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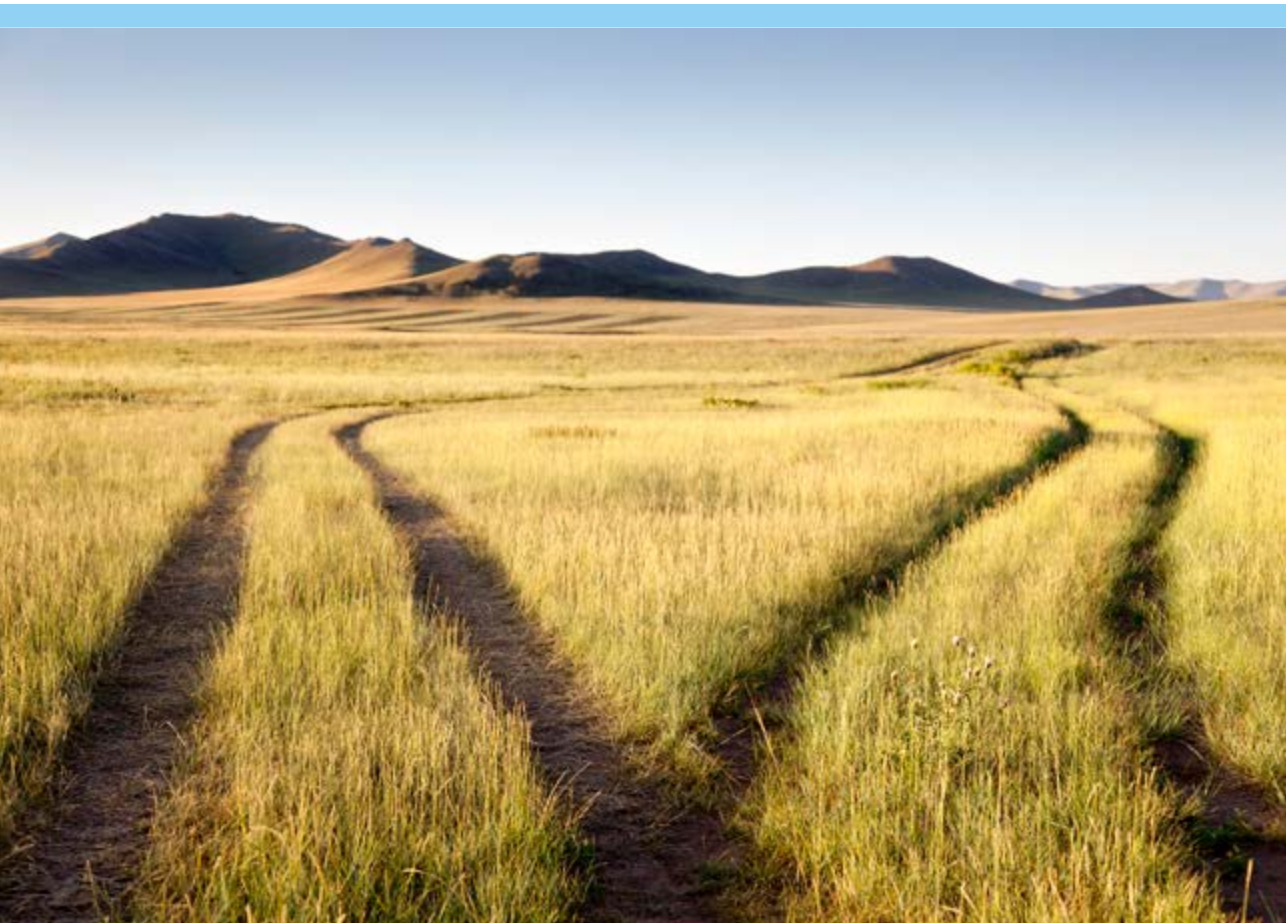
EXPLORING NATURE-POSITIVE PATHWAYS

A CONTRIBUTION TO THE IMPLEMENTATION OF THE CBD POST-2020 GLOBAL BIODIVERSITY FRAMEWORK



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Exploring nature-positive pathways. A contribution to the implementation of the CBD Post-2020 Global Biodiversity Framework – Full report

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Contents

Foreword

This report addresses one of the major challenges humanity is facing: taking responsibility for addressing the root causes of biodiversity loss and restoring nature to fulfil the ambition to make humans live in harmony with nature. It was written in the run-up to the 15th Conference of the Parties to the UN Convention on Biological Diversity (CBD). COP-15 was originally scheduled to be held in Kunming (China) in 2020, but was postponed due to the COVID pandemic and will now be held in December 2022, in Montreal (Canada), under the presidency of China. This conference will take place at a time when the intractable linkages between climate change and biodiversity loss are becoming increasingly visible and we are in need of solutions to both problems.

This UN conference will set the agenda for biodiversity policies for the coming decade. It aims to provide a transformative framework for biodiversity, including a new set of targets for the coming decade to achieve just transitions towards nature-positive societies. The success of a new global framework on biodiversity governance relies on combining 'whole-of-government' and 'whole-of-society' approaches to achieve nature-positive development pathways and taking a holistic approach towards the multiple values of nature. The challenge for governments in implementing this framework will be to build productive linkages between these whole-of-government and whole-of-society approaches in order to deepen and accelerate a just transition towards nature-inclusive societies. The worldwide efforts on biodiversity that are made by citizens, indigenous and local communities, NGOs, business and finance provide a very welcome signal and create important opportunities for realising the transformative changes that are needed.

This report analyses two alternative pathways to achieve ambitious long-term biodiversity goals, reflecting the multiple values of nature, while achieving the objective of staying well-below the 2 °C global warming target (Paris Agreement) and ensuring food security (Sustainable Development Goal 2). This analysis shows the necessity of combining strong conservation policies with those on climate mitigation and reforming food and energy systems, if we are to 'bend the curve for biodiversity' and restore nature. The question that is addressed in this report, but is often left untouched in scenario analyses, is how to achieve these transformative changes and what governments can do to make this happen.

This report presents transformative governance arrangements that will contribute towards achieving nature-positive development pathways that are highly relevant for a broad approach towards nature policy in various contexts, such as rural landscapes, supply chains and cities. The challenge for government authorities will be to build on the energy that is there in society, in order to enable these transitions and act on developing new, nature-positive and climate-neutral pathways and abandoning those that are unsustainable.

Addressing the root causes of biodiversity loss and climate change requires a systemic understanding of the transformative changes, which also needs to be combined with addressing the structural dimensions of changing underlying values in society, as well as of production and consumption systems. Only then will actions in the coming decade result in a step towards achieving the CBD 2050 vision of living in harmony with nature.

I sincerely hope that this report will contribute to the implementation of CBD's post-2020 global framework on biodiversity governance and inspire the exploration of nature-positive development pathways!

André van Lammeren, PhD

Acting Director-General
PBL Netherlands Environmental Assessment Agency

Summary

Given the lack of progress in achieving international targets on biodiversity, a fundamental change in biodiversity policy worldwide is crucial.
Purely incremental changes in nature governance cannot reverse the trend of biodiversity loss. Transformative change of the socio-economic root causes that drive biodiversity loss is required, not only to halt the loss of biodiversity but also to restore nature worldwide. In addition to large-scale protection and restoration efforts, reorganisation of production and consumption patterns will also be essential.

To bend the curve of biodiversity loss, conservation efforts need to be complemented by a broader set of sustainability measures, especially strong ones on climate change mitigation in energy and food systems, including dietary changes away from meat and dairy.
A quantitative analysis of solution-oriented scenarios shows that ambitious conservation efforts alone will not be enough to bend the curve of biodiversity loss, and might even increase trade-offs between conservation and other sustainability goals, such as food security. To achieve biodiversity, climate and food security goals together, ambitious conservation strategies need to be complemented by broader sustainability measures. These measures include climate mitigation in line with the 1.5 °C objective of the UNFCCC, reduction in meat and dairy consumption and food waste, and making agricultural production more sustainable. Consumption changes, in particular, are key to avoid trade-offs in combined biodiversity, climate and food security policy agendas.

Building on the increasing nature-related efforts by non-state and state actors on sub-national levels provides opportunities for realising transformative change.
Over the past years, there has been an increase in the contributions from non-state and state actors on regional and local levels (e.g. cities, regions, companies, NGOs, and indigenous peoples) to conserve and restore nature. The CBD calls this a 'whole-of-society' approach to change, which is also recognised in its post-2020 Global Biodiversity Framework. The CBD could build on this 'groundswell of action' to strengthen future implementation, as these initiatives provide the seeds of transformative change for biodiversity. However, there are barriers to scaling up these bottom-up efforts, such as a lack of both recognition and adequate governmental policies to support these initiatives. The question, then, is how non-state actors and state-actors on local and regional levels could be more effectively supported by their national government and international institutions to achieve the transformative changes that are needed.

Multiple nature-positive pathways are possible in rural landscapes, supply chains and cities.
The objective of a nature-positive future is defined as reversing nature loss to achieve a net positive improvement by 2030 (i.e. resulting in more biodiversity and nature in 2030 than we have today), with full recovery by 2050 (requiring large-scale restoration of nature). This report explores what nature-positive pathways could mean in three specific configurations of societal actors and nature: rural landscapes, supply chains, and cities. The configurations are networks where non-state actors and state actors on sub-national level and national governments are considered together with different types of nature (e.g. agricultural lands, wild areas, urban parks). The analysis shows that options for nature-positive pathways are available to the non-state and sub-national state actors in these configurations. This points to the possibilities for national governments to develop policy strategies aimed at actors in these specific contexts to enable transformative change.

