transformation. Especially analysing the projects we were involved in, allowed us to understand to what extent project activities contributed to dynamics, knowledge and agency and to reveal gaps in project design or implementation. Looking back on completed projects to rethink how they could have been more transformative was also an instructive thought experiment for both interviewers and interviewees, even in cases where not all of the guiding questions could be answered.

How useful is the framework on transformative change for project planning?

We find the framework especially useful for project planning. We have found it useful as checklist that helps to elaborate a Theory of Change, identify a balanced set of activities as well as partners, potential agents of change including multipliers/communicators, and to anticipate resistance. The formulation of a transformative vision, i.e. a vision that is ambitious on the one hand and realistic on the other, seems to be the most important first step upon which the project activities can be further designed. Well established project planning tools like stakeholder mapping, socio-economic assessments, etc. can be used and easily extended to identify potential agents of change or resistance. At the same time, socio-cultural assessments that take into account the voices of marginalised groups and traditional customs can generate important transformative knowledge. Moreover, such assessments can help design project activities that will likely be understood and acknowledged by local people and decisionmakers.

8 Main findings and implications

STEP 5

Deriving recommendations

Expert workshops

What recommendations for international collaboration and development cooperation can be derived for biodiversity, forests and the ocean?

In this chapter, we bring together our analysis of the findings of global assessments and the project reflections[8]. In Section 8.1, we synthesise the core challenges across the three commons analysed and identify the underlying causes for their continued degradation. This allows us to formulate ambitions to guide the transformation towards sustainable management of global commons. In Section 8.2, we use the conceptual framework to structure and prioritise measures for transformative change towards sustainability. The five building blocks of the framework (vision, knowledge, dynamics, emancipation and agency, and governance) constitute integrated elements. In the previous chapters, the framework was used for analysing the recommendations in the international assessment reports and for guiding the reflection of the project case-studies. We now use the framework more comprehensively to address the question: Which measures might enable transformative change towards a **sustainable management of global commons such as biodiversity, forests or the ocean**?

8.1 Causes of degradation and ambitions for sustainably managing global commons

Recalling the core challenges for sustainably managing global commons (see Box 15), we went on to identify the **cross-cutting challenges or underlying causes** that drive the degradation and depletion of our global commons most severely.

Box 15: Core challenges for sustainably managing global commons identified in global assessment reports

Concerning **biodiversity** loss (see Section 4.1.2):

Prevailing production and consumption patterns and incentive structures lead to land and resource use that exceeds bio-physical capacities.

Biodiversity loss reinforces global inequalities which in turn reinforce biodiversity loss.

The protection of biodiversity as global commons lacks determined, integrative and multilateral responses.

Concerning **forests** (see Section 4.2.2):

The main challenge is to halt deforestation and forest degradation, in particular by conserving the remaining natural forests. To achieve this the underlying drivers of deforestation and forest degradation (competing demands and conflicts with other sectors) need to be addressed.

Concerning the **ocean** (see Section 4.3.2):

Planning fails to deal adequately with the interconnectedness of marine ecosystems.

Excessive marine resource use and harmful discharges must be addressed.

The governance of the ocean is currently fragmented.

[8]We used the conceptual framework developed in Chapter 3 to examine a number of past and ongoing research and cooperation projects to see how they have contributed (or could have contributed) to transformative change (see Chapter 7). All projects' aims included improving the management of at least one of the global commons analysed here: biodiversity, natural forests or the ocean.

This synthesis process involved breaking down the challenges extracted from the assessment reports into underlying causes or indirect drivers and matching them with findings from the projects. In summary, for all three analysed commons, the causes for degradation and destruction can be broadly synthesised as follows:

- Overconsumption and excessive waste, especially by wealthier consumers, have led to levels of resource use that exceed biophysical capacity, or the "planetary boundaries" (as conceptualized by Rockström et al. 2009).
- Production and resource extraction practices have high environmental and social impacts, the costs of which are borne by others (externalised), including future generations.
- These practices continue to degrade and reduce the remaining global commons, and
- further aggravate socio-economic inequalities, which constitute justice issues and also render collective stewardship and problem-solving more difficult.

Transforming global agri-food systems is central for both biodiversity and forests, as continuing agricultural expansion and intensification are considered to be central causes for their loss. Similar findings apply to other sectors such as energy. It becomes clear that the underlying causes for the degradation and depletion of global commons – and therefore also the potential solutions – fundamentally depend on how societies and in particular how economic systems are organised. As they are multiple-use commons (see Section 5.4), the negative effects of production on global commons often go unperceived (by those causing them); true costs are not included in the price of products and not accounted for in production and consumption decisions. This means that even from a purely economic-growth-oriented perspective, current rules are inevitably leading to inefficient resource use (see Dasgupta et al. 2021). Profits derived from exploiting poorly protected (global) commons are private while the environmental damage that comes along with it is socialised and therefore incurred by all. This is most evident in open-access situations (such as the high seas). Unaccounted 'social costs' include high economic and health risks for people working or living at the beginning and end of global supply chains, often working overtime and earning less than 'living wages', which means they earn too little to fulfil even basic human needs.

The project analysis shows that reducing the pressures caused by current production and consumption practices is not enough and does not automatically stop degradation or the conversion of remaining natural areas. Specific instruments and regulations are therefore needed to (i) safeguard critical parts of nature, such as the remaining natural forests, (ii) allow overused parts, such as many fish stocks, to regenerate, and (iii) restore degraded parts, such as land areas prone to desertification.

How can such fundamental change in economic practices be achieved? According to the literature on transformative change (Chapter 3.1), transformation can occur in a series of small steps, as long as a clear vision ensures these enhance one another and develop effects in the right direction. To make this insight operational, we break down the general vision into more targeted ambitions in order to address the cross-cutting challenges identified above. Measures to address these should clearly contribute to

- **significantly reduce total resource use and waste**, which can only be achieved by a globally more balanced and significantly less resource-intensive satisfaction of human needs. At the same time, all humans should be able to at least satisfy their basic needs. This would provide a "social foundation" (Raworth 2012) to global resource use and contribute to reducing inequality. Avenues for achieving this include consuming less resource-intensive, more durable and reusable products, including much more conscious food choices (with less animal-based products). However, increasingly globalized supply chains make it practically impossible for consumers to know what their choices entail, which in turn means regulation has to ensure that consumers can make responsible choices and producers are liable for any damages they cause.
- **encourage and ensure production patterns without external costs**, this means prohibiting practices with highly detrimental impacts and holding producers accountable and producers held accountable in case of breach. Remaining impacts on the environment and on human health are mitigated or compensated for, the costs of which should be included in the product or service provided (true or full cost accounting).
- **reduce socio-economic inequalities**, both in terms of access to resources and in terms of securing a fair distribution of benefits as prerequisites for self-determined choices and a life in dignity for all. This is relevant for enabling sustainable management of the commons, as we currently find many areas where commons are overused

as they are the only resources that marginalised groups have access to.

- **safeguard and restore critical elements of the global commons**. In order to secure and – where possible – increase nature's contribution to people, parts of the global commons require explicit protection, even if production and consumption were organised much more sustainably than they currently are. Examples for measures to achieve this include protected areas, no-take policies in fisheries to allow overfished stocks to recover, or quantitative restrictions on CO_2 emissions.

These ambitions provide clear orientation while allowing many different measures for achieving them; this means they leave sufficient leeway for deliberation and inclusion to decide on context-specific choice and implementation. We argue that only if these ambitions are pursued globally, they will enable a sustainable management of global commons.

Against this background, the main potential for triggering change consists in identifying measures to restructure global and national regulation in such a way that it will contribute to converting consumer and producer decision-making towards sustainable behaviour. The question is how economic policy and economic development pathways can be reoriented in order to significantly reduce pressure on the global commons and thus prevent further deterioration, and on the contrary to allow these ecosystems to regenerate. This concerns the content of transformative change. Further challenges concern the process of how to "stimulate, nurture, and navigate" change processes and socio-ecological transformations in favour of safeguarding global commons from local to global settings, in particular how to deal with the barriers to change, i.e. factors that stabilise unsustainable practices within the current economic system. Figure 20 summarises the arguments of this section.

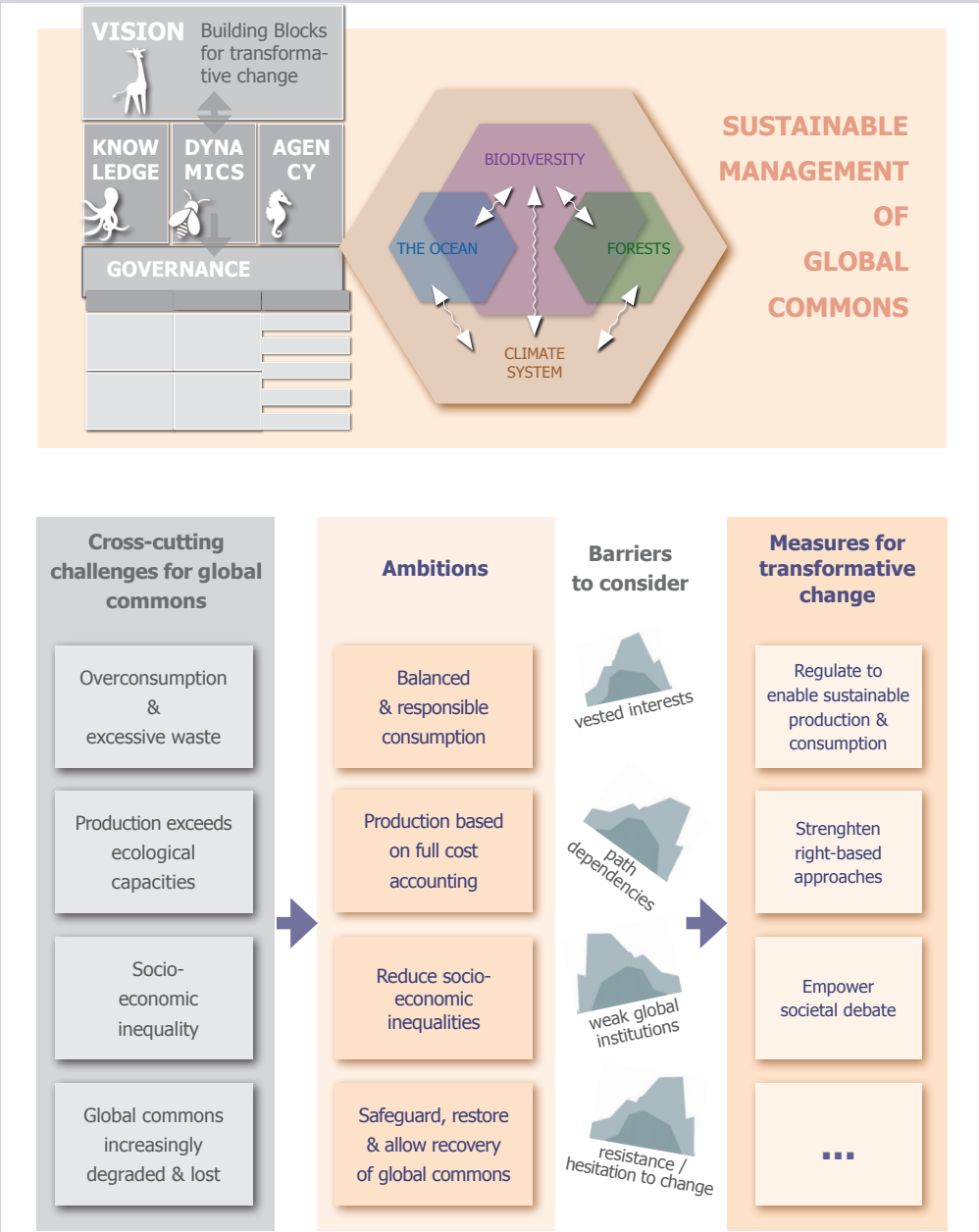


Figure 20: Ambitions that address cross-cutting challenges and guide transformative change

8.2 Increasing the transformative potential of measures

The objective of this section is to discuss what defines the transformative potential of different measures. We argue that the four ambitions elaborated above can serve to guide the direction of change or, phrased differently, to keep it on track towards a sustainable management of global commons. The measures discussed were derived in Chapters 6 and 7, based on the discussion of the recommendations of global assessment reports and the reflection of projects. The discussion is structured along the building blocks of our framework on transformative change and summarised in Figure 21 below.