Achieving ambitious nature goals must happen within a framework of multiple values of nature in which attention to justice is essential.
To support a whole-of-society approach, government authorities should recognise and support the multiple ways that stakeholders value, depend on and integrate nature in their operations and activities. Recognising and rewarding multiple values of nature would provide national governments with an opportunity to strengthen non-state actors and state actors on sub-national levels in their commitment to change. Government authorities need to deal with power imbalances between stakeholders and economic sectors to ensure a just transformative change and avoid adding to socio-environmental injustices, marginalisation and harm to certain groups within society.

Rural landscapes are key in any transformation towards a nature-positive future as they contain key biodiversity hotspots, host food production systems and accommodate other important human activities.
Rural landscapes are contested areas where multiple actors compete to shape and govern them. Currently, sectoral approaches still dominate the governance of rural areas, which are characterised by the co-existence of conservation, agriculture, tourism, forestry and other sectors. These approaches often fail to integrate the various sectors and ecosystems within rural landscapes. For transformative change, rural landscape governance needs to move away from sectoral approaches and adopt integrated landscape approaches where the different sectors, stakeholders, and both managed and natural ecosystems come together to deal with differing interests, prevent trade-offs and optimise synergies towards nature-positive approaches and overcome siloed sectoral ones. Landscape approaches offer opportunities for enabling a transition away from the still common top-down approaches to rural landscape governance and supporting bottom-up initiatives and decision-making. This can empower local actors and build on the ways they value, depend on and use nature.

Considering the strategic role that rural landscapes play in nature-positive transformations, it will be necessary to address power imbalances between multiple actors. Landscape approaches must result in a change in the distribution of material resources across all stakeholders. Historically marginalised and oppressed groups, such as indigenous peoples and local communities, women and youths, should be included and empowered to achieve

a just transition. National governments can support integrated landscape approaches in rural areas via a set of policy tools, ranging from decentralisation of decision-making to the creation of local partnerships and platforms for knowledge-sharing and collaborations, to financial aid and the deployment of local investment tools. Finally, they could organise the process of inclusive land-use planning, secure land tenure and define environmental regulations to facilitate and empower local actors in their negotiations.

Supply-chain action is necessary for business and finance to contribute to the objective of nature-positive approaches and restructure production and consumption patterns.
To reach transformative change, economy-wide transitions are needed for the consumption, processing and production parts of supply chains. This, in turn, calls for collective action by business and finance, and for combining interventions at various steps in the supply chains of food, energy and materials. The focus on supply chains addresses actors with both direct and indirect links to biodiversity loss. There is a large potential for business and finance to contribute to nature-positive approaches. Their actions can be guided by the conservation hierarchy that is promoted in various business-oriented initiatives. Still, incremental changes in existing business models of individual companies will not be enough to reach the objective of transformative change for a nature-positive future. Actors from the financial sector have an important role to play in this by managing the risks of environmental degradation caused by companies within their portfolios and by supporting investment in nature-positive innovations.

When choosing policy instruments to activate companies that are — directly or indirectly — responsible for biodiversity loss, national governments should take motivational factors of companies with different sustainability ambitions into account. Pro-active companies that shape the early phase of innovation can be supported by facilitating and enabling policies, while passive companies can be activated by regulation in the later phases of transition when innovations have to be mainstreamed. This requires a coordinated approach to actors, in both the supply chains and the production landscape in which they operate.

The cross-border character of many supply chains calls for an international governance approach, as there are different jurisdictions involved. Special attention is needed for a fair distribution of the costs and benefits of transitions in cross-border settings. Insights are needed into how the various instruments of non-state actors and state actors on sub-national levels can be combined in producer and consumer countries. Such insights can for instance be obtained by closely following the effects of current policy developments to establish deforestation-free supply chains for agro-commodities.

Cities are crucial arenas for realising a nature-positive future; city dynamics affect direct and indirect drivers of biodiversity loss, both within and beyond their boundaries.
Far too often, practitioners are focusing on how urban growth and land conversion are threatening biodiversity, which tends to neglect the multiple ways in which cities address both direct and indirect drivers of biodiversity loss. Some urban initiatives contribute directly to conserving and restoring biodiversity within cities boundaries, while others are

doing so more indirectly, such as by addressing climate mitigation or by showing people how to use land differently. Yet, despite the increase in urban nature in cities, there are certain barriers to urban greening (e.g. limited private sector investment) that can only be overcome by targeting the underlying structural conditions (e.g. lack of public mandate). Therefore, transformative change in urban development towards nature will require a fundamental shift in the 'urban infrastructure regime' and engagement in the practices of multiple actors across the regulatory, urban development and financial domains — thus, leading to fundamental changes to the ways cities develop and function.

Combinations of various smaller actions are needed, such as establishing partnerships and community-based actions, to create transformative pathways. Policymakers could create their own specific pathway by identifying pivotal stepping stones, based on their particular policy context, to key actions that would enhance urban nature. To this end, a range of regulatory, financial and 'soft' governing mechanisms are available to national and local policymakers, such as the implementation of certain rules, financial rewards, knowledge-sharing and voluntary agreements. In this respect, it is also essential to acknowledge the unequal distribution of urban nature within cities and as well as risk of these inequalities being exacerbated by new interventions to achieve a nature-positive future. Moving forward requires combining stepping stones for various stakeholder groups, while addressing the inequalities that are brought about by pursuing nature-positive futures, creating cities where people and nature can thrive together.

National governments have an important role in supporting and enabling ambitious whole-of-society approaches to realise transformative change for biodiversity.

Many societal actors around the world are already mobilising and taking action for biodiversity, showing the first stages of the transformative changes needed ('seeds of change'). This report suggests that this 'groundswell of action' requires a series of government interventions to accelerate and scale up those efforts. National governments can support these bottom-up efforts by acting on three fundamental levels: systemic, structural and enabling. Acting on these levels simultaneously is needed to avoid trade-offs between agendas and approaches. Government authorities need to work on the systemic level of change, promoting cooperation, innovation and interaction between actors and all sectors and removing those barriers that are currently hindering actors in achieving change and scaling up their efforts. This was clearly demonstrated in the rural landscape configuration where government authorities were suggested to support the creation of a local partnership and roll out financial tools for local investment. Governments must enable and support all historically marginalised and oppressed groups, such as indigenous peoples and local communities. They can enable them by creating opportunities for innovation and empowerment as well as by strengthening capacities. This can be done, for example, by supporting national action agendas. Providing insight into the co-benefits of biodiversity action for other societal goals may provide greater traction for ambitious biodiversity policy, as is shown in the urban context in the links with public health.

This must be coupled with action to alter the structural elements that are currently impeding a just transformative change. Importantly, government authorities have a fundamental role in halting and changing current unsustainable practices and policies, thus working towards nature-positive and zero-fossil economies, amongst other things. Specifically with respect to the supply chain configuration, government authorities need to put policies in place to stop the further destruction of biodiversity hotspots that is caused by commodity trading. Another way of dealing with structural change is for government authorities to create and implement policies that recognise the multiple values of nature as a way of preventing a too-narrow focus on the economic value of nature. In all three configurations, government and international policy should support indigenous peoples and local communities.

The contribution of the CBD post-2020 Global Biodiversity Framework to strengthening whole-of-society approaches.

To achieve the CBD 2050 vision of living in harmony with nature as well as the new goals and targets for 2030, the new global framework on biodiversity governance needs to support national governments as well as the whole of society.

While the importance of whole-of-society approaches for biodiversity is increasingly being recognised, this still needs further attention on an international level, as an integral part of CBD's implementation mechanisms. This may include strengthening the Action Agenda for Nature and People and supporting national action agendas. In this respect, high-level champions can play an important role, also in connecting national and international level action. In addition, aligning with international, national and sub-national goals and policies on climate, food security, sustainable production and consumption and other SDGs and integrating them in nature-positive development strategies is essential. This would also create opportunities for orchestrating non-state efforts in other policy domains. Alongside integrative and inclusive governance processes, experimenting with the inclusion of non-state actors and sub-national government in CBD peer-review processes will help strengthen learning and enabling approaches to attain the new post-2020 goals and targets. Accountability mechanisms that provide insight into the contributions by non-state actors and sub-national government towards achieving the post-2020 goals and targets should also be strengthened further. This is especially important to ensure visibility and credibility of whole-of-society contributions to the goals of the CBD.

MAIN FINDINGS

Main Findings: Exploring nature-positive pathways

Setting the scene

From halting biodiversity loss to also restoring nature …
Given the lack of progress towards achieving internationally agreed goals on biodiversity since 1992, a fundamental change in international and national biodiversity policy is crucial. In 2018, the UN Convention on Biological Diversity (CBD) started negotiations to agree on a new global governance framework for biodiversity. A shift is taking place in defining the objectives of biodiversity policy, from halting biodiversity loss to also restoring nature.

… requires transformative change.
Neither business-as-usual nor incremental changes to the ways in which nature is governed can reverse the trend of biodiversity loss. Nature-positive development can only be achieved through transformative change, a process that will change the underlying societal factors (indirect drivers, root causes of biodiversity loss) that drive development. This includes changing institutions, governance structures, power relationships, paradigms, goals and values (e.g. globalisation, the paradigm of economic growth, values of nature, the relationships between humans and nature). Tinkering around the edges and implementing minor changes will simply not stop further biodiversity loss, let alone promote nature-positive development.

Increasing the contributions that benefit nature from non-state actors and local government provides an important opportunity for realising transformative change.
A new element in CBD's post-2020 global framework on biodiversity governance is its emphasis on a whole-of-society approach for biodiversity policy, next to its traditional focus on government conservation policy. While the inclusion and participation of societal actors in governing nature is nothing new, a whole-of-society approach to change recognises and builds on a society-wide mobilisation of actors. Over the past years, there has been an increase in the contributions from non-state actors and local government (e.g. cities, regions, companies, NGOs, and indigenous peoples) to conserve and restore nature and, historically, certain stakeholders, such as indigenous peoples and local communities, have already been doing so for a long time. The post-2020 framework could build on this 'groundswell of action' to strengthen implementation, as this would help to create

momentum for biodiversity on all levels of society and will empower societal actors. The question is, however, whether the efforts of all of these actors are adequately acknowledged, supported and scaled up by national and international institutions, and, if not, how this could be achieved.

Overview of this study

This report has three **objectives**:

- To show what efforts are needed and what pathways are possible to achieve nature-positive goals;
- To show what non-state actors and local government authorities are already doing to contribute to achieving nature-positive goals in three configurations: rural landscapes, supply chains, and cities;
- To show how national governments and international policies can tap into and support these societal efforts towards CBD's post-2020 goals and targets and its 2050 vision of living in harmony with nature.

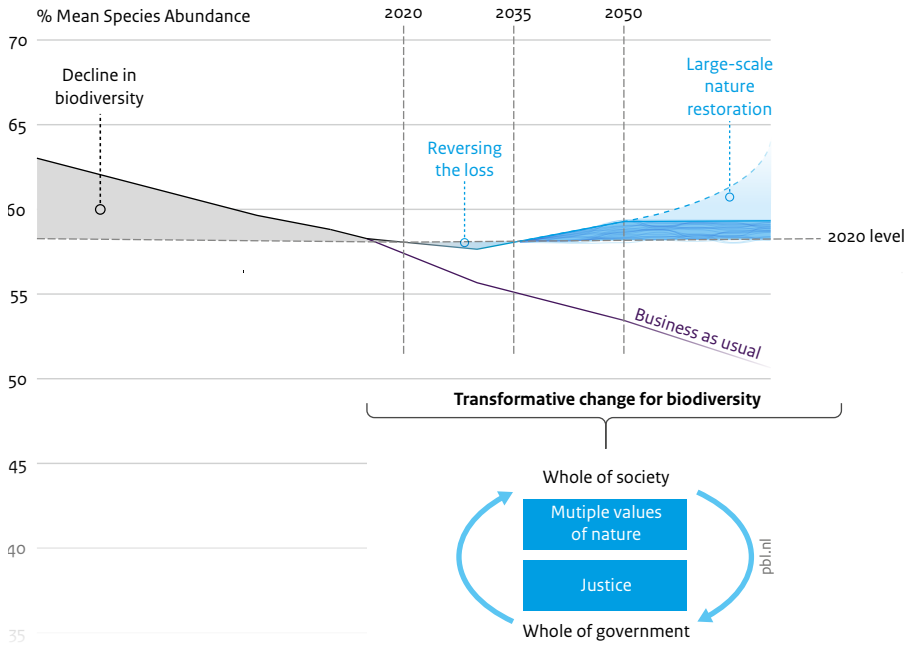
This report can help national and international policymakers to understand how to mobilise, further support and catalyse cooperative biodiversity initiatives by all of these actors.

Approach

This study combines a quantitative model-based analysis of alternative pathways to meet the objective of a nature-positive future, with a governance analysis based on a whole-of-society approach. For this report, we used two recently developed conservation and agriculture scenarios — Half Earth and Sharing the Planet — to elaborate on what efforts are required to achieve nature-positive goals. Both these scenarios meet ambitious biodiversity, climate and food security goals, but differ in the ways they achieve them, as they are premised on different conservation strategies and values of nature.
These scenarios show what nature-positive development pathways can look like on a global level.The scenario analysis leaves open the question of how these efforts can be realised on the ground. To answer this question, this report focuses on three specific configurations of societal actors: rural landscapes, supply chains and cities. These configurations are networks where non-state actors and local government authorities are considered together with different types of nature (e.g. agricultural lands, wild areas, urban parks). For these configurations, this report explores a) the implications of nature-positive developments on the ground and how these developments are already emerging from the actions by all of these actors; b) what strategies they are already developing; and c) what national governments could do to support these on-the-ground efforts.

Figure MF.1

Pathways to a nature-positive future



Bron: PBL

Pathways to a nature-positive future. Transformative change as conceptualised in this report becomes possible when efforts by all stakeholders from society and government build on the multiplicity of nature's values and include justice in working towards a nature-positive future. This requires productive links between whole-of-society and whole-of-government approaches.

A whole-of-society approach to pursue nature-positive development

Nature-positive objective can serve as a guiding concept for biodiversity policy, which needs to pay attention to multiple values of nature.

A nature-positive approach means reversing nature loss to enable a net positive improvement by 2030 (i.e. achieving more biodiversity and nature by 2030 than we have today, using 2020 as baseline), and full recovery by 2050 (requiring large-scale restoration of nature). This shifts the objective from halting biodiversity loss to reversing it and restoring nature also beyond conservation areas. A nature-positive approach is increasingly acknowledged by many societal actors and by science as having the potential of becoming a guiding concept, a 'pole star' for biodiversity policy, something for stakeholders to gather around with their visions, commitments and actions. As such, the objective of achieving a 'nature-positive future' could become the guiding objective for biodiversity policies worldwide, equivalent to the climate objectives of 'net zero' or 'climate neutral'.

This report suggests that the nature-positive objective is coupled to a framework that considers the multiple ways in which people value and depend on nature for their livelihoods and well-being. Nature-positive development can only truly be positive when it works for both nature and people and includes the various ways that people live with and care for nature. It follows that nature-positive developments should integrate conservation targets to reverse biodiversity loss by 2030 and restore nature with targets of supporting and maintaining nature's contributions to people in both its biophysical (provisioning, regulating and supporting services) and socio-cultural components. This is considered a critical step on the way to thriving nature and people thriving with nature and one that this report explores in the following chapters (see Figure MF 1).

A whole-of-society approach can build on actions already taking place for nature by non-state actors and local government.

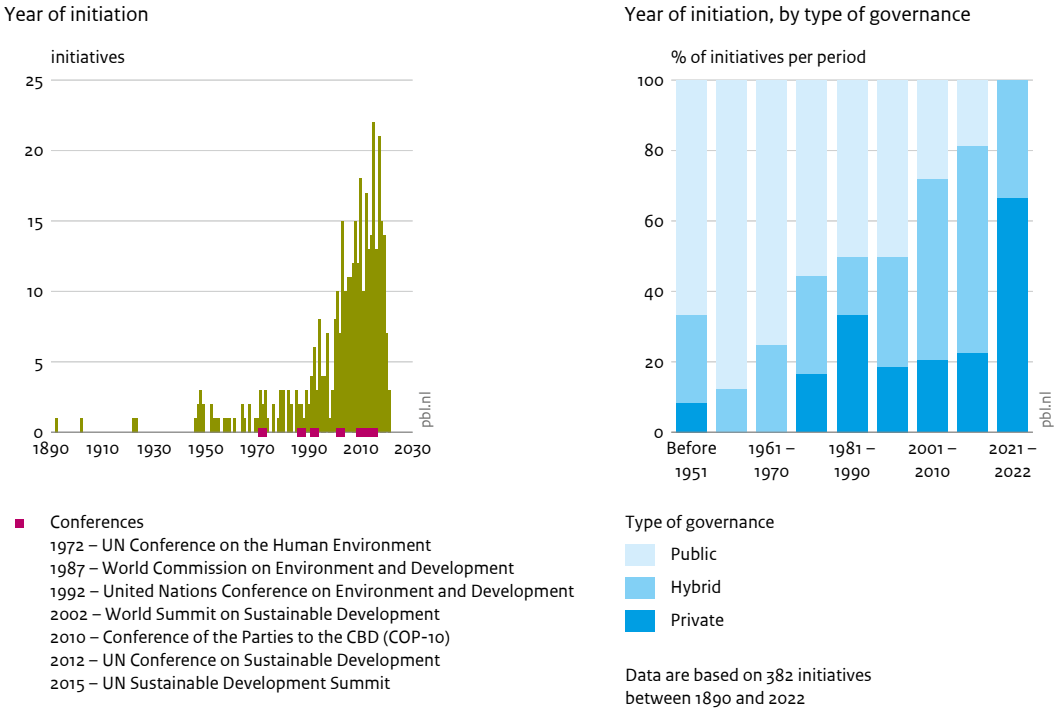
A whole-of-society approach is a governance objective to realise nature-positive development pathways, and more broadly sustainability, which arises from the urgency of bending the curve of biodiversity loss and aligns with multiple and increasing calls for inclusiveness and equity. It is characterised by a society-wide mobilisation of societal groups, resources and narratives that is already happening on the ground (as illustrated in Figure MF.2 for the international level) towards shared biodiversity and sustainability goals: a groundswell of action that needs to be acknowledged, supported and enabled. Whole-of-society approaches have become increasingly popular in multiple policy discussions over the past years, for example those on public health and risk management, climate and energy. Within the field of biodiversity conservation governance, non-state actors on sub-national levels have not only been active in direct conservation efforts, but also have become more influential in the policy arena, providing a range of governance functions, such as standard-setting, networking, knowledge creation and dissemination, and finance. These functions are needed for the type of action that addresses direct and indirect drivers of biodiversity loss. A whole-of-society approach creates opportunities for new, transformative ways of governing nature.