A set of compelling narratives needs to outline the way forward

The need for fundamental change across many, if not all, sectors of society requires a vision and compelling narratives to guide and inspire different sectors to engage in transformative change to sustainability. A narrative (implicitly) includes problems, causes, actors and solutions. It reveals alternative choices and potentials. Narratives provide context and meaning to measures. Narratives do not primarily have to address the environment: changes need to happen in the economic realm, and social impacts are the ultimate consequences of the loss of global environmental commons. Sustainable development, as summarised in the SDGs, can serve as a common goal and vision; narratives involving potential solutions could then support working towards this overall goal.

So far, no new story has convincingly mobilised concerted efforts towards transformation. Ideas of universal well-being based on continuous economic growth still prevail, despite fifty years of pointing to the biophysical limits of our planet and persistently high – and in many countries increasing – socio-economic inequalities.

While the assessment reports provide well-developed criticism of the 'old model' and a clear understanding of the need for transformative change, we were unable to identify compelling new narratives in the reports. The scope of the problem – the need to drastically reduce resource and energy use and the destructive impacts these currently entail – makes it hard to imagine one compelling alternative narrative. Problems, meanings and solutions vary across different sectors and socio-political contexts. Several of the projects highlighted that they spend a considerable amount of time and effort on translating concepts and terminologies between different sectors and that this is essential for identifying ways forward.

Literature discussed in Chapter 6 and the review of projects led us to conclude that transformative narratives need to embed the ambitions outlined above into new stories and, at the same time, a societal debate is needed to **reframe several established economic and political paradigms**:

1. The promises of efficiency gains, technological advancement, mobilising private initiative, and adaptive capacity of societies are insufficient responses given the scale of the identified challenges.
2. Precaution, sufficiency, inclusiveness and solidarity should become leading principles for policy – their better embodiment in images, words, and stories is needed.
3. The narrative "anyone can work their way up from dishwasher to millionaire" frames freedom as the possibility for individuals to accumulate wealth, accomplishment as material consumption reflected in cars, mansions, and participating in the global jet set. In alternative, more minimalist narratives, freedom refers to the choice of how to live, what to do, fulfilment, belonging, sharing, learning, amazement, wonder, caring, connecting. The required reductions and changes in current patterns of consumption are limiting within the first, but liberating within the second narrative.
4. Similarly, governments regulating supply chains or internalising production costs can be perceived either as interfering with markets and limiting corporate freedom or as a necessary precondition to level the playing field for innovative entrepreneurs

to develop novel solutions and sustainable practices.

5. Modern agriculture – far from achieving the promise of "feeding the world" – is at a crossroads between continuing along extractive, industrialised and agroecological pathways. In current models, farmers are dependent on fossil-fuel based commercial inputs, loans and globally connected markets. While some further optimization and greening may be possible, these models are unlikely to return (and remain) within planetary boundaries or to ensure a world without hunger. The alternative is shifting towards agro-ecological, regenerative and resilient systems, which avoid or mitigate many adverse side effects of production on the biosphere and rely mainly on managing self-sustaining cycles (see Section 6.1.2).

6. Reducing socio-economic inequality within societies, between countries and world regions but also between generations is an essential part of sustainable development, the current levels of inequality also jeopardise sustainability of global commons because it makes collective stewardship and fair decision-making very difficult. Global commons are often the only resources economically marginalized groups can access, and strong demand from across the globe favours extractive use over sustainable management. For further arguments see Box 16 below).

The examined projects provide examples for transformative visions at concrete thematic levels. For instance, the narrative 'only rapid economic growth can raise people out of poverty' is challenged or at least modified by: 'the benefits from healthy ecosystems are a lifeline for the poor – therefore, economic growth must not degrade those vital assets' (TEEB-India). Similarly, one could emphasise that 'conservation protects vital assets for sustainable development' instead of 'conservation defends nature against humans' (Pro2GRN).

Project experience also indicates that radical alternative narratives may easily cause rejection. Thus, narratives may have to evolve slowly towards the transformative vision: being somewhat compatible with currently dominant paradigms, but sufficiently different to 'make a difference'. Narratives featuring transformation have to entail a broad range of issues at multiple levels to gain acceptance and influence across sectors and continents. Overarching approaches (e.g. 'deforestation-free value chains' or 'circular bioeconomy') have to be broken down and re-articulated for regional and national contexts. International and development cooperation are well-suited to facilitate and contribute to such debates.

Visions that contribute to stabilising and optimising currently unsustainable management practises are not transformative. Thinking beyond the existing economic, legal, and political settings helps to challenge well-established but possibly no longer valid assumptions. This implies taking risks and leaving the beaten paths. Inspiration could also come from the arts and humanities.

Value change includes the recognition that Western-style modernity is not the only valid worldview. The recognition of value plurality and of diverse cosmologies and (indigenous) knowledge systems shows that exploitative resource use is only one variant of human-environment relationships; and that other value systems and worldviews may actually offer better answers to some of the grand challenges, for example, based on interdependence and 'convivencia'. Opening spaces for visioning exercises and experimentation could promote open-mindedness and help revitalise overlooked or forgotten sustainability values. This could unfold transformative potential by opening the political space for radically different conceptualisations of a 'good life'. Furthermore, and perhaps even foremost, cultural self-determination can be seen as a prerequisite and an inspiration for pursuing alternative sustainability pathways.

Box 16: Further arguments to support transformative narratives

Global public goods of a well-functioning biosphere are a prerequisite for human and societal well-being.

The inherent dynamics of the world's current economic system produce highly harmful outcomes – this problem can be solved because knowledge, regulations, and other effective means are available to harness and future-proof the world's economies, provided opposition to change can be overcome.

Societies can change the rules where currently limited private gains cause considerable and increasing economic loss for society as a whole (Dasgupta et al. 2021).

Lifting the veil: internalising social and environmental costs gives clarity. It shows the bundle of true costs and true benefits of human resource use.

Justify the need for transformation with the SDGs and strong 'non-negotiable' arguments, such as compliance with human rights, living incomes, and a life in dignity for all.

Food sovereignty and the right to food impose limits on food business, and shape self-determined agricultural and landscape development.

Global and regional commons, and the services they provide, play key roles for water security and for mitigating and enhancing adaptation to climate change.

How we address climate change matters enormously for biodiversity, and biodiversity can contribute substantially to addressing climate change.

"Environmental changes are undermining hard-won development gains" (UNEP MPN 2021).

Enable co-production of transformative knowledge by deliberative approaches

More systematic approaches to knowledge co-production as well as exchange on knowledge and experience acquired on transforming systems seem most promising to generate transformative knowledge. More knowledge is needed on how to transform systems towards sustainability and how to ensure inclusive local processes that lead to achieving sustainable management of global commons. This is currently an emerging field, at best. The breadth and depth of potentially relevant knowledge is vast and rapidly growing. Yet, global sustainability goals cannot be achieved unless knowledge on feedback loops between social and ecological systems is significantly improved (Mastrángelo et al. 2019). Nevertheless, some of the reports conclude that, while knowledge may still be incomplete and fragmented, it is clearly sufficient to support immediate action. This certainly applies for many specific problems; however, knowledge on how to overcome path dependency, restructure the current logic of globalised capitalism or enable sustainability transitions, especially at larger scales, is still insufficient.

There is a need for funding the (co-)production and sharing of transformative knowledge, as well as experimenting with different approaches to obtain such knowledge. One key proposal (put forward by the Science Platform Sustainability 2030) is to change funding priorities and evaluation metrics of research to better include sustainability-related knowledge needs: "towards a funding that valorises long-term economic perspectives, environmental wisdom, and the needs and interests of local resource users" (WPN 2019: 50).

Several further competences (regarding skills, knowledge, and knowledge exchange) are required for enhancing transformative change. Transformative competences emphasised in the project interviews include communicative skills such as empathy, patience, diplomacy, and "translation" capabilities between different sectors (and their respective jargons, frameworks, objectives, etc.). Such skills are necessary to motivate people, to bring together ideas and to judge the timing and fit of possible interventions. In one of the projects, a more systematic approach was taken using insights from the field of organisational development in order to iden-

tify entry points for transformation: Following a careful diagnosis of how public organisations and institutions function within their socio-cultural context, the project identified which institutions can be reformed, who can act as a change agent and which arguments and approaches are convincing in the particular context. This resulted in considerable enhancement of the effectiveness of state agencies, and has improved compliance with environmental regulation. Another project successfully organised primary producers and enabled the co-production of transformative knowledge on improving social and environmental outcomes of specific supply chains. The project reviews further revealed that local academic institutions and think tanks are important partners in transformation projects because of their locally-specific knowledge, contextualisation skills, and their influence on discourses and on future decision makers. They also form part of a critical public, can improve public debate, and raise the awareness needed to disrupt corruption and enhance political accountability.

Beyond these promising examples, neither the assessment reports nor the project experiences provide clear ideas on how to specify or respond to transformative knowledge needs on broader issues, such as culturally adapted ideas and measures on:

1. How to shift complex globally connected economies, which are built on the expectation of growth and profit, onto the grounds of regeneration, precaution, sufficiency, inclusiveness and solidarity?
2. How to balance the pursuit of private interests and care for global commons within democratic structures that are increasingly marked by the concentration of corporate economic power?
3. How to enable changes in values and the spread of alternative ideas and visions for a good life that does not rely primarily on resource-intensive consumption?

This list of elements encouraging transformation can be continued; the challenge consists in identifying the knowledge necessary for supporting transformation vs. the practically unlimited amount of interesting or potentially useful knowledge. Scientists alone are inherently biased in defining such knowledge needs. Knowledge co-production, especially if it is context-based, pluralistic, goal-oriented and interactive, appears as a promising approach, which also contributes to a democratisation of knowledge (Nordström et al. 2020). The participatory process of scoping transformative knowledge needs a diversity of actors and perspectives. Enquiring skills across disciplines, and capacities for reflective and interpretive discussion will help change agents to enable deliberation on transformative change. Exchanging and co-producing such knowledge also has an emancipatory and mobilising potential.

Measures need to support phasing out and address resistance

There are sustainable alternatives or best practices, but these cannot outcompete unsustainable practices that externalise high proportions of their costs. Transformation can be enhanced by successively phasing out unsustainable alternatives and by helping incumbent actors to change their practices. Transformation dynamics are not systematically addressed by the assessment reports. Nonetheless, they provide several suggestions for initial efforts of phasing in more sustainable practices and for phasing out currently dominant unsustainable systems. In many sectors, sustainable alternatives are emerging, but suggestions on scaling up, institutionalisation and beyond are scarce. While opening up new opportunities does no harm to incumbent interests, the redistribution of opportunities and phasing out of unsustainable practises with high environmental and social costs involves changing stakes, and therefore politics. Politically it is much easier to incrementally improve unsustainable practices, instead of replacing them with sustainable alternatives. This pursuit of 'buying time', or of 'gradual relief' merely postpones tough choices and exacerbates problems. Transformation not only causes friction, it may also require friction to get started: crises can speed up decision-making and enlarge the set of options for possible responses. Crisis can also scale up the magnitude of such responses.

Project experiences underscore these points and indicate that within the current setting, it is very difficult, if not impossible, for sustainable alternatives to compete within the prevailing system. Sustainable alternatives are often prevented from becoming mainstream because unsustainable alternatives are still allowed, or worse, continue to be encouraged. Where proposed actions remain singular, largely voluntary, or additional to current practices, their effects tend to be stabilising the status quo, rather than transformative.

Underlying causes for the degradation and depletion of global commons, in particular unsustainable consumption and production patterns, are reinforced by a series of **structural barriers** (see Figure 20 above). First, there are clear **vested interests** in maintaining the current system by actors who obtain considerable benefits (resources, status, etc.) from the current economic system and leverage their power to maintain the status quo. Transformation will likely cause considerable friction and stimulate resistance from those set out to lose from change. Second, there are **path dependencies**, where current institutional set-ups (e.g., incentive structures) have stabilised or "locked in" our socio-economic systems to favour current trajectories. Third, **weak global institutions** make it difficult to negotiate competing interests and agree on rules for the use of global commons (i.e., private-public, global to local). Finally, there is **resistance or at least hesitation to change**, meaning that civil society at large hesitates to change lifestyles and behaviour to the extent necessary to put us on a transformative change path. This is due to a range of reasons from lack of awareness of current and future consequences for humanity to the fact that alternatives are often complicated or much more expensive. The most blatant form of resistance is **corruption** to avoid environmental and social regulation. Structural barriers to change and the power dynamics in favour of practices that deplete global commons are not explicitly addressed in most assessment reports.

So, what can be done? In several instances the elements recommended in international assessment reports are useful and necessary, but likely to be insufficient for achieving the aspired changes. For example, assessments concerning forests call for certification, responsible consumption and production, international payments for ecosystem services and integrated landscape management, but do not link them to each other; as isolated voluntary actions their impact will, however, remain marginal. Additional literature calls for combining these and other elements to institutionalise new sets of rules to **change the framework in which private actors operate**, particularly rules regarding supply chains, finance and possibilities to externalise costs. Changing rules so that sustainable operations are in the self-interest of the private sector turns innovative businesses into agents of change towards sustainability transitions. Regarding agriculture, some reports explicitly call for protecting and empowering smallholder farmers against corporate interests. This explicit recognition of imbalances of power and inequities as critical parts of the problem has politicised the call for 'changing the system'. Certainly, transition within democratic frameworks tends to occur in sequences of smaller steps. The key question is whether these are directed towards addressing root causes or whether they reinforce the unsustainable model.

Therefore, the **key challenge at the moment is institutionalisation**. A new system requires changing fundamental rules and responsibilities in favour of the common good, this is necessary to safeguard global commons. Institutions need to be modified to achieve both pathways of phasing in (sustainable actions) and phasing out (unsustainable actions). The incentive structures for both consumers and producers have to be altered: unsustainable practices need to become less feasible, costlier, and/or increasingly limited by regulation, whereas sustainable alternatives need to be encouraged and become more attractive. Thus, divestment is just as sensible and necessary as innovation.

Transformative change is by definition a **multi-level governance challenge**. The different levels can enhance transformative dynamics or lead to stalling. For example, national or local examples can demonstrate the feasibility of more sustainable alternatives, and thereby inspire others. Regional level rule-setting can exert influence beyond the territory where specific legislation applies, as firms from outside the region comply to gain access to the regulated markets. Successful examples can thus pave the way for broader international or global agreements. On the other hand, bold initiatives towards sustainability at the national level can be slowed or even halted by international regulations, particularly regarding trade or investment protection. A recent example is the Germany-based energy provider RWE taking the Netherlands to court against its ambitious climate regulation (Politico 2021). This has two implications: first, opportunities for transformation should be seized at whatever policy level they present themselves, because they can stimulate change on other levels too. Second, rules and regulations beyond the environmental sector need to be scrutinised for impacts on global commons.

The example of the ambitious EU Water Framework Directive suggests that change can come in single 'big leaps', even when implementation on the ground still takes decades. On the other hand, the continuously failing reform efforts in

the EU Common Agricultural Policy indicate that well-organised lobbying can make even modest reforms nearly impossible and very costly for taxpayers, despite widely established evidence of needed change.

Another conclusion regarding the current global dynamic is that the **biodiversity agenda should be linked to the agenda** of managing and **recovering from the global Covid-19 pandemic and** to the **climate change agenda**. There are not only synergies, but such linking will also make it more difficult to advance one at the expense of the other in terms of political attention or funding. The much higher political awareness and interest in climate change are strong reasons for joining efforts. Another reason is the strong interlinkage where climate mitigation and adaptation strategies can be either biodiversity-friendly and lead to mutually reinforcing positive outcomes, or highly destructive for biodiversity and as a consequence lead to mutually reinforcing negative outcomes. The global Covid-19 pandemic now at the top of political agendas and the packages to support recovery present a rare window of opportunity for investing in a much greener economy and way of living. The painful experience of a pandemic can also help to focus attention on and hopefully address some of the underlying issues, such as deforestation and wildlife trade.

Rights-based approaches enable agency

Clear social and environmental rights combined with accessible options to invoke them creates spaces for agency and emancipation. There is frequent mention in all assessment reports of the importance of including local and indigenous communities, their knowledge and sometimes their institutions in land-use decisions and practices. Yet, most of these recommendations do not refer to the potential of local collective agency for initiating change. Nor do they formulate visions or approaches rooted in indigenous and local knowledge which could serve as alternatives or starting points for thinking towards different socio-economic systems – which shows that the potential of agency and emancipatory power for transformation is not fully recognised yet.

Several studies demand explicit and unambiguous **support for local communities**, particularly where this goes against the vested interests of more powerful actors. OECMs (Other Effective Area-Based Conservation Measures) may bring more inclusive approaches to area-based conservation. The maintenance of diverse knowledge and governance systems is recognised as a related crucial ingredient also of transformative change (Bulkeley et al. 2020). In forestry, institutional decentralisation is recommended as a political instrument to empower local citizens (IPBES ECA 2018: 785, GBO 5 2020: 66). Project experience underscores these points. Specifically, the most disadvantaged segments of society, who are often difficult to reach and engage in a project (women, youth, unorganised smallholders, etc.), are also highly vulnerable to changes. Very deliberate, specific and sustained efforts are needed to involve and safeguard such groups throughout programme design and governance. Organising and building capacity of marginalised groups is a common strategy to increase agency.

Local action for sustainability has to build on democratic political agency. Civic **participation** is widely established, but in practice often pursued for instrumental objectives and limited to short episodes of consultation, the same applies to less widely used collective management models. Both could foster the **articulation of identity**, of shared social values and of alternative futures by opening up spaces for collective decisions at the local and regional level, for example, on 'in what kind of landscapes do we want to live?' They could nurture the capacity and culture for reflective and differentiated debate and could lead to results such as securing local property rights, better compromise between competing interests, or strengthened local economies. The aim to expand conservation areas, as foreseen by the post 2020 GBF, could be an occasion to experiment with new formats of engagement and participation. In this context, involving local 'champions of change' increases the transformative potential.

Several assessment documents highlight **inequality** as an important issue, also because it limits agency. Economic inequality, for example, tends to favour political inequality, which undermines fair democratic governance. In turn, growing inequality and increasing biodiversity loss form a vicious circle, which is conducive to poverty (Hamann et al. 2018). Finding just and equitable solutions is therefore an objective in itself as well as a key means for transformation. The linkages here are manifold: Land **concentration** favours monocultures, follows economies of scale and weakens the stewardship role of land owners. The global concentration of agro-chemical industries and a food system driven by shareholder interests (Howard and Hendrickson 2020) are detrimental to global

commons, whereas small-scale land use generally sustains more livelihoods and imposes less pressure on biodiversity, soils and water. While the latter is not automatically the case, tenure security in combination with research and extension services that adequately address small-scale production have yielded positive outcomes for both agency and biodiversity (Oxfam 2020, FAO SWF 2020). Most documents therefore emphasise the need for securing land **tenure**, particularly of disadvantaged groups. However, few concrete suggestions are made on how to achieve this.

Most projects analysed also consider **dealing with resistance to change** as essential. Addressing opposing stakeholders, fostering exchange or confronting resistance with additional and/or new capacities and knowledge are important features. Other projects avoided addressing resistance in order to focus on win-win options and not to jeopardize achieving the project goals. This illustrates that the aspect of 'anticipating resistance' is often beyond the scope and timeframe of projects. In line with different scholars (Defila and DiGiulio 2020, Fazey et al. 2020) we suggest **longer funding cycles (6+ years) and programme designs** that allow for an explicit focus on tackling resistance to change from powerful interest groups.

While the assessment reports remain very unspecific about this topic, the OECD (2019: 34) suggests "targeted measures to **address potential impacts on competitiveness and income distribution**" as ways to overcome political-economy challenges such as vested interests. NYDF (2019: 57) attaches importance to **fighting corruption as a key driver of political resistance to change**. Creating spaces for less powerful groups to experiment and supporting marginalised groups to organise so they can better defend their interests are further examples of how to support agency. The project examples, as well as mentions in the additional reports, underscore the importance of actively addressing resistance because it affects transformation dynamics and the room for emancipatory agency.

The 'High-Level Panel', in its Ocean Equity blue paper, outlines promising proposals that would increase agency across sectors, such as establishing the `**Right to a Healthy Environment**` as a basic human right. Meanwhile, in October 2021, the United Nations Human Rights Council (HRC) adopted a resolution that confirms that having a clean, healthy and sustainable environment is a human right. Although not legally binding, this is expected to strengthen communities and individuals fighting for the environment and often also their livelihoods (see Chapter 6.3.2).

Up to 80 per cent of the planet's biodiversity is located on indigenous territories and, despite increasing pressure, is declining there much more slowly than in other areas (WWF 2020, IPBES GA SPM 2019: 31). This underscores the importance of recognizing and upholding the individual and collective rights of Indigenous Peoples for the conservation of the global commons. Particularly with a view to CBD's 30 x 30 protection target, **rights-based approaches** should be anchored in the GBF post-2020 agreement in a way that adequately protects the rights to self-determination and land and resource rights of IPLCs. If carefully designed, OECMs as a non-traditional conservation tool could have value for IPLCs in terms of leveraging recognition and support for their rights and governance systems on the one hand, and to account better for their contributions to the global and national conservation targets on the other. Developing proposals for and showcasing successful examples of different options of formally securing rights to the land and rights to a healthy environment in combination with stewardship obligations concerning biodiversity can serve as inspiration for other countries. While there are many fundamental issues involved and there are no easy fixes these topics are receiving too little attention and often further aggravated by conservation efforts. New alliances are needed here.

Overall the chances of less powerful actors to successfully fight for their rights can be significantly enhanced if **corporate compliance** with rules and frameworks for responsible investment and human rights would become better enforceable and subject to jurisdiction along global supply chains (see also the following Synopsis on Transformative Governance). For this to be effective, but more importantly to maintain the agency of governments in terms of environmental protection, it is important to scrutinise investment treaties and trade agreements so that **the protection of investor rights does not seriously limit the options for legislation on environmental protection** or makes them extremely costly, due to rights for high levels of compensation.

Figure 21 summarises our main conclusions for the first four building blocks of transformative change. The next section delves into specific measures of transformative governance.

1

Transformative VISION

Mutually compatible and compelling narratives have to reframe several established economic and political paradigms to motivate and guide transformative change.

- Promises of efficiency gains, technological advancement, private initiative, and adaptive capacity of societies are insufficient responses given the scale of challenges.
- Precaution, sufficiency, inclusiveness and solidarity should become leading principles for policy
- Extreme inequality jeopardises sustainability because it makes collective stewardship and fair decision-making very difficult
- New narratives where freedom refers to the choice of how to live and what to do, belonging, sharing, learning, amazement, wonder, caring, connecting.
- Government's role is to modify legal and financial framework so innovative entrepreneurs can develop novel solutions and sustainable practices.
- Agri-food systems need to shift from extractive, industrialised paths towards agro-ecological, regenerative and resilient, managing self-sustaining cycles.