Recognising multiple values of nature and justice provides an opportunity to strengthen whole-of-society approach.

A whole-of-society approach to change requires national governments to recognise and support the multiple ways actors value nature, depend on nature and integrate nature in their operations and activities. As clearly stated by the recent IPBES methodological assessment on values (IPBES, 2022), the way nature is valued through policies matters a great deal for the success of transformative change, while historically a narrow focus on the economic value of nature has dominated policy. This has overshadowed the multiple ways people value and depend on nature, resulting in material and cultural injustices. Expanding the ways nature is valued in biodiversity policies is therefore essential to mobilise actors around the biodiversity targets. Along with a redistribution of resources and power, this could result in an empowerment of a multitude of actors in decision-making about nature that have traditionally been marginalised and excluded from and oppressed by biodiversity policies. This report analyses the potential of this approach within the three configurations covered in this report.

Figure MF.2

International cooperative initiatives for biodiversity



Source: IVM/PBL Biostar 2.0

Increase in international cooperative initiatives on biodiversity. Private hybrid (public– private) collaborations have become more prevalent, next to public initiatives.

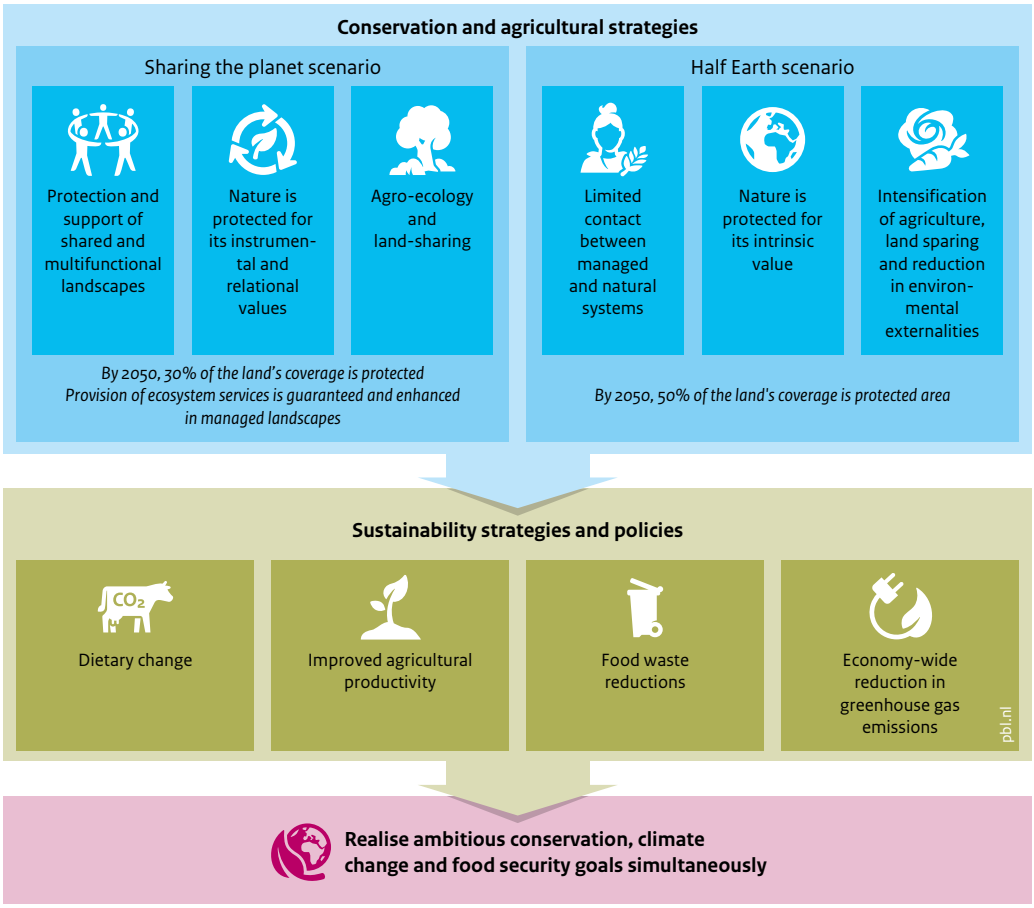
Ambitious conservation efforts need to be combined with broader sustainability efforts

Alternative nature-positive pathways: Half Earth and Sharing the Planet.

Multiple pathways are possible to realise nature-positive developments, as different values of natures can be prioritised and result in different approaches to conservation and sustainable use. The Half Earth and the Sharing the Planet scenarios represent two alternative, solution-oriented scenarios for nature where intrinsic, instrumental and relational values of nature are given different weights to orient the conservation strategy (see Figure MF.3). Despite different conservation strategies, both scenarios are developed (and then quantitatively assessed) to ensure that they simultaneously achieve ambitious biodiversity, climate and food security goals. This shows that alternative pathways exist to achieve nature positive and they can work in parallel in different spatial contexts — although providing different results on the kind of nature that is protected and on other societal factors, such as food security. This result highlights the importance of considering a multiplicity of values of nature when discussing about how to achieve ambitious goals.

Figure MF.3

Conservation, agriculture and sustainability strategies to inspire nature-positive pathways



Source: PBL

Sharing the Planet and Half Earth: alternative strategies for nature-positive development. The strategies differ in how nature is conserved and to what extent. Both, however, are subsequently coupled with the same sustainability policy package that is necessary to bend the curve of biodiversity loss.

Conservation efforts alone will not bend the curve of biodiversity loss, but requires broader set sustainability measures being employed, especially strong climate change mitigation measures in energy and food systems.

The quantitative analysis of Half Earth and Sharing the Planet scenarios shows that expanding conservation efforts to protect larger swaths of land and sea — even to the point of the protection of 50% land surface under the Half Earth scenario — will not succeed in bending the curve of biodiversity loss and; on the contrary, it might increase trade-offs between conservation and other sustainability objectives, such as food security. In the

quantitative analysis, it was found that complementary sustainability measures had to be combined with ambitious conservation action to achieve nature-positive development. This package of measures includes ambitious climate mitigation action, including dietary changes away from meat and dairy consumption, changes in agricultural production and food consumption. Particularly, consumption change and demand side management are key to avoid trade-offs for nature in combined biodiversity,climate and food security policy agendas. The remainder of this summary addresses the question of how, in the three configurations covered in this report (see Figure MF.4), transformative change towards nature-positive development may be realised.

Rural landscapes are key to any nature-positive transformation

Because of the multiplicity of sectors, ecosystems and political agendas, rural landscapes are contested areas where multiple actors compete to shape and govern them.

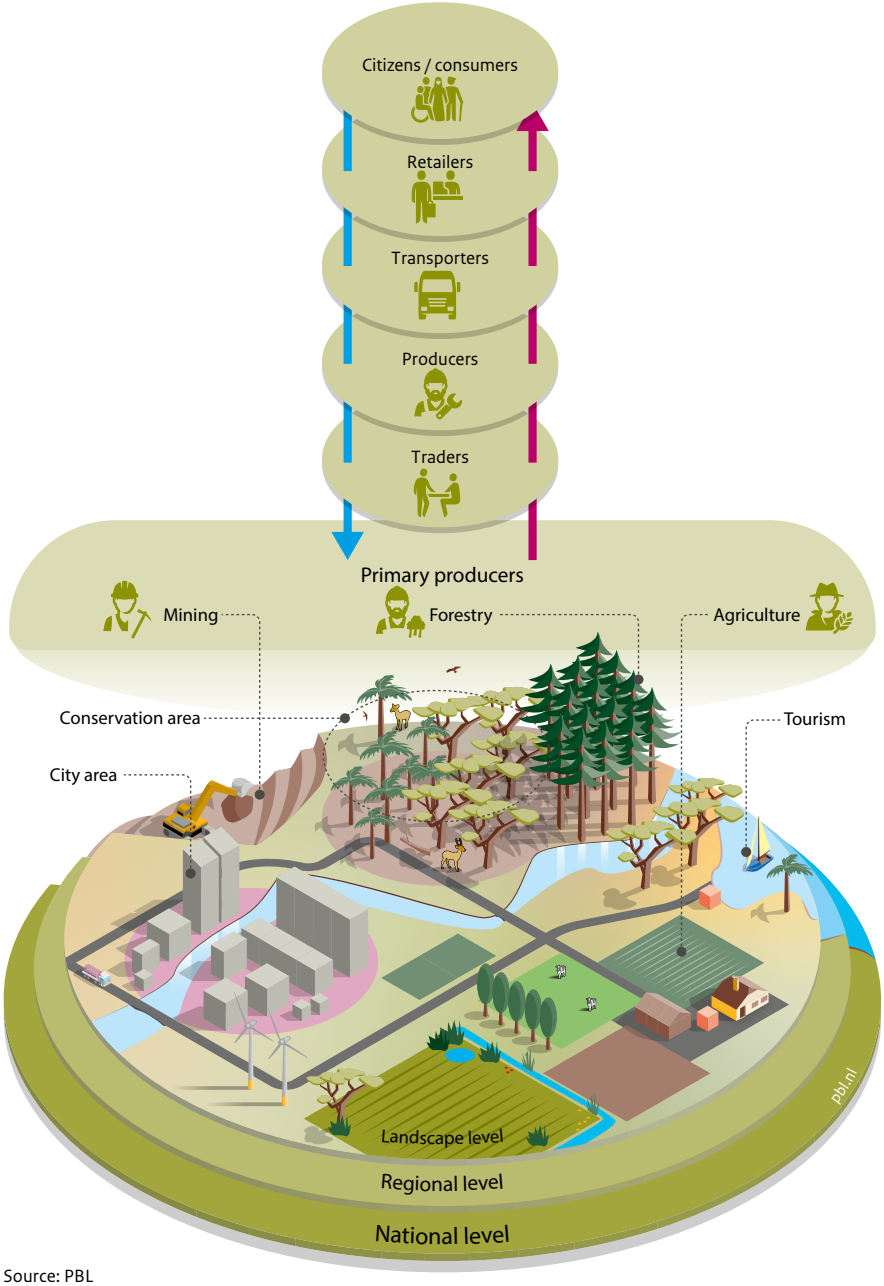
Globally, urbanisation trends are emptying rural areas with the exit of their inhabitants, across both the Global North and South, while growing urban areas become all the more tightly dependent on and connected to a rural hinterland for the provision of resources and nature's contributions to people. Because rural areas contain key biodiversity hotspots and food production systems and host a variety of other human activities, they are crucial to sustainability agendas. The Half Earth and Sharing the Planet scenarios show that there are multiple pathways to transformative change in rural landscapes and highlight that different types of rural landscapes may emerge from the integration of multiple values of nature, needs and visions. Regardless of these different visions — which will be negotiated on a landscape level, local actors in rural landscapes are already actively involved in nature-positive development. National governments and international policies at the CBD can tap into these efforts on a rural level and further harness the potential of local landscape approaches.