New narratives should be nested and adapted to address mulitiple levels and gain acceptance and influence across sectors and continents.

2

Transformative KNOWLEDGE

> Several substantive knowledge gaps remain, e.g.: knowledge on feedback loops between social and ecological systems, how to overcome path dependency, restructure the current logic of globalised capitalism, in particular how to deal with resistance.

> Knowledge for enhancing transformation entails

- experimenting with different approaches
- communication skills such as empathy, patience, diplomacy;
- translation capabilities between sectors, levels and disciplinary boundaries;
- knowledge to enhance political accountability
- diagnosis of institutions against their socio-cultural background to identify entry points for change.

> Co-production of knowledge is needed that is context-based, pluralistic, goal-oriented and interactive.

3

Transformation DYNAMICS

> Sustainable alternatives are often prevented because unsustainable alternatives are still allowed, or encouraged. Changing these frame conditions considerably increases the chances new and more sustainable approaches gain traction.

> Structural barriers such as vested interests, path dependencies, weak global institutions, and resistance to change need to be explicitly considered when designing policies to enhance system change.

> The key challenge now is institutionalisation: agreeing and implementing new rules and responsibilities in favour of the common good.

> Seize opportunities for transformation at whatever policy level they present themselves, this can stimulate change on other levels, too.

> Rules and regulations beyond the environmental sector need to be scrutinised for impacts on global commons.

> Link the biodiversity agenda to Covid-recovery and climate change to achieve synergies and avoid advancing one at the expense of the other.

4

EMANCIPATION and agency for transformation

> Support and learn from diverse knowledge and governance systems in particular from indigenous people,

> The most disadvantaged groups in society (women, youth, unorganised smallholders, etc.), are highly vulnerable to change. Deliberate, specific and sustained efforts are needed to involve and safeguard such groups.

> Involving local 'champions of change' holds high transformative potential.

> Economic and political inequality drive biodiversity loss. Finding just and equitable solutions is therefore an objective in itself and key for transformation.

> Some of the most potent ways to enhance agency are legal instruments:

- Establish the 'Right to a Healthy Environment' as a basic human right;
- Ensure investor rights do not seriously limit possibilities or legislation for social and environmental protection
- Secure land tenure, particularly for disadvantaged groups;
- Increase corporate liability along global supply chains.

Figure 21: Conclusions based on the first four building blocks of the framework

Transformative Governance means: changing the rules to re-organise the playing field

The first four blocks outline how to create settings conducive to transformative change, namely a vision providing direction, knowledge on how to change the system, an understanding of dynamics and options for increasing democratic discussion and opportunities for agency. It is against this background that strategies for enhancing transformative change towards a sustainable management of global commons can be identified. Questions here include: What **instruments** can help to move the system into the right direction and who are potential **agents of change**? From theory we derived the need for inclusive, informed, adapted, integrated and accountable **governance** (see Chapter 3.2) this is largely acknowledged and integrated within the analysed projects.

Efficiency gains alone have been shown to be insufficient and at the global level we collectively need to ensure that "our demands on nature do not exceed its supply" (Dasgupta et al. 2021: 69). This requires significant reductions in overall resource use: less resource-intensive production i.e. less animal and more plant-based foods, significant reduction of waste, more circular production with significantly longer lifetimes of product use, more reuse and recycling.

Calls for involving the private sector via Corporate Social Responsibility, mainly to help fund biodiversity policy, have been raised for many years now, just like the call for increasing positive incentives such as Payments for Ecosystem Services and reducing negative ones such as harmful subsidies. While useful and needed, the real challenge is to phase out unsustainable production practices. In order for the private sector to meaningfully contribute to this shift, the massive externalisation of costs has to stop. What is needed is to change the rules so that damage and degeneration of the commons is avoided and production and consumption account for their full impacts. The challenge is to provide a level playing field for innovation towards sustainability and to turn e.g. the finance sector into a motor of the sustainability transition.

In Chapter 9 we provide several tables with potential measures to achieve this, here, we illustrate this with three examples instruments that can contribute to this change of rules to enable transformation at the global level.

Rules for managing the ocean

Oceans are a prime example of global commons, and would benefit most from further agreements on rules. With the exception of fisheries, oceans are in large parts currently exploited under an open access regime. This more or less means that whoever is able to exploit the ocean, does this in a largely unregulated manner. For some issues there have been global agreements, including phasing out single hull oil tankers, thereby considerably reducing risks of oil spills. Similarly, there are some marine protected areas even in the high seas. The measures suggested below (increasing awareness by obligations to report on impacts of any productive activity on the environment and in particular on biodiversity and ecosystem services, as well as creating legislation to hold companies accountable for the damages they cause) would contribute significantly to improving the state of the world's oceans. However, with increasing interest in ocean mining, further agreements on rules and limits to exploitation are needed. As outlined in Chapter 6.3.2, some regional alliances and 'coalitions of the willing' such as the High-Level Panel on Oceans are probably best placed to develop, test and thereby demonstrate effective rules that would benefit all nations. Increasing the number of countries that understand and participate in this new regime, and thus raising the interest in establishing such rules at the global level could be an interesting field for development cooperation.

The role of finance and insurance in changing incentives

The experience from the Eco.Business project shows that investors understand that sustainable production systems are not only good for sustainability, but also reduce financial risks. Making all investors aware of their responsibilities, as well as their own self-interest, in supporting sustainable production is a first step and requiring producers to report their impacts on global climate and biodiversity (including in forests and the ocean) is the next important step for redirecting investment flows. Further steps could come from public procurement legislation to prevent public investment in unsustainable activities. The EU Taxonomy on sustainable finance is an important effort in this overall direction. Holding producers liable for their damages to global commons would make financing of unsustainable activities much costlier. Insurance providers can play a similar role by fully reflect-

ing risks to global commons and the costs of potential damages in their rates (see SRI 2020: 45f.). Given the EU is a large player globally, implementing any of these steps has a noticeable impact and hopefully serves as example for other players to follow.

Making global supply chains sustainable

The third example also illustrates the implications of the call for the joint implementation of the five governance modes:

- **Inclusive:** for each step of the governance process, all relevant actors need to be included and their role defined.
- **Informed:** available and necessary information for strategic choices needs to be compiled and accessible to all stakeholders.
- **Adaptive:** structures and outcomes must constantly be reflected, evaluated and adjusted in order to enable adaptive learning processes.
- **Integrated:** across levels and sectors, rules and incentive options need to coherently support the implementation of the strategic mechanism/governance process.
- **Accountable:** rules need to ensure that key actors fulfil their responsibility in the governance process.

Most global assessments analysed still place high hopes on product certification. However, experience has shown that while it can help orient particularly responsible, wealthy consumers, certification has neither succeeded in stopping unsustainable practises, nor enabled producers to obtain significant price premiums. Conversely, it implies considerable transaction costs, can be misused for "greenwashing", and is susceptible to corruption or differing standards in different parts of the world. The Eco.Business fund management underscored the importance and difficulty of identifying reliable certification schemes for their investments; if professionals find this challenging, relying on consumers to manage global commons by buying certified products almost sounds naive.

It therefore seems more useful to phase out unsustainable production practices; to achieve this, costs need to be internalised along the entire supply chain. This requires legislation that holds producers accountable for the externalities of their products, obliging them to demonstrate that inputs and production processes are sustainable and making them liable for infringements. In such a context, certification makes more sense as it certifies compliance with a legal obligation [accountable]. A challenge is how to establish sustainability criteria that are pragmatic enough that they can be implemented and enforced yet ambitious enough to actually make a difference, and they will likely have to be become more ambitious over the next few years [informed & adaptive]. Involving all actors along the supply chains has led to rather minimal standards of many voluntary schemes. The experience of the agricultural supply chain programme shows this has considerably improved 'in the shadow of hierarchy': in view of the fact that the EU is currently preparing further legislation for deforestation-free supply chains, the willingness to participate as well as ambition levels suggested by the private sector have been considerably higher than in purely voluntary schemes. Pilot projects demonstrate that higher returns to primary producers and less environmentally destructive practices are possible, even under current market conditions [inclusive].

However, improving production systems and supply chains will not per se reduce deforestation and forest degradation; the protection of forests needs to be regulated and implemented by separate legislation. In projects addressing deforestation, subnational governments apply jurisdictional or landscape approaches with the goal of establishing and certifying "sustainable sourcing regions" across different sectors, with clear zoning and enforced forest protection. These projects are experiencing that such regulation-enforced landscape management is essential to ensure that supply chain measures or REDD+ payments reduce deforestation [integrated].

To enforce supply chain regulation, additional reports recommend improved databases, e.g. to support efforts to phase out illegal timber trade. Project interviews specify that partner countries should be encouraged to improve land tenure and better address corruption and lack of law enforcement, especially around illegal deforestation [informed & accountable]. Effects of policy measures need to be monitored closely so that they can be adjusted or complemented by further instruments in a timely manner [adaptive]. The measure of supply chain legislation contributes to three of the four ambitions identified. It creates strong incentives for producers to avoid environmental damages such as deforestation along their supply chain. More indirectly espe-

cially when communicated well, consumers are made aware of the fact that certain products often lead to deforestation, while learning about the deforestation-free options. This awareness and the slightly increasing costs to consumers hopefully contribute to reducing consumption. Finally, it contributes to reducing inequality by making all enterprises along the supply chain liable thus avoiding what currently happens: that high social and environmental costs are shifted to countries with low wages and little social protection and low environmental standards. By itself supply chain legislation does not protect and allow regeneration of forests but implementing sustainable sourcing regions with well-enforced forest protection can achieve this ambition.

How to navigate transformative change using the building blocks

Most transformations in the Global South require transformation in the Global North as well. Thus, transformative change requires coordinated action at multiple levels and across actors, sectors, countries and continents. The EU as one of the largest single markets and an important political player has the potential to lead by example and the **European Green Deal** explicitly proposes to do so. In a sense the policy proposal contains the main elements proposed here: Its vision it to "transform the EU into a modern, resource-efficient and competitive economy, ensuring:

- no net emissions of greenhouse gases by 2050
- economic growth decoupled from resource use
- no person and no place left behind".

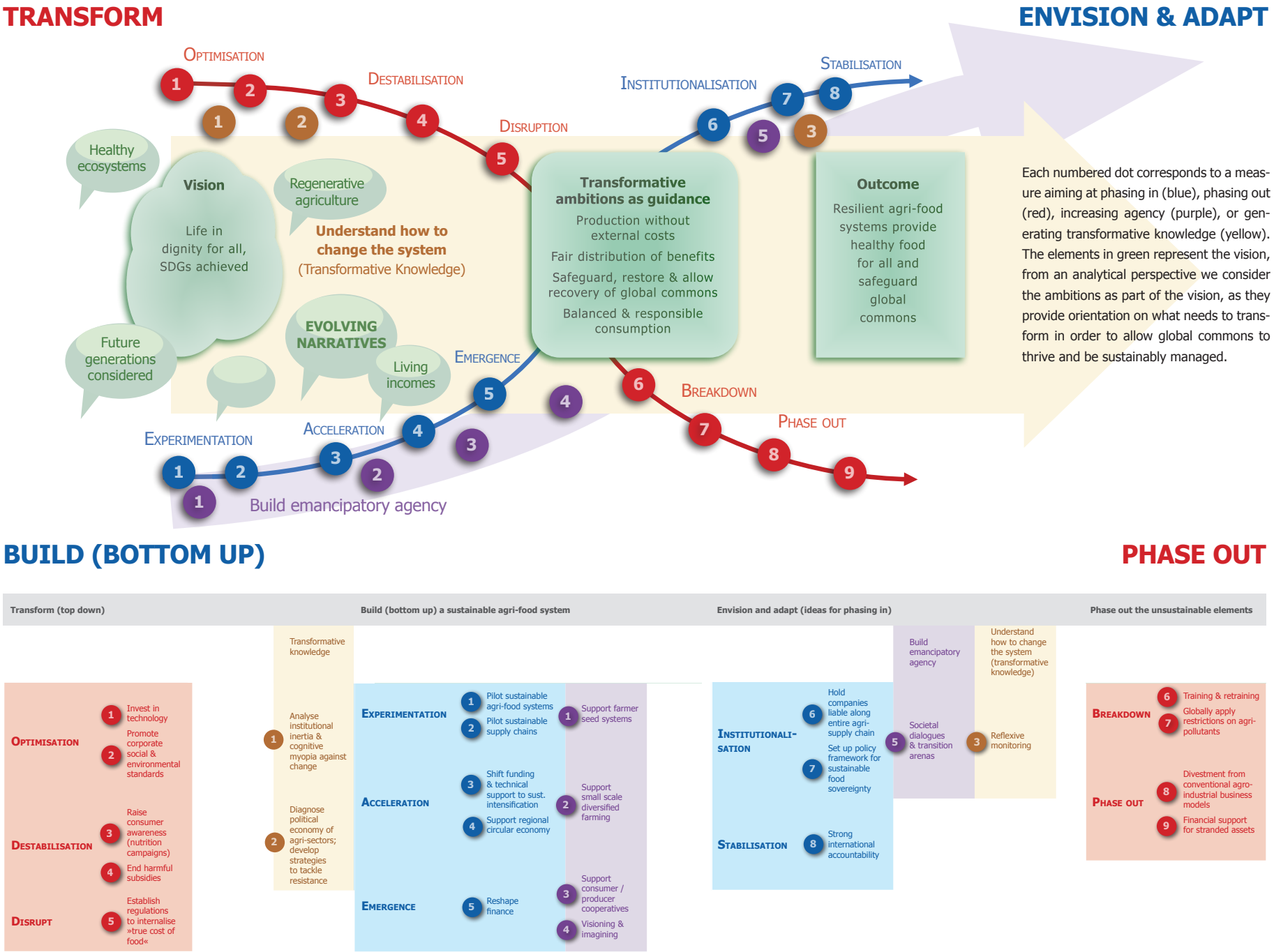
The EU Taxonomy on Sustainable Finance provides important knowledge and is a first step to shifting investments from unsustainable to sustainable production. The FLEGT initiative takes supply chain regulation another step forward. The farm-to-fork strategy envisages important steps to more sustainability in the agri-food system although it does not make the shift to regenerative agriculture (see Box 17). The goal of leaving no one behind addresses inequality but emancipatory agency is not stepped up beyond the provisions on participation and right to information already in place before the Green Deal.

In Chapter 6.1.2, we have outlined ideas **for transforming the agri-food system**, one of the most prominent drivers of biodiversity loss and deforestation and an important contributor to pollution of the oceans. Figure 22, building on Loorbach and Oxenaar (2018), shows how measures can support system transformation and how the other building blocks of the framework can be linked to this. The figure is nearly an illustration how elements interact and support each other- in addressing drivers of degradation, measures need to be specified for each country's context.

Box 17: Implementing the new Biodiversity Strategy in the European Union

With the European Green Deal (EC 2019), a high level of ambition has been formulated towards transformation. The new Biodiversity Strategy (EC 2020a) is part of this deal and implementation will be supported by significantly enhancing the European Science-Policy-Interface for biodiversity governance. Complementary initiatives have been put in place: a Biodiversity Knowledge Centre has been established to facilitate knowledge sharing and cross-sectional policy dialogue, a Biodiversity Partnership has been created to boost related research funding in co-ordinated programmes between Member States and the EC (and thus supporting better implementation of biodiversity research and innovation in Europe), a science service will help to synthesise and make all relevant results available to policy makers to support implementation of the strategy. Also, the strategy will aim to stimulate tax systems and pricing to better reflect real environmental costs (including biodiversity loss), and integration of biodiversity into public and business decision-making. Among others, the strategy points to the synergies with climate change and Covid-19 recovery measures and aims to allocate at least €20 billion per year for spending on nature. The European Green Deal also includes the attempt to change the agri-food system, its 'Farm-to-fork strategy' (EC 2020b) represents the first step towards food systems transformation, with ambitious and concrete targets on pesticides, fertilizers, organic farming, antimicrobial resistance and climate goals to be achieved by 2030. This strategy has been widely recognised for its game-changing potential. However, its success will depend on the level of ambition in the implementation and on its alignment with other EU policy strategies, particularly the Common Agricultural Policy (CAP). The CAP reform has been controversial and proven not to be adjusted sufficiently to environmental and biodiversity commitments, underscoring both the extent of the challenge and the need for changing our agri-food system.

Figure 22: Illustration how building blocks can inspire combinations of measures to enhance transformative change, using the example of agri-food systems (building on Loorbach and Oxenaar 2018)



9 (Policy) Recommendations for enabling sustainability transformation of global commons

This chapter derives recommendations in terms of policy ideas and measures for supporting transformative change. It builds on the main findings elaborated in Chapter 8 (see Figure 20).

The transformation aspired should allow global commons such as biodiversity, forests and the ocean to thrive and enable the global community to sustainably manage them in the context of the SDGs. In Chapter 8, we outline what is needed based on the conceptual framework and its building blocks and conclude that such transformative change requires coordinated action and partnerships at multiple levels, across actors, sectors, countries and continents. Therefore, Germany (and all other countries[4]) can and should support transformation for global commons in three different yet mutually enhancing roles:

1. **'Transform in Germany and within the EU':** Transformation will not succeed if affluent industrialised societies do not make substantial and quick progress in reducing their production and consumption footprints. This includes the footprint of German businesses in other parts of the world (see Section 9.2).

2. **'Forge international policy for transformation':** Germany has significant room-to-manoeuvre for co-shaping international commitments and global policy processes. This influence can accelerate ambition and action on all types of sustainability agendas; in particular as a strong voice within the EU and G7. Germany can contribute to significant innovations changing global policy and regulation concerning, for example, supply chains, liabilities, rules for the finance and insurance sectors (see Section 9.3).

3. **'Practice development cooperation which supports transformation in other parts of the world':** This can range from financial and technical support for achieving multilaterally agreed sustainability objectives, to supporting countries to participate in revising international trade and supply chain policies, to strengthening public deliberation and search for transformation visions within partner countries (see Section 9.4).

Phasing out the support for **unsustainable practices** is an essential task in all three roles.

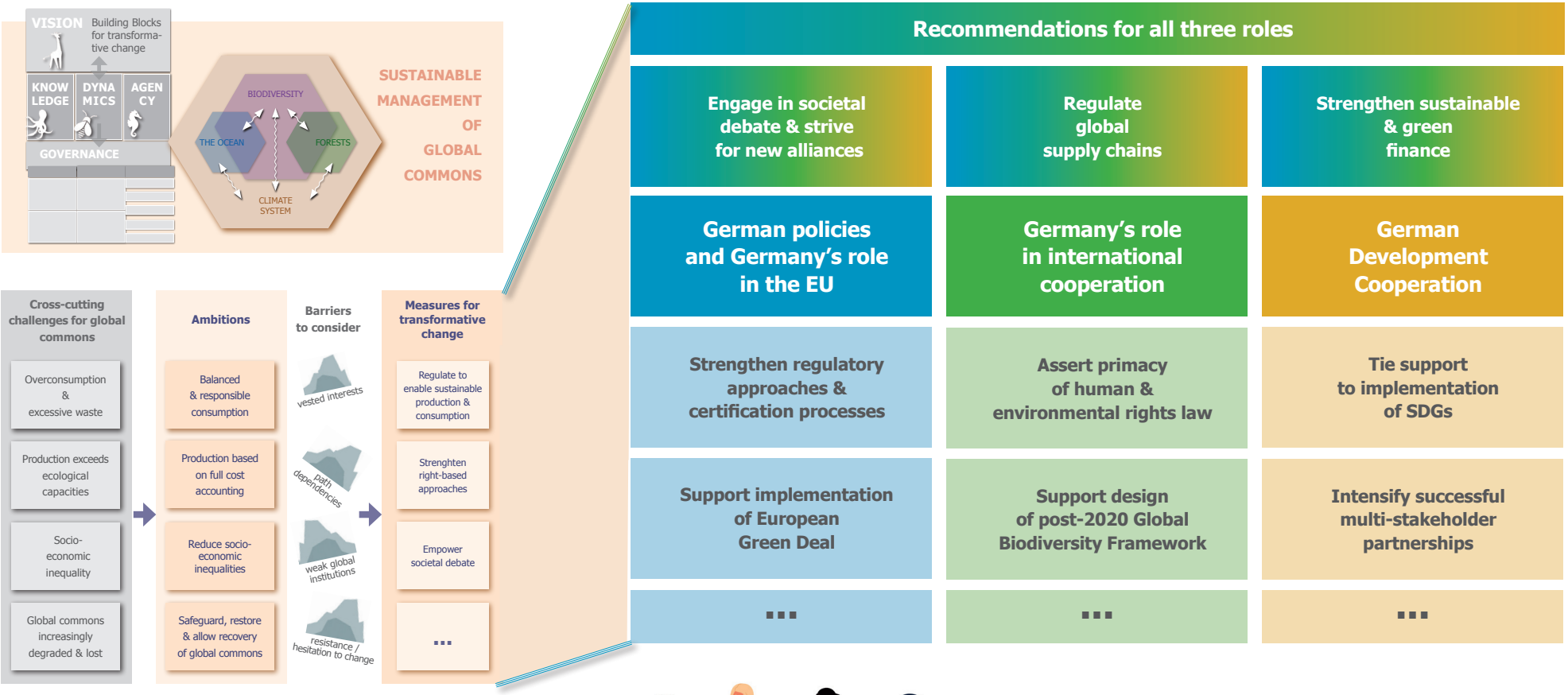
Within these three main clusters of action, all stakeholders (public, private and civil society) have individual, complementary and nested roles to play. Adopting a genuine whole of society and a whole of government approach should become the norm for any initiative. This will help to facilitate synergies, manage trade-offs and to develop joint solutions. All societal groups can contribute to triggering and mutually enhancing transformative change.

Nevertheless, governments play a central role and are the main actors to agree on and to enact the measures recommended. Most of these measures are intended to change the rules and thereby the incentives and reference frames for civil society and the private sector. Their successful implementation will require strong support from different sets of stakeholders in Germany, in the EU and beyond, including different sector ministries, civil society, private sector, research organisations and others. Resistance, also from outside the EU, should be anticipated and actively addressed. Ideally, by providing clear guidance and motivation, measures enable all actors to contribute to the envisioned transformation.

The process carried out for deriving recommended policy ideas and measures is illustrated in Figure 23.

[4]While this report has been written with the support of the German Ministry for international cooperation which requested specific recommendations, transformative change can only be achieved by collaboration across ministries and sectors. Recommendations therefore go beyond the scope of this ministry. Similarly, recommended measures could and should also be taken by other countries, as no single country can achieve the required changes alone.

Figure 23: Building on ambitions to derive measures in different roles



The following sections of this chapter present these measures grouped according to the different roles outlined above. Each section first describes important aspects that need to be taken into consideration and then presents tables that describe and qualify each measure and connect them to the elements of the transformative change framework. While the joint consideration of all building blocks constitutes the transformative potential of future policy choices, the recommended measures differ in their emphasis. The tables should therefore not be considered as a menu of discrete, separate strategies. Only a combined approach of complementary measures – aligned to specific contexts – will likely stimulate the necessary transformative changes.