Moving away from sectoral policies towards integrated rural landscape approaches is key to achieving nature-positive development.

Sectoral approaches often fail to integrate the various sectors and ecosystems of rural landscapes — characterised by the co-existence of conservation, agriculture, tourism, forestry and other sectors. Landscape approaches have become increasingly popular in the debate around sustainable development, conservation and climate change mitigation, since the landscape has been recognised as a relevant spatial unit of action and integration for these agendas. Landscape approaches involve the integration of the sectors that are typically present in rural landscapes and multiple stakeholders, to combine managed and natural ecosystems and include multiple landscape values (natural, economic, cultural, spiritual, historical, heritage-related, nutritional and others) as a strategy for dealing with the various stakeholder interests, preventing trade-offs and optimising synergies towards a nature-positive future and overcoming siloed sectoral approaches.

Figure MF. 4

Configurations of actors in the landscape

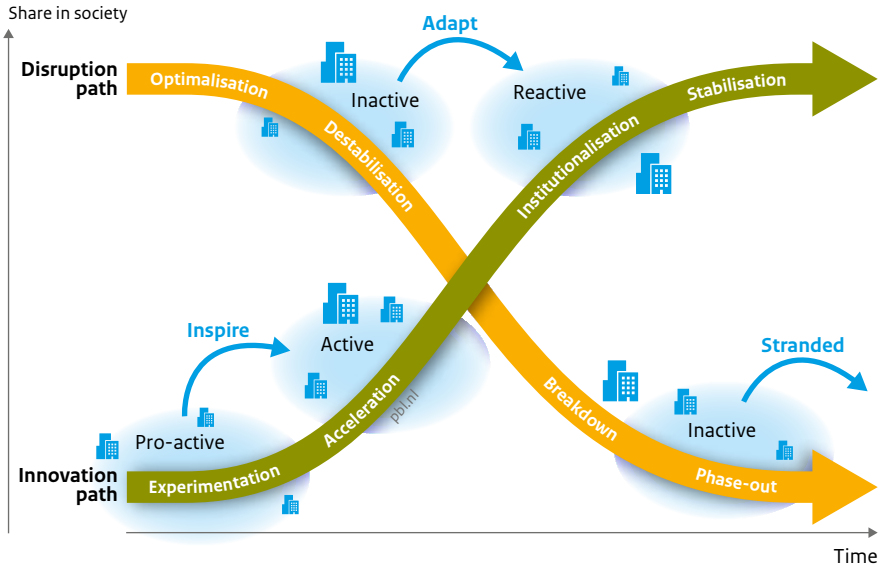


Source: PBL

The three configurations covered in this report: rural landscapes, supply chains, and cities.

Figure MF.5

The role of different company strategies in transformative change



Source: DRIFT Erasmus 2018; Van Tulder Erasmus RSM; Adaptation by PBL

The role of companies with differing biodiversity strategies in transformative change, ranging from inactive, reactive, active to pro-active.

Integrated rural landscapes governance requires inclusive and participatory frameworks to tap into the potential of a whole-of-society approach.

Current landscape governance, too often, is a top-down process imposed on territories with little possibilities for local actors to have an impact in the decision-making process. Landscape approaches are therefore an answer to the increasing call for inclusivity from multiple actors and to the need for platforms where multiple stakeholders can collectively decide about the territory they live and work in. Landscape approaches can help to design deliberative and inclusive processes, and provide an inclusive and participatory framework that can stimulate actors to work together and become aware of the benefits of improving rural landscape sustainability. Especially at the landscape level, stakeholders can come together, put forward their needs, negotiate and take action towards nature-positive development.

Integrated rural landscape governance needs to deal with power imbalances between sectors, stakeholders and interests.

The mere creation of participatory and inclusive arenas for discussion is not enough to ensure that all actors have a real say in — and impact on — the way decisions are taken and implemented. The struggle of IPLC against mining activities or large-scale, export-oriented agriculture are only some examples of the power struggles that can exist between and

within local needs and definitions of what a rural landscape should look like and external actors who may want to use that landscape. Given power imbalances, landscape approaches will not only have to create inclusive platforms for dialogue but also need to address root causes and allow for a reconfiguration and change of institutional practices, such as the way resources are allocated between actors or how decisions are taken on the rural landscape.

National and international support needed to make landscape approaches more effective.
Designing landscape approaches for rural areas requires the support from national governments and international institutions in different ways (as illustrated in Figure MF.5). Governments can facilitate the creation of landscape partnerships between local actors and political and administrative territorial structures via, for example, changes to the legal system. They could facilitate institutional technical assistance for landscape and territorial partnerships and provide opportunities for local stakeholders to share knowledge, and create solidarity and reciprocal support. Governments could support innovation in financial systems and tools for local investment. Governments can organise the process of land-use planning, secure land tenure and implement environmental regulations to facilitate and empower the outcomes of the negotiations between actors.

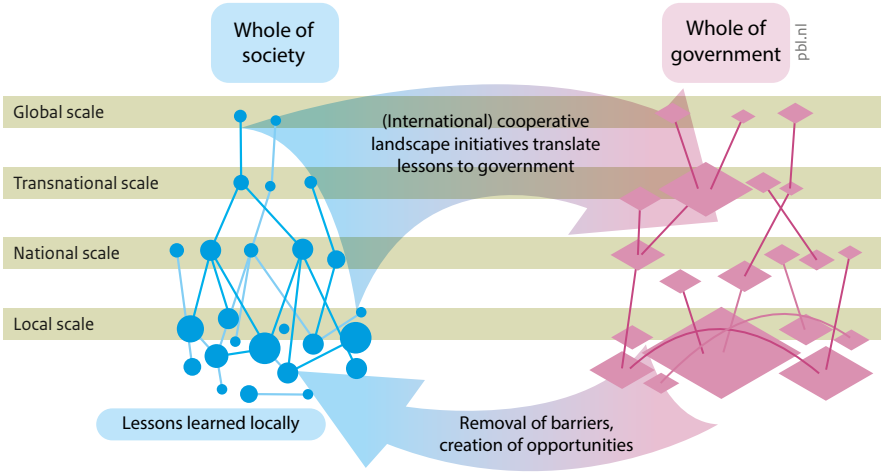
Supply chain action is needed for business and finance to contribute collectively to the nature-positive objective

To achieve transformative change, economy-wide transitions are required in the consumption, processing and production parts of supply chains.
Collective action along supply chains by actors from various economic sectors, knowledge institutions and governments is needed, in order to harness the full potential of a whole-of-society approach. This calls for alignment and orchestration of individual actors and actions. Product and resource supply chains provide a logical and potentially effective configuration of actors to organise such a cooperative challenge. In this way, companies with both direct and indirect (upstream and downstream) links to the drivers of biodiversity loss can be targeted.

There is large potential for business and finance to contribute to the nature-positive objective, guided by the conservation hierarchy.
Many measures are available to companies and can be structured as a hierarchy for stepwise implementation. These measures range from avoidance to mitigation, restoration and compensation, with types of actions that help to change current impacts. By itself, such a stepwise approach to changing existing businesses will not be enough to reach a net-positive situation. Rethinking and reforming current production structures are also needed for transformative change to take place.

Figure MF.6

Collective definition and implementation of nature-positive pathways through integrated landscape approaches



Source: PBL

Nature-positive pathways on landscape level refer to the interactions between local and global levels and non-state and state actors. Lessons can be learned from local landscape initiatives that can then be applied on all scales, thanks to the mediation of international networks of cooperative landscape initiatives. Lessons can be translated into actions for government authorities, on various levels, to act on removing barriers and create opportunities for change.

Leverage can be found in collective action, combining the abilities of individual actors their complementary potential and spheres of influence, both in supply chains and production landscape. Companies will not be able to apply all solutions, measures and innovations by themselves, as they have different capacities, abilities and motivations for change. Nor do they operate in isolation but are connected with other companies through the various supply chains. These chains for different consumption domains (food, energy and materials) provide a logical and potentially effective configuration of addressing the cooperative challenge of reducing impacts and changing economic consumption and production patterns. A cooperative and whole-of-society approach can partly be built on the measures identified in the conservation hierarchy, on the innovative capacity of front runners, and on the numerous sustainability initiatives by international cooperatives in which companies work together with other societal actors to access knowledge and define sustainable operating standards.

Fundamental changes in existing business models are needed to achieve the nature-positive objective. In addition to reducing environmental pressures, more fundamental changes are also needed in the way that businesses operate. Examples include changing food consumption patterns (innovative sources of protein), and radical changes towards a more circular use of resources, such as biomass, materials and nutrients (e.g. reuse and recycle). Such systemic changes have to be stimulated, while high costs and other barriers to changing existing production structures have to be overcome. The financial sector has an important role in

making these changes possible, not only by managing financial risks from environmental degradation in existing business models, but also by investing in innovations and supporting the related new business models.

Governments should also take the motivational factors of companies into account.
In choosing policy instruments to activate companies in supply chains, their motivations are key. The instruments need to be targeted at the actors that are directly or indirectly responsible for biodiversity loss. Policies for stimulating new practices aimed at innovation and those at discouraging and disrupting currently unsustainable practices need to be combined. Such policies have to be targeted at companies with distinct sustainability strategies that are active in different phases of the transformative change process (see Figure MF.6). The international character of many supply chains calls for a governance approach that takes historical, cultural and welfare differences into account; also because there are different jurisdictions involved. Special attention needs to be paid to a fair distribution of the costs and benefits of changing current production practices in such cross-border settings. For this, cooperation between national governments is necessary, combining incentives and rewards for consumers, retailers and manufacturers in the Global North with those of traders and producers in the Global South.

An important example of a governance challenge for supply chains for agro-commodities is to make them deforestation-free.
In the past few decades, there have been many voluntary initiatives to guarantee the sustainability of production practices, based on broadly accepted market standards. But relying on the use of these certification systems is not sufficient, as decades of practical experience have revealed several shortcomings. An effective international approach requires a combination of measures with actor involvement from both the supply and demand side. In this multi-actor, multi-level setting, a combination of regulatory, financial and soft instruments have to complement each other, and overcome the shortcomings of single approaches. Insights into how the various instruments of non-state and state actors can be combined can be obtained by closely following the effects of current policy developments towards establishing deforestation-free supply chains for agro-commodities.

Cities are crucial arenas for biodiversity action within and beyond city boundaries

An increasing number of cities engage in nature conservation and restoration and are thriving with nature.
Cities and urban stakeholders often recognise and deploy the multi-functionality of nature based solutions for simultaneously dealing with multiple urban sustainability issues (e.g. climate change, public health and loss of biodiversity). Yet, current urban planning and design often are still not nature-positive and tend to favour the development and management of traditional 'grey' infrastructure, such as roads. Therefore, transformative change in urban development towards nature positive requires fundamental shifts in the 'urban infrastructure regime'.

Focusing on urbanisation as a 'threat' tends to ignore city dynamics which address both direct and indirect drivers of biodiversity loss.
While urbanisation's impact on biodiversity is an important concern that needs to be addressed, a focus on how urban growth and land conversion threaten biodiversity tends to ignore the importance of city dynamics, including a range of actors, such as those in city networks addressing both direct and indirect drivers of biodiversity loss. Some initiatives are contributing directly to conserving and restoring biodiversity, whereas others are contributing in more indirect ways, such as through climate mitigation or land-use changes. By tackling these drivers of biodiversity loss in multiple ways — from land-use change to climate change — cities are contributing to nature-positive trajectories within and beyond city limits.

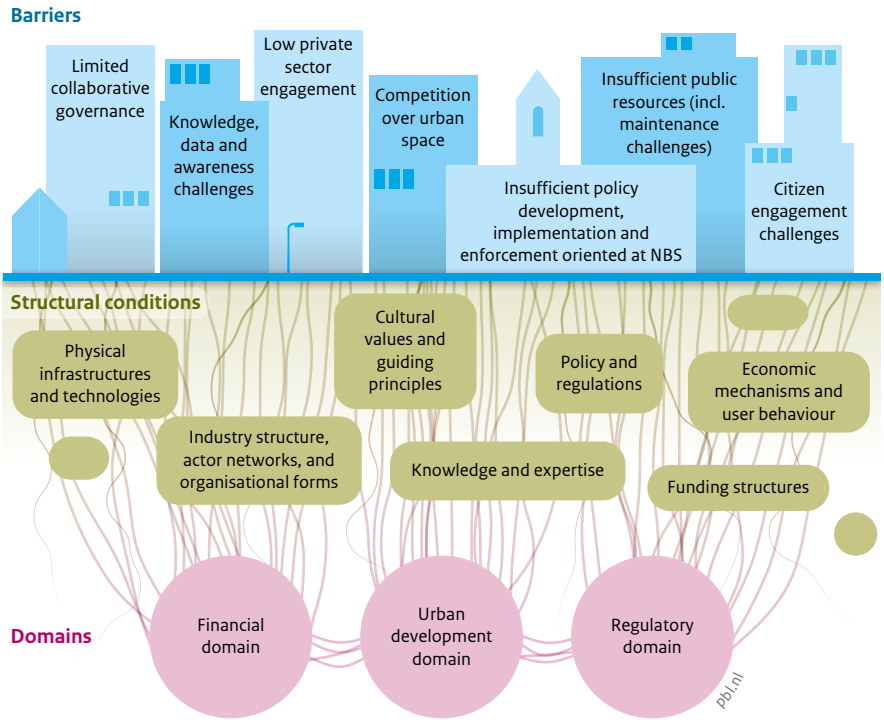
Pathways of synergistic actions are needed to transform urban infrastructure regimes.
Despite the increasing deployment of urban nature in cities, there are also barriers to urban greening (e.g. limited private sector investment) which can only be overcome by targeting the underlying structural conditions (e.g. lack of a public mandate).

Therefore,transformative change in urban development towards a nature-positive future will require fundamental shifts in the 'urban infrastructure regime'. Moving forward requires the engagement of the various actors on the aspects of regulation, urban development and finances of the urban infrastructure regime — fundamentally changing the ways in which cities develop and function (see Figure MF.7). Combinations of various smaller efforts (or, what we call stepping stones), such as establishing partnerships and community-based action, are needed to generate a combined, transformative impact — the whole is greater than the sum of its parts. Policymakers could create their own specific pathway by identifying pivotal stepping stones, based on their particular policy context, to key actions that would enhance urban nature.

Urban greening may exacerbate socio-spatial inequities — it is necessary to design deliberative and inclusive processes to overcome uneven and inequitable urban nature provision.
In the pursuit of a nature-positive future, it is essential to acknowledge the unequal distribution of urban nature within cities as well as the risk of new nature-positive interventions also leading to such inequalities. Urban greening may exacerbate socio-spatial inequities, displacing marginalised communities as a result of higher real estate prices. Overcoming these inequalities requires challenging existing power relationships between urban actors and socio-economic conditions, engaging local communities and stakeholders as well as embracing plural values of nature and related practices.

Figure MF.7

Urban infrastructure regimes across the regulatory, urban development and financial domains



Source: Dorst et al. 2022

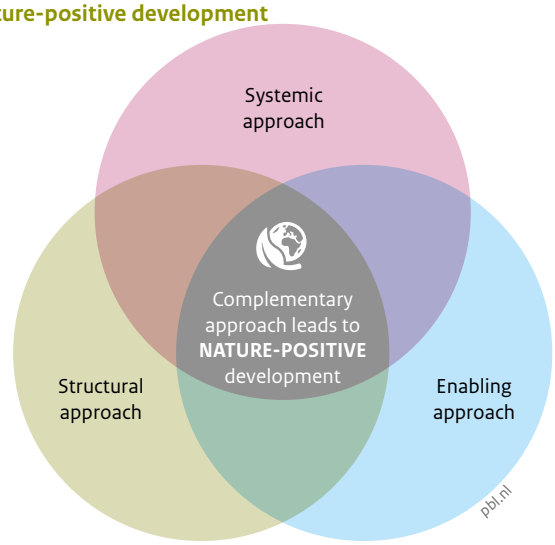
Regulation, urban development and finances are the three fundamental aspect of an urban regime (referred to as domains). Each aspect has its structural elements which may form certain barriers. Policies should not simply address those barriers, but rather should focus on the structural conditions that are causing those barriers.

Policymakers have to adopt combinations of regulatory, economic and soft policy instruments to support nature-positive urban development.

A range of regulatory, financial and soft governing mechanisms to support nature-positive development are available to national and international policymakers, such as implementing regulations, agreeing on financial rewards, sharing knowledge and entering into voluntary agreements. Combining these mechanisms is essential for generating transformative impacts; the requirements for achieving multifunctional benefits could for instance be accompanied by financial rewards. Moving forward requires combining these governing mechanisms while also providing scope for non-governmental action, creating cities where people and nature can thrive together.