The recommended measures are qualified according to their potential contributions to achieve:

- the four ambitions (ensure production without external costs, reduce socio-economic inequality, safeguard & restore global commons, enable responsible consumption),
- whether they can be used to 'phase in' sustainable alternatives and/or to 'phase out' current unsustainable practises,
- the Sustainable Development Goals (SDGs).

The ambitions constitute the yardstick regarding the direction of the required transformation. In that sense, we perceive them as part of the transformative vision and of how to address the underlying causes for the degradation of the global commons (see Chapter 8). To stimulate discussion, we provide our estimation to what extent each measure can contribute to achieving these ambitions. Potential is indicated by +, a particularly high potential by **+**, and indirect contributions by (+). We would like to emphasise that according to our understanding **significant progress towards all four ambitions is necessary** so that transformative change promotes sustainable management of global commons and that the **design of measures matters enormously**.

Phase in/phase out refer to two different yet complementary processes of system transformation (see building block on dynamics of transformation in Chapter 3.2): The innovation and establishment of new approaches or technologies ('phase in'), and the reduction and ultimately closure of practises that are unsustainable ('phase out'). We indicate in the table whether measures can be used for phasing-in or phasing-out; and again, how a measure is designed strongly influences whether it can actually achieve its goals. Some measures have particularly high potential for creating transformative knowledge and transformative agency symbolised by the respective icons of the framework.

The intent behind the tables below is to collate measures to change the rules in such a way that sustainable practices are no longer 'nice to have' for those that can afford to be corporately or privately 'responsible', but that the way global institutions (and this includes markets) are designed ensures we meet the needs of all within the means of the planet (Raworth 2012).

9.1 Overarching topics and general recommendations (all three roles)

The 2030 Agenda for Sustainable Development provides the overarching framework for what an overwhelming part of the international community wants to achieve: "The principles of the Agenda (universality, indivisibility, leave no one behind, participation, accountability) and the SDGs need to be recognised as guiding in all policy fields, for both domestic and internationally-oriented policies, taking into account different national capacities, policies and priorities" (Anbumozhi et al. 2017). However, to fully unfold the potential of its transformative elements, the **SDGs need to move to the centre of national and international policymaking** across all sectors. It is not sufficient to refer to them in selected areas, more determined, integrative and multilateral responses **to implement all SDGs and associated principles** are needed. To be able to achieve this, continuous efforts are required to better integrate sectors and to systematically include civil society and the private sector. Industrialised countries should lead by example, an opportunity many have yet to seize. The importance of aligning development agendas with decisive climate and biodiversity action is widely accepted. The 2030 Agenda can only be successfully implemented if **efforts for biodiversity, forests, the ocean, climate and other global commons are stepped up**.

The first table contains measures relevant in all three roles and shows how these roles complement each other. Measures here address the regulatory and governance framework, participation and partnerships, and knowledge for transformative change. In addition, as transformative change is a process, transformative governance needs to be adaptive and at the same time informed, integrated, inclusive and accountable (see Chapter 3.2).

Table 9.1: Recommendations applicable in all three roles

Recommendations applicable in all three roles		Ambition: Direct or (indirect) contribution to global ambitions for transformative change				Can be used to phase in sustainable / phase out unsustainable practices	Contributions to SDGs
Recommended measures	Description	Ensure production without external costs	Reduce socio-economic inequality	Safeguard & restore global commons	Enable responsible consumption		
Regulatory and governance framework							
Mainstream biodiversity into public and business decision-making at all levels and across key sectors	**Why:** Economic activities, policies and investment decisions that drive biodiversity loss need to be transformed. To guide this transfomation, biodiversity targets must become integral part of sector policy targets. **How:** Effective biodiversity mainstreaming entails institutional change processes to overcome the related systemic and institutional barriers. For EU and Germany, i.a. the EU Biodiversity Strategy is decisive in this respect. At the international level, the GBF should be supported in terms of scope and contents, which in turn should guide biodiversity positive development cooperation policies and strategies. Projects should aim to support partners' capacities (e.g. NBSAPs) to co-create strategies, solutions and sustainable business models together with planning and finance authorities, economic sectors and businesses.	+	(+)	+	+	IN + OUT	2 ZERO HUNGER; 6 CLEAN WATER AND SANITATION; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION; 14 LIFE BELOW WATER; 15 LIFE ON LAND
Integrate the biodiversity and climate change agendas and actions	**Why:** Climate and biodiversity goals are highly interdependent and will benefit from being pursued jointly. Removing the structures that cause both biodiversity loss and contribute to climate change should be a priority. **How:** Support (better) integration of both agendas in research, policy, planning and practice within all three roles. Promoting nature-based approaches with robust environmental and social safeguards can be part of the solution.	(+)	(+)	(+)	(+)	IN + OUT	13 CLIMATE ACTION; 14 LIFE BELOW WATER; 15 LIFE ON LAND
Accelerate transformation through regulation of global supply chains	**Why:** Legal regimes are a major determinant of power, governance and value creation within supply chains and can ensure better social and environmental standards, requiring companies to conduct due diligence. Highest potential lies in making companies liable along their supply chains. **How:** Even if global impact might initially be limited, Germany and EU should lead by example. Approaches include import and supply chain legislation, e.g. for forest-related and fisheries-related supply chains. A uniform European set of rules should be pursued. Beyond regulation, innovative techniques or technology, such as "forest-smart" mining techniques could be supported in international and development cooperation.	+	(+)	+	+	IN + OUT	8 DECENT WORK AND ECONOMIC GROWTH; 10 REDUCED INEQUALITIES; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION; 14 LIFE BELOW WATER; 15 LIFE ON LAND
Reorient finance towards green and sustainable investments	**Why:** To transform economies requires both, long-term investments in sustainable economic activities and projects, and withdrawing investments from fossil fuels (divestment) and other environmentally harmful practices. **How:** The EU taxonomy for sustainable finance should be further developed as a leading standard. This entails avoiding any dilution so that it can reliably guide investors and appropriate regulatory measures to establish clear obligations for companies to record and publish all negative impacts on global commons. Partner countries can be supported in creating conditions for developing green financial markets and mobilizing private investments (crowding in), e.g. through blended finance approaches.	+	(+)	+	(+)	IN + OUT	12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 14 LIFE BELOW WATER; 15 LIFE ON LAND **All others indirectly**
Reflect risks to global commons in financing costs	**Why:** The risk of potentially harmful and therefore costly investments should be fully borne by the investor and public money should not be used for such potentially harmful investments (i.a. "do no significant harm") related to the global commons. **How:** Work together with reinsurance companies to reflect the risk of biodiversity and ecosystem services fragility in the price for providing capital – be it via investments or re/insurance.	+		+	(+)	OUT	12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 14 LIFE BELOW WATER; 15 LIFE ON LAND
Use and promote the use of alternative human well-being metrics domestically and internationally	**Why:** The current prime economic indicator, GDP, does not accurately reflect several important dimensions of economic development, e.g. it misrepresents the value of biodiversity and ecosystems. Other dimensions of development and prosperity (e.g. health, education, social cohesion, happiness) would provide much better orientation for public decision making than a single flawed economic indicator. **How:** Germany could experiment at national level and support at EU and international level to promote the use and ultimately galvanize a coherent set of metrics to guide government policies and help to change narratives around economic success. Development cooperation could play a special role in empowering voices, perspectives and world views from the global south.	(+)	(+)	(+)	(+)	IN	3 GOOD HEALTH AND WELL-BEING; 8 DECENT WORK AND ECONOMIC GROWTH; 14 LIFE BELOW WATER; 15 LIFE ON LAND; 16 PEACE, JUSTICE AND STRONG INSTITUTIONS

Table 9.1: cont.

Recommendations applicable in all three roles		Ambition: Direct or (indirect) contribution to global ambitions for transformative change				Can be used to phase in sustainable / phase out unsustainable practices	Contributions to SDGs
Recommended measures	Description	Ensure production without external costs	Reduce socio-economic inequality	Safeguard & restore global commons	Enable responsible consumption		
Engagement and partnerships							
Intensify multi-stake-holder partnerships, motivate them to advance broader system change	**Why:** Multi-stakeholder partnerships (e.g., private sector and civil society) function much more effectively with continued support and orientation. German involvement in such partnerships – inter alia in the forest and marine sector – has contributed to substantial results in tackling complex challenges. **How:** Intensify commitment to long-term multi-stakeholder partnerships (as an essential governance structure) based on best-practice partnership pathways.	(+)	(+)	(+)	(+)	IN + OUT	13 Climate Action; 14 Life Below Water; 15 Life on Land; 16 Peace, Justice and Strong Institutions; 17 Partnerships for the Goals
Support alliances for responsible production and consumption	**Why:** Achieving sustainable patterns of consumption and production is critical for decoupling economic growth from environmental degradation. It also offers opportunities for the Global South in terms of new markets and more welfare-generating management of the global commons. It needs concerted efforts across sectors and from all parts of society. **How:** Create and support spaces for experimentation and upscaling both domestically and globally. Entrypoints include supporting of international and local platforms for action-oriented collaboration and social alliances between producers and consumers. For example, support actors that aim for alternative food systems, to unite the fragmented governance and work with them to identify and remove misaligned incentives.	(+)	(+)	(+)	+	IN + OUT	2 Zero Hunger; 8 Decent Work and Economic Growth; 10 Reduced Inequalities; 12 Responsible Consumption and Production
Knowledge for transformative change							
Fund inter-national, inter- and trans-disciplinary research initiatives on transformative change	**Why:** Transformative knowledge is the type of knowledge needed to challenge the status quo, break with path dependencies and to devise innovative solutions. **How:** Dedicate research funding and international research partnerships to an explicit transformative change research agenda. Target initiatives that seek concrete solutions for achieving the four ambitions identified with a strong focus on delivering transformative knowledge and action. Support research in partner countries and the inclusion of local and traditional knowledge.	(+)	(+)	(+)	(+)	IN + OUT	17 Partnerships for the Goals
Support leader-ship and capacity building	**Why:** The ability of individuals, leaders, organizations and societies to rethink economy and society and to initiate and perform transformative changes needs to be empowered. **How:** Support future leaders and potential change agents from all countries to develop critical competencies and provide opportunities and platforms for international exchange in working environments also beyond political summits. Align education and training formats offered through development cooperation to include transformation knowledge and skills. Foster (development of) formats for deliberating on needs, attitudes and values, on organizational culture and change management experiential formats and make sure that youth plays a key role.	(+)	(+)	(+)	(+)	IN + OUT	4 Quality Education; 16 Peace, Justice and Strong Institutions; 17 Partnerships for the Goals
Incubate social inno-vations	**Why:** Social change needs innovation and experimentation to develop new narratives and mindsets, to change the relations between civil society, government and market and to challenge and alter institutions. **How:** Support physical and mental spaces for learning and discussion and a culture of experimentation. Help to spread ideas across policy and thematic areas, support young change makers and networking. Priority topics could be building a sharing economy, or transforming diets to reduce per capita consumption of meat, fish and animal products adapted to the cultural context.	(+)	(+)	(+)	(+)	IN	4 Quality Education; 16 Peace, Justice and Strong Institutions; 17 Partnerships for the Goals
Support the exchange of trans-formative knowledge	**Why:** Knowledge on transforming systems is scarce and scattered. **How:** Strengthen global learning through development and international cooperation, e.g. by providing support to initiatives that promote knowledge and innovation exchange. This includes the dissemination of transformative knowledge from Germany and the EU and likewise learning from successes elsewhere.	(+)	(+)	(+)	(+)	IN + OUT	4 Quality Education; 17 Partnerships for the Goals

9.2 Recommendations for German policies and Germany's role in the EU

Germany and the EU, as an important economic area, should act as role models by decoupling economic activity from resource consumption as far as possible. To effectively protect the global commons of biodiversity, forests and the ocean in particular, social and ecological risks and costs should be significantly reduced and any remaining costs and risks must be "priced into" political and economic action. This "mainstreaming" of climate and biodiversity concerns within all economic activities is a central component of a systematic anchoring of social and ecological sustainability in our societies.