Figure MF.8

Combining structural, systemic and enabling approachs towards transformative changes for nature-positive development



Source: PBL

Combing systemic, structural and enabling approaches towards transformative change for a nature-positive future.

Ways to enable ambitious whole-of-society approaches to transformative change for biodiversity

National policies need to combine systemic, structural and enabling approaches to transformative change for a nature-positive future.

Many societal actors worldwide are already mobilising to take action on biodiversity, yet, specific national government policies and policy instruments should enable non-state actors and local and regional government authorities to accelerate and scale up their efforts. Governments can support such bottom-up efforts by acting on three fundamental levels (see Figure MF.8), which need to be tackled simultaneously. Failing to do so would cause trade-offs and would probably hinder the potential for transformative change. Governments need to work on the systemic level of change by encouraging interactions between the actors to achieve complementary actions within and between configurations, and removing those barriers that are currently hindering actors in achieving change and scaling up their efforts. This was shown in the rural landscape configuration by the creation of local partnerships and the roll out of financial tools for local investments. This needs to be combined with enabling and supporting historically marginalised and oppressed groups, such as indigenous peoples and local communities. Governments could create opportunities for innovation and empowerment by providing resources and improving the preconditions for change. This can be done, for example, through supporting national action agendas that can contribute to the initial stages of transformative change and be

coupled with action to alter the structural elements that are currently impeding just transformative changes. Governments, amongst others, need to create and implement policies that recognise the multiple values of nature as a way of preventing a too-narrow focus on the economic value of nature, as was found in the recent IPBES value assessment. Policies for a nature-positive approach must urgently consider the multiple ways people value nature — to enable a wide range of historically marginalised and oppressed groups, as well as act on the structural bias of the current economic system of considering nature only as an economic asset. Furthermore, government authorities must redistribute material resources to also include the historically marginalised stakeholders who have long since been acknowledged to be essential in biodiversity conservation, such as indigenous peoples and local communities. To act on the structures that currently hinder transformative change, government authorities need to unmake current unsustainable policies and put a stop to unsustainable practices. Transformation is simply not only about innovation but also about unmaking that which is not working. For example, government policies on a zero-fossil and nature-positive economy, must also rule out fossil-fuel extraction.

Whole-of-society approaches need further development, as an integral part of CBD's policies.
To achieve the nature-positive objective and the CBD 2050 Vision of people living in harmony with nature, the related policy-making for a nature-positive future must be supported in inclusive and integrative ways. Moving forward requires government biodiversity policies that go beyond those that only address the direct drivers of biodiversity loss, to those that also tackle the indirect drivers, taking a whole-of-society approach and involving all levels of government, as is required to achieve transformative change.
The importance of whole-of-society approaches for biodiversity is increasingly being recognised, although this needs further development as an integral part of CBD's implementation mechanism, including a further strengthening of CBD's Action Agenda for Nature and People and supporting national action agendas. In addition, aligning and integrating nature-positive development strategies with international, national and sub-national goals and policies on climate, food security, sustainable production and consumption and other SDGs is essential, also for enhancing non-state action. The action agendas of CBD, UNFFF and the Agenda 2030 (SDGs) could be brought together in a 'race to net zero and nature-positive' futures. Alongside integrative and inclusive governance processes, experimentation that fosters innovative, diverse and alternative approaches can help to attain nature-positive goals and is given a mandate through the post-2020 global biodiversity framework. In addition to learning approaches, this also calls for a further strengthening of accountability mechanisms that provide insight into the contribution of non-state actors and local and regional government authorities. This is especially important to ensure visibility and credibility of whole-of-society contributions to CBD's goals, which could be supported through capacity-building approaches that emphasise demonstration projects, living laboratories and partnerships across various sectors while fostering interregional learning.

FULL RESULTS

1 Introduction

The problem of biodiversity loss

A million species are at risk of extinction and the loss of ecosystems undermines progress towards the Sustainable Development Goals and the Paris Agreement on climate. Current biodiversity policies have not been able to halt the loss of biodiversity around the world. Under current trends, drivers of biodiversity loss are projected to continue, with major consequences for nature and people (IPBES, 2019; CBD, 2019). It is increasingly understood that not only will it be necessary to halt the loss of biodiversity but nature will also need to be restored. IPBES (2019) made clear that this requires addressing the indirect drivers of biodiversity loss and a collective effort from all actors in society (IPBES, 2019). To bend the curve for biodiversity (Mace et al., 2019), transformative changes in society will be necessary. Transformative change is about changing the underlying societal factors that drive development, which includes changing consumption and production patterns, governance structures and institutions, power relationships, economic paradigms and value systems (IPBES, 2019).

A new global governance framework for biodiversity: the challenge of achieving transformative change

In 2018, the UN Convention on Biological Diversity (CBD) started negotiations to agree on a new global governance framework for biodiversity. At the time of finalising this report (autumn 2022), the contours of the post-2020 Global Biodiversity Framework, to be agreed on at the 15th Conference of the Parties (COP 15) in Montreal, are becoming clearer.
The ambition is to close a new 'global deal for nature', which will contribute to realising transformative change for biodiversity, worldwide. The new governance framework will set goals and targets for the coming decade, provide means of implementation and contribute to improving the implementation mechanisms for biodiversity policy at all levels of decision-making around the world.

Increasing ambition: from halting the loss of biodiversity towards restoring nature

Irrespective of the outcome of the negotiations at COP 15, there is a societal movement towards a 'nature-positive' as the objective for biodiversity action and policy, comparable to the 'net-zero' objective for climate mitigation. Nature-positive approaches are increasingly acknowledged by many societal actors and science to have the potential of becoming a pole star for biodiversity policy — a concept for actors, with their visions, commitments and actions can gather around. This objective implies an important increase in the ambition level for nature policy. Nature-positive actions are defined as reversing biodiversity loss to achieve a net improvement by 2030 (i.e. having more biodiversity and nature in 2030 than we have today) using 2020 as baseline, with full recovery by 2050 (requiring large-scale nature restoration) (Locke et al., 2021).

Rising stakes for post-2020 Global Biodiversity Framework

The negotiations and the wider international process around nature and climate, including many new scientific analyses, show that the stakes for biodiversity policy are rising. Biodiversity loss has been ranked as the third most severe global risk, over the next 10 years, by the World Economic Forum (2022). 'Bending the curve for biodiversity' requires transformative change, recognising the multiple values of nature, improving quality of life and ensuring justice (IPBES, 2019, 2022), implying deep societal change. Furthermore, it is increasingly recognised that the biodiversity and climate crises cannot be addressed in isolation and require a coherent and integrated national and international policy agenda. As part of the SDGs, synergies need to be built and trade-offs must be dealt with (Pörtner et al., 2021). And, last but not least, stronger implementation mechanisms and improved means of implementation are needed to make sure that new goals and targets will be achieved (Bulkeley, Kok and Van Dijk, 2021; Visseren-Hamakers and Kok (eds), 2022). Whole-of-society efforts for biodiversity as basis for transformative change To achieve a nature-positive future, the Post-2020 Global Biodiversity Framework promotes not only action at all levels of government, but also contributions by other stakeholders (e.g. cities, regions, companies, NGOs, and indigenous peoples). Many societal actors worldwide are already mobilising to take action on biodiversity. This is a hopeful sign, but there is also still a long way to go to bend the curve for biodiversity (Pattberg et al., 2019). A combined 'whole-of-government' and 'whole-of-society' approach is urgently needed to achieve transformative change.

A whole-of-society approach is characterised by a society-wide mobilisation of actors, resources and narratives, which is already happening, towards achieving shared biodiversity and sustainability goals: a groundswell of action that needs to be acknowledged and supported. Over the past years, there have been increasing contributions to nature conservation and restoration from non-state and sub-national state actors. The Post-2020 Global Biodiversity Framework could build on this groundswell of action. This report argues that a whole-of-society approach to biodiversity governance is essential for realising transformative change in order to achieve the nature-positive objective. It may help to create momentum for biodiversity within society and strengthen the implementation of biodiversity policies, building on the actions of societal actors who are already active. Although the inclusion and participation of societal actors in governing nature is nothing new, a whole-of-society approach to change will recognise and build on a society-wide mobilisation of actors as one of the pathways to a nature-positive future (Pattberg et al., 2019; Kok et al., 2020). The question, however, is whether the efforts by these front runners of non-state actors and local and regional government are adequately acknowledged and supported by national governments and international institutions, and how these could be scaled up to society-wide commitment and action.

Objectives

This report focuses on three configurations of non-state and state actors on sub-national levels to show how nature-positive development can occur and be further fostered: rural landscapes, supply chains and cities. As illustrated in Figure 1.1, these three configurations cover nature and human–nature relationships in various dimensions as well

as direct and indirect drivers of biodiversity loss. Based on the analysis of these three configurations of societal actors, this report provides insights into how national governments and international institutions may build on and facilitate a whole-of-society approach to achieve ambitious biodiversity goals.

This report has three *objectives*:

1. To show what efforts are needed and what pathways are possible to achieve nature-positive goals;
2. To show what non-state and sub-national state actors are already doing to contribute to achieving nature-positive goals in three configurations: rural landscapes, supply chains, and cities;
3. To show how national governments and international policies can tap into and support these societal efforts towards CBD's post-2020 goals and targets and its 2050 vision of living in harmony with nature.