For German policies, there is untapped potential for harnessing transformative power and dynamics both domestically and jointly within the EU as a key player in trade policy, environmental and development policy. As the largest member state and contributor, as well as one of the largest donors of development funds, Germany has special opportunities and responsibilities. For example, the BMZ, as Ministry for international collaboration, is central to this due to its responsibility in conceptualising German development cooperation and in steering Germany's contributions to international organisations. For this reason, **BMZ should actively engage in societal discussion processes on transformative change** and contribute to the evolution and dissemination of ideas and positions across policy and thematic areas. This includes striving for new alliances to achieve synergistic collaboration across ministries and parties in Germany, also for ratcheting up the German Sustainability Strategy. It should also expand engagement in shaping policies and initiatives at the EU level to reconcile the interest of European and partner countries. Entry points and relevant policy processes include the European Green Deal, the EU Biodiversity Strategy for 2030, the Farm to Fork Strategy and also EU actions on international ocean governance.

Other priorities include phasing-out harmful subsidies, redirecting financial flows towards sustainable action, regulatory approaches for forest- and fisheries-related supply chains secured by effective certification processes. These measures are in fact being pursued by the EU, and Germany can make strong proposals and help to build alliances and understanding.

Table 9.2: Recommendations for German policies and Germany's role in the EU

Further specific recommendations for German policies and Germany's role in the EU		Ambition: Direct or (indirect) contribution to global ambitions for transformative change				Can be used to phase in sustainable / phase out unsustainable practices	Contributions to SDGs
Recommended measures	Description	Ensure production without external costs	Reduce socio-economic inequality	Safeguard & restore global commons	Enable responsible consumption		
Align and ensure ambitious implementation of European Green Deal, Biodiversity Strategy 2030 & Farm to Fork Strategy	**Why:** Transforming agri-food systems in the EU is an important contribution to reduce pressure, also in other parts of the world. **How:** Strengthen agroecological approaches – as a stepping stone towards robust, productive and equitable agri-food systems embedded in ecological cycles – in the EU and globally. Promote true costs in agricultural policy (i.e. make social and environmental costs of production transparent and internalise them), apply the 'polluter pays principle', support farmers to make the transition.	+	+	+	+	IN + OUT	2 ZERO HUNGER; 6 CLEAN WATER AND SANITATION; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION; 14 LIFE BELOW WATER; 15 LIFE ON LAND
Support research and development towards a circular economy	**Why:** The renewable energy transition and circular economy entails a growing demand for energy storage. The batteries used for this purpose require large amounts of mineral resources, the extraction (e.g. Lithium) causes large environmental and social side-effects while recycling of batteries is still underdeveloped and large amounts of waste are produced. **How:** Redirect e.g. fuel subsidies to supporting the circular economy within the EU. Focus much more on the systemic transformation of production and consumption, where least progress has been achieved so far. Focus on absolute reduction of resource extraction e.g. by increasing lifespans of products, sharing and reuse; shift production of bio-based materials to systems relying on and fostering ecological cycles rather than simply increasing bio-based substitutes.	+	(+)	(+)	+		7 AFFORDABLE AND CLEAN ENERGY; 9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
Improve sustainable public procurement	**Why:** Sustainable public procurement spending can create a shift in demand and helps to build awareness. **How:** Consistently align public procurement with environmental and social goals. Change public auditing rules to create possibilities to remunerate more sustainable alternatives. Actively phase-out unsustainable products and practices.	(+)	(+)	(+)	+	IN + OUT	12 RESPONSIBLE CONSUMPTION AND PRODUCTION
Identify and redirect subsidies harmful to global commons and sustainability, in Germany and the EU	**Why:** These subsidies reinforce (incentivise) modes of production which are currently undermining the global commons and make sustainable production less competitive. **How:** Prioritise reducing subsidies that support activities that both contribute to biodiversity loss and create large emissions. Systematically identify and publicly report subsidies, including why they are harmful.	+	(+)	+	(+)	OUT	8 DECENT WORK AND ECONOMIC GROWTH; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 14 LIFE BELOW WATER; 15 LIFE ON LAND

9.3 Recommendations for Germany's role in international cooperation

There is clear indication that governments jointly need to **change ground rules** in several sectors, **so that individual and business decisions enhance sustainability** rather than undermine it. Potential for such changes lies e.g. in global supply chains, the financial sector, and trade agreements.

An essential precondition for governments and ultimately the UN to maintain their ability to shape our common future is the need to **assert the primacy of international human and environmental rights law**. Currently, a whole set of legal rules are in place to protect investors' rights in the frame of the World Trade Organization or the investment-related clauses of free-trade agreements. This can seriously limit the capacity of any government to protect global commons and needs to be changed as it increases inequality and ecosystem degradation. Besides tabling proposals and strong commitments to achieve international agreements, single countries such as Germany can take critical first steps such as increasing transparency, giving non-governmental organisations rights to file action or to sue, changing burdens of proof, or strengthening the application of the precautionary principle.

The work of the **Biodiversity Convention will benefit from the greatest possible complementarity with both the 2030 Agenda and the Paris Climate Agreement**. Focussing on synergistic strategies that link biodiversity and climate goals with each other and with national development strategies is needed. This cannot be achieved through environmental and nature conservation policy alone. Therefore, the participation of all levels and departments of government and a whole-of-society approach in developing and implementing future biodiversity strategies should be sought. Implementation, review and reporting need to be strengthened and better aligned with targets and indicators of other agendas (e.g. SDGs, NDCs, land restoration plans under United Nations Convention to Combat Desertification).

Deforestation-free production chains as promoted by the EU, as well as the effective enforcement of the new EU regulation on deforestation-free products will hopefully illustrate the potential and form the basis to advocate for similar legislation at the international level as well. Further options are guiding and supporting companies on this path. Initiatives and projects have shown that integrated landscape management (jurisdictional approach) and sustainable forest management can reduce the pressure on forest ecosystems by reducing one of the main drivers of deforestation, the land conversion to agricultural areas.

Closing the ocean governance gap is imperative to reduce negative human impacts and create a sustainable ocean economy that facilitates equitable access to and distribution of ocean wealth. The predominantly sectoral orientation and institutional fragmentation of international marine governance must be overcome and transformed into an integrated system that enables international coordination and cooperation and the transparent negotiation of particular interests.

Global alliances (of the willing) and multi-actor partnerships from politics, civil society, academia and the private sector can provide scope for action where multilateral efforts still struggle to create political momentum and to provide additional impulses to strengthen international policy agendas.

Table 9.3: Recommendations for international cooperation

Further specific recommendations for Germany´s role in international cooperation		Ambition: Direct or (indirect) contribution to global ambitions for transformative change				Can be used to phase in sustainable / phase out unsustainable practices	Contributions to SDGs
Recommended measures	Description	Ensure production without external costs	Reduce socio-economic inequality	Safeguard & restore global commons	Enable responsible consumption		
Interventions for restructuring global governance (in addition to measures on regulation and governance in Table 9.1)							
Improve international trade agreements	**Why:** Trade agreements do not adequately consider their environmental and social impacts and their negotiations are too confidential to allow adequate public and political examination (to flag these issues). **How:** Develop verifiable anchoring of sustainability criteria in international trade agreements, including effective sanctioning mechanisms. Ensure that trade agreements do not place the protection of investments above the protection of common goods. Ensure adequate public debate in all stages of negotiation.	+	+	(+)	(+)	IN + OUT	8 Decent Work and Economic Growth; 10 Reduced Inequalities; 12 Responsible Consumption and Production; 17 Partnerships for the Goals
Assert the primacy of international human and environmental rights law	**Why:** While human rights are broadly agreed they are often difficult to claim or invoke, especially by local actors and for environment-related infringements. In addition, legal rules which currently protect investor rights (e.g. in the frame of trade agreements) limit the capacity of governments to regulate in favour of social and environmental goals. **How:** Amplify rights and opportunities to access information and institutions of justice. Ensure the primacy of international human rights law and environmental rights law. Extend these rights e.g. by finalising the establishment of the right 'to a healthy environment' at UN level.	+	+	+	+	OUT	13 Climate Action; 14 Life Below Water; 15 Life on Land; 16 Peace, Justice and Strong Institutions
Globally stop subsidies harmful to global commons and to sustainability in general	**Why:** This important measure has been agreed for decades and global progress has been very limited. It now needs specific action plans. International agreements can help governments to actually take action. **How:** Increase accountability at international level, e.g. CBD parties could agree on OECD proposal "All countries should systematically identify, assess and track public expenditure harmful to biodiversity" (OECD 2020: 3) within 2 years and make this information publicly available. Agreeing on halving by 2025 and phasing out all environmentally harmful subsidies by 2030 at the latest.	+	(+)	+	(+)	OUT	8 Decent Work and Economic Growth; 12 Responsible Consumption and Production; 14 Life Below Water; 15 Life on Land
Interventions specifically targeted to biodiversity, forests and ocean governance							
Ensure direct and indirect drivers of biodiversity loss are targeted in the Post-2020 GBF	**Why:** Assessment reports are clear on the need for transformative change for biodiversity which addresses the direct and especially also the indirect drivers of loss. **How:** Increased attention should be paid to specific agreements regarding the reduction of the footprint of production and consumption, especially of rich countries. Investing in sustainable agri-food systems and integrative landscape planning, restoration and management are among the priorities, while responsibilities should be shared among different ministries and between stakeholders from public and private sectors.	+	+	+	+	IN + OUT	14 Life Below Water; 15 Life on Land
Advocate for human rights-based approaches in the Post-2020 GBF	**Why:** Human rights-based approaches are considered promising to strengthen the legal basis for conservation efforts and to effectively and equitably conserving biodiversity and other global commons. **How:** Ensure that human rights, land and resource rights and in particular the specific rights and contributions of indigenous peoples, afro-descendants, local communities, peasants, rural women, and rural youth are acknowledged in the Post-2020 Global Biodiversity Framework (GBF).	+	+	+	(+)	IN + OUT	1 No Poverty; 2 Zero Hunger; 10 Reduced Inequalities; 14 Life Below Water; 15 Life on Land; 16 Peace, Justice and Strong Institutions

Table 9.3: cont.

Further specific recommendations for Germany´s role in international cooperation		Ambition: Direct or (indirect) contribution to global ambitions for transformative change				Can be used to phase in sustainable / phase out unsustainable practices	Contributions to SDGs
Recommended measures	Description	Ensure production without external costs	Reduce socio-economic inequality	Safeguard & restore global commons	Enable responsible consumption		
Interventions specifically targeted to biodiversity, forests and ocean governance cont.							
Promote inclusive approaches to conserving biodiversity	**Why:** In the light of the envisaged increase in global protected and conserved areas (30x30 target), the global community should recognize the pivotal role of indigenous people and local communities in achieving the target. **How:** Forge equitable alliances that support sustainable management of traditional lands, fisheries-management areas, indigenous territories and other lands. Ensure that for example the requirements for OECMs are designed in such a way that they contribute to the conservation of important biodiversity and ecosystem services while strengthening a broad range of governance models and comply with the United Nations Declaration on the Rights of Indigenous Peoples.	+	+	+		IN + OUT	1 NO POVERTY, 2 ZERO HUNGER, 10 REDUCED INEQUALITIES, 14 LIFE BELOW WATER, 15 LIFE ON LAND, 16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Promote a whole-of-society approach in both targets and goals as well as implementation of the Post-2020 Global Biodiversity Framework	**Why:** Implementation, review and reporting need to be strengthened and better aligned with other agendas (e.g. SDGs, NDCs, restoration plans under UNCCD). Commitments and potential action from all sectors of society should be encouraged and brought together within the NBSAPs and other means of implementation. **How:** Strive for explicit inclusion of all levels of government and non-state actors, including the private sector, in future NBSAPs. Focus on those groups that have a critical role to play in delivering biodiversity outcomes and sectors that drive biodiversity loss. Encourage them to make meaningful commitments.	(+)	+	+	(+)	IN	13 CLIMATE ACTION, 14 LIFE BELOW WATER, 15 LIFE ON LAND
Strengthen ocean governance and Integrated Ocean Management (IOM)	**Why:** Alliances or coalitions – such as the High-Level Panel for a Sustainable Ocean Economy – should seek to strengthen the knowledge and action base of ocean governance and IOM. **How:** Support the harmonisation and implementation of the existing regulatory frameworks and liability regimes.	+	(+)	+	(+)	IN	14 LIFE BELOW WATER, 16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Integrate ocean health into existing frameworks	**Why:** An ocean health approach helps to understand and manage the ocean as a connected system while considering the interactions between ocean health and human health. Thus, it can contribute to improved responses to ocean management and to better integration of the ocean, climate and biodiversity agendas. **How:** Promote a better integration of marine and coastal concerns into existing frameworks (e.g. UNFCCC, CBD) and an implementation agreement on biodiversity conservation on the high seas under UNCLOS.	(+)	(+)	+		OUT	14 LIFE BELOW WATER
Support initiatives to reduce the pressure on forests	**Why:** Initiatives and processes for forest conservation and sustainable forest management at the European and global level, such as the EU FLEGT Regulation or the Bonn Challenge for forest restoration at the landscape level, already play an important role but are not sufficient. **How:** Ratchet up existing EU regulation and lobby for global agreements on regulatory approaches that commit producers to deforestation-free production of agricultural products, timber and minerals backed by certification processes (e.g. import regulation, supply chain legislation). To avoid leakage and to ensure forests are protected, jurisdictional approaches with clear regulations and enforcement are required, including Free Prior and Informed Consent of Indigenous Peoples as a project precondition.	+	(+)	+	(+)	IN + OUT	12 RESPONSIBLE CONSUMPTION AND PRODUCTION, 3 GOOD HEALTH AND WELL-BEING, 15 LIFE ON LAND

9.4 Recommendations for German Development Cooperation

Transformative change means doing things differently, and it also means not doing certain things anymore. To ensure German development cooperation´s allocation criteria and patterns, instruments and structures align with its stated intentions, **German development cooperation should** be open to revisit current strategies and explicitly **promote transformative approaches** including **a plan for phasing out funding** that supports approaches and management regimes which **cause biodiversity loss and ecosystem degradation**. Given the strong commitment to agriculture, forestry and fisheries and the central role these sectors play not only for biodiversity and ecosystems but also for food security, livelihoods and rural development, **sustainable land and sea management**, and, in particular, **agroecological approaches**, should be promoted as a matter of priority.

Moreover**, the commitment to biodiversity, forests and oceans should be extended and additional funds mobilised**. Economic recovery measures after Covid-19 should be made biodiversity- and climate-friendly and prioritise action that contributes to the restoration of forest landscapes, the protection of remaining natural forests and marine protection.

Deliberation and emancipatory agency are key for transformative change processes. This includes deciding together with partner countries and organisations where support can best encourage transformation; given that transformation requires adaptation and inclusiveness projects would benefit from less rigorous pre-planning in favour of more flexibility. Knowledge management and transfer is at the core of development cooperation, and transformative knowledge is critical to change processes. Therefore, German development cooperation should focus on building transformative knowledge and capacities. Agency can be increased by supporting knowledge co-production, e.g., by means of transdisciplinary, solutions-oriented projects, strong inclusion of indigenous and local as well as experiential knowledge held by practitioners, and by creating spaces that recognise and respect different values, understandings and knowledge systems. Effective solutions can only be achieved by giving social and environmental justice appropriate priority.

Table 9.4: Recommendations for German development cooperation (strategic and operational levels)

Further specific recommendations for Germany´s role in international cooperation		Ambition: Direct or (indirect) contribution to global ambitions for transformative change				Can be used to phase in sustainable / phase out unsustainable practices	Contributions to SDGs
Recommended measures	Description	Ensure production without external costs	Reduce socio-economic inequality	Safeguard & restore global commons	Enable responsible consumption		
Strategy and operational level							
All cooperation investments should (ultimately) serve the sustainability transformation	**Why:** As long as many investments in partner countries follow or deepen unsustainable trajectories, the costs of transformative change will further increase and remain prohibitively high. **How:** Review the financial flows and products in development finance and tighten the rules. Consistently phase-out public funding for rural development and agriculture projects that do not have a proven positive impact on biodiversity and climate. Set criteria for project funding (e.g. following the EU sustainable finance taxonomy). Establish strict sustainability criteria for development funds on the capital market. Likewise, Covid-19 recovery pledges and plans should aim to restructure the economy and society to less nature- and climate-damaging practises and reduce inequality.	+	+	+		IN + OUT	**All (indirect)**
Realign full range of portfolios to safeguard global commons and support nexus approaches	**Why:** Overarching system change goes beyond sector boundaries. Innovation portfolios and funds that allow for further mainstreaming of biodiversity and climate change are needed to explore, demonstrate and scale-up integrated solutions. **How:** Design coherent and holistic approaches with high operational flexibility that stimulate innovative work instead of commitments for sector-based or institutional goals and targets, e.g. through jurisdictional, nexus or One Health approaches.	(+)	(+)	(+)		IN + OUT	1 NO POVERTY, 3 GOOD HEALTH AND WELL-BEING, 10 REDUCED INEQUALITIES, 13 CLIMATE ACTION, 14 LIFE BELOW WATER, 15 LIFE ON LAND, 16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Integrate pro-active approaches to resistance in the design of development cooperation measures	**Why:** Dealing with resistance and vested interests is a core issue of transformative change. Development cooperation measures should support partner organisations in dealing with actors with a vested interest in the status quo. **How:** Promote transformation partnerships and coalitions of the willing that contribute to challenge the status quo by deconstructing ideologies and by shifting power dynamics, e.g. by involving company headquarters in Germany or the EU in the discussion of practices in developing countries. Align capacity development in this respect.	+	+	(+)	(+)	IN + OUT	10 REDUCED INEQUALITIES, 12 RESPONSIBLE CONSUMPTION AND PRODUCTION, 13 CLIMATE ACTION, 14 LIFE BELOW WATER, 15 LIFE ON LAND, 16 PEACE, JUSTICE AND STRONG INSTITUTIONS
Extend engagement in trilateral cooperation	**Why:** Joint approaches within partnerships can connect South-South with North-South cooperation: positive contributions include regional integration, knowledge and technology transfer, and the advancement of cooperation approaches. Project experience suggests trilateral approaches are often better prepared and benefit from conceptual co-development by different partners. **How:** Create an impact-oriented strategy based on a thorough exploration of compatible interests and goals and enable mutual and joint learning.	(+)	(+)	(+)	(+)	IN + OUT	10 REDUCED INEQUALITIES, 16 PEACE, JUSTICE AND STRONG INSTITUTIONS, 17 PARTNERSHIPS FOR THE GOALS
Enhance support for the implementation of the Post-2020 Global Biodiversity Framework	**Why:** Biodiversity loss is a development issue. It jeopardizes progress towards the SDGs. The need for international cooperation arises, among other things, from the uneven capacity of countries in the Global South, which harbour some of the greatest biodiversity, to invest in its effective protection. **How:** Further expand the commitment to support partner countries technically and financially in the implementation of their National Biodiversity Strategies and Action Plans. Ensure in the design of the implementation modalities that the local population is closely involved in the development of protection and use concepts, that sustainable (traditional) forms of use are recognised and promoted, and that these enable adequate livelihoods.	(+)	+	+		IN	1 NO POVERTY, 3 GOOD HEALTH AND WELL-BEING, 6 CLEAN WATER AND SANITATION, 12 RESPONSIBLE CONSUMPTION AND PRODUCTION, 13 CLIMATE ACTION, 14 LIFE BELOW WATER, 15 LIFE ON LAND, 17 PARTNERSHIPS FOR THE GOALS

Table 9.4: cont.

Further specific recommendations for Germany´s role in international cooperation		Ambition: Direct or (indirect) contribution to global ambitions for transformative change				Can be used to phase in sustainable / phase out unsustainable practices	Contributions to SDGs
Recommended measures	Description	Ensure production without external costs	Reduce socio-economic inequality	Safeguard & restore global commons	Enable responsible consumption		
Strategy and operational level							
Support the development of viable solutions for mining on land and in the oceans	**Why:** New technologies increase the demand for mineral resources (e.g. electric cars) with increasing pressures on protected and unprotected ecosystems. **How:** Strong regulation and dialogue between policy makers, mining companies, local communities and protection organisations can ensure a consequent and viable implementation of the mitigation hierarchy: avoid, mitigate, restore, compensate. Development measures could create or support participatory platforms.	+	+	+	+	IN + OUT	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE; 12 RESPONSIBLE CONSUMPTION AND PRODUCTION; 13 CLIMATE ACTION; 14 LIFE BELOW WATER; 15 LIFE ON LAND
Promote One-Health approaches	**Why:** One-Health approaches embrace human, animal, and environmental health and their critical interdependence in connection with climate protection, biodiversity conservation and agriculture. **How:** Cooperate with international organisations to establish the approach in international and development policy debates and anchor it in German development cooperation measures.	(+)	(+)	(+)	(+)	IN	2 ZERO HUNGER; 3 GOOD HEALTH AND WELL-BEING; 14 LIFE BELOW WATER

9.4 Call to action

We need a development that "does justice to humanity's obligations to itself and to the planet which is its home" (Justice C.G. Weeramantry, *International Court of Justice 1997).*

Humanity needs to acknowledge that the planet has a limited capacity to satisfy seemingly unlimited human needs. It is not the planet we need to save but rather the ecosystems and the flow of benefits on which societies depend. This will be a decisive decade, and 2022 is a crucial year for the biodiversity agenda to continue creating momentum and defining further goals and implementation modes. The Covid-19 pandemic and the twin crises of climate change and biodiversity loss remind us of the urgency to ensure sustainable and just human development as they heavily "impact (mostly in negative ways) people's quality of life" (IPBES 2021: 7).

The global commons discussed in this report – biodiversity, forests, and the ocean – are in peril. To maintain the commons and thus the planet in a healthy and liveable state, humankind needs to radically transform its ways of operating. This is largely consensus among the scientific community, as our review of recent global assessment reports demonstrates. Societies and communities across the globe show that changes are possible, needed and desired.

Ideas for sustainable alternatives are amply available, but knowledge for changing current pathways, the required alliances, and compelling visions are still weak. All of society must do more, especially governments and private businesses. According to our framework, transformative potential increases when actions connect to such compelling visions by strategic knowledge, while at the same time considering dynamics and truly emancipatory politics. From what we know, this can lead to the leap forward required to safeguard the global commons.

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This report analyses the findings and recommendations on global commons from international environmental assessments. Key insights from this analysis include:

- We need to shift from the paradigms of economic growth and resource efficiency towards the ideas of societal well-being and resource-sufficiency.
- We need to transform societal priorities and reform our institutions and the way they cooperate.
- We need to change the basic rules of how economic activities make use of global commons, thus we need to transform our economic models and link the international economic agenda – especially trade policies, production and consumption – to sustainability objectives.
- We need to redesign the financial systems for delivering sustainable development.
- We need to change how we view and value nature.
- We need to dovetail technical and /digital transformations and sustainability transformation so that risks are regulated and potentials are used in the best possible way.
- We need a stronger role of governments in setting high social and environmental standards, regulations and effective enforcement.

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