Approach

This study combines a quantitative model-based analysis of alternative pathways to meet the objective of a nature-positive future, with a governance analysis based on a whole-of-society approach. For this report, we used two recently developed conservation and agriculture scenarios — Half Earth and Sharing the Planet — to elaborate on what efforts are required to achieve nature-positive goals. These scenarios have been developed as part of the PBL CBD post-2020 project and are applied for the analysis in this report (Immovilli and Kok, 2020; Kok et al., under review). Both these scenarios meet ambitious biodiversity, climate and food security goals, but differ in the ways they achieve them, as they are premised on different assumptions about the values of nature that should be prioritised in the future. The scenarios show what efforts would be needed on a global level and what options there are for achieving these goals. In this way, the scenarios point to possible nature-positive development pathways.

The scenario analysis leaves the question of how these efforts can be realised on the ground. To fill this gap, we examined — as mentioned above — three specific configurations: rural landscapes, supply chains and cities. We chose these configurations to make an abstract concept — nature-positive development pathways — more concrete so as to understand what would be required to put them into practice. Clearly, these three configurations are only some of the many ways that would bring actors and nature together. Furthermore, it is clear that there are overlaps and connections between them. Taken together, we argue that these configurations provide a relevant basis to further elaborate a whole-of-society approach towards nature-positive development.

For these configurations, we explored a) what nature-positive developments could mean on the ground and how nature-positive actions are already emerging in non-state and sub-national state actor networks; b) what strategies non-state actors and local and regional government are developing ; c) what national governments can do to support these on-the-ground efforts and foster further nature-positive developments.

Finally, we used the insights from the scenarios and the governance mechanism we found in the configurations to the transformative change needed to restore biodiversity. This helped us to address the third objective of our study, which is to reflect on the implications of enabling a whole-of-society approach to nature-positive developments for national and international biodiversity governance.

Transformative change towards a nature-positive future needs to take into account multiple values of nature and justice

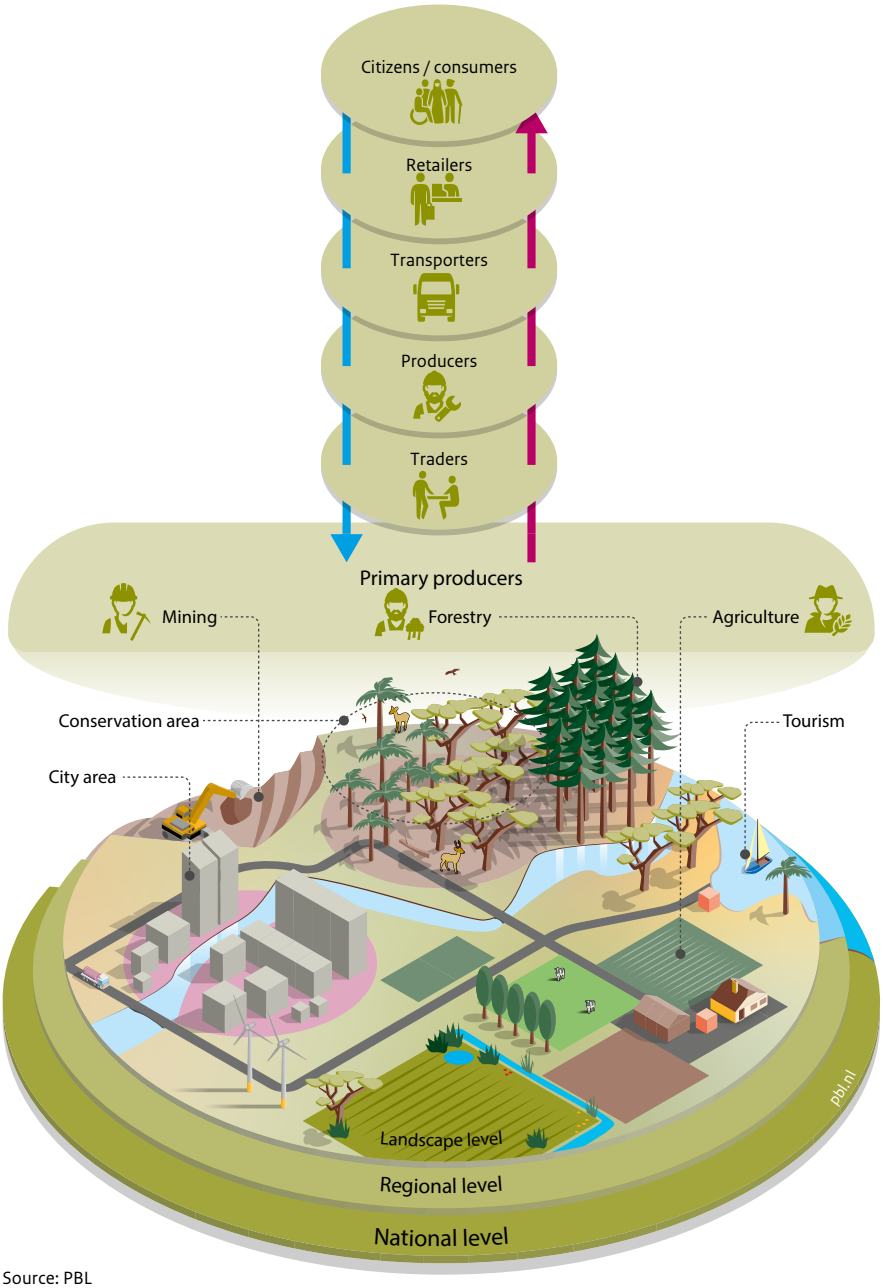
As part of the urgency of accomplishing nature-positive development, multiple values of nature need to be recognised and integrated in strategies and decision-making by all actors in society (Dasgupta, 2021; IPBES, 2022; Keune et al., 2022; Pascual et al., 2021, Pereira et al., 2020). As clearly stated in the recent IPBES methodological assessment on values (IPBES, 2022), the way nature is valued through policies matters a great deal for the success of transformative change, while historically policy has been dominated by a narrow focus on the economic value of nature. This has overshadowed the various ways in which people value nature and depend on it, resulting in material and cultural injustices, marginalisation and harm (IPBES, 2022; Pascual et al., 2021). A whole-of-society approach could facilitate the inclusion of multiple values of nature in its governance, as it would support nature-related action by non-state actors and local and regional government starting from their own needs and values.

Recognising that people value nature and depend on it in different ways, can be a starting point to empower a multitude of actors that have traditionally been marginalised and excluded from biodiversity policies — such as indigenous peoples and local communities, women and youth — and can contribute to shifting power relations in favour of these groups (Pascual, 2021). This report therefore brings the multiple values of nature more to the forefront of the debate on biodiversity governance and transformative change, to identify the variety of facets of nature that need to be sustained for human well-being and expand the set of possible strategies that may be used to achieve nature-positive developments beyond traditional conservation areas (this will be done with the Half Earth and Sharing the Planet scenarios).

An inclusive approach to the multiple values of nature would help to connect and integrate biodiversity conservation targets with other relevant societal goals, such as food security, poverty alleviation and education. For example, if one is to include instrumental values of nature (nature's contributions to people) and hence consider agricultural landscapes as possible sites for conservation and agricultural policies must be combined with other societal objectives for community livelihoods, poverty alleviation, food security, amongst other things. In other words, biodiversity conservation becomes intertwined with other sustainability and value dimensions. Although this inevitably will create trade-offs, there are also synergies to be found.

Figure 1.1

Configurations of actors in the landscape



Source: PBL

The three configurations covered in this report: rural landscapes, supply chains, and cities.

Target audience

Our target audience consists of national policymakers interested in achieving nature-positive goals and the post-2020 targets, tapping into whole-of-society efforts to achieve transformative change for biodiversity. The report is intended to help public decision-makers to understand how to further support and catalyse biodiversity initiatives by a variety of societal actors ranging from civil society members, indigenous people and local communities, those from the business and finance sectors, as well as municipal actors and others at sub-national levels.

Outline of the report

The report is structured as follows. Chapter 2 describes our understanding of nature-positive, transformative change for biodiversity and achievement of the nature-positive objective in the context of multiple values of nature and a whole-of-society approach. Chapter 3 presents the insights from scenarios towards achieving ambitious objectives on biodiversity, climate change and food security. This forms the basis for the subsequent elaboration of transformative action and strategies for the whole of society within landscape, supply chain and urban configurations (Chapters 4–6; see Figure 1.1). Chapter 7 concludes with a discussion of national and international policies to foster transformative change for nature and people from a whole-of-society perspective.

2 Transformative change for nature and people

This chapter is the analytical lens and the background for the following chapters. It provides a definition and our interpretation of nature-positive, transformative change and a whole-of-society approach and elaborates why this report takes the whole-of-society approach as a starting point to achieve transformative change for biodiversity.

2.1 The nature-positive objective: reversing biodiversity loss and restoring nature

The nature-positive approach has the potential of becoming a long-term orientation point for biodiversity action

Biodiversity governance still needs to find its own long-term orientation point, one that makes the CBD vision of 'living in harmony' more concrete and something that the various stakeholders can rally around. Up to now, a specific target for biodiversity, one that is equivalent to the 1.5 °C–2 °C climate objective, net-zero or climate neutrality target, has proven elusive. Emerging from discussions on zero net-loss and net-positive outcomes for nature, the nature-positive objective may work to guide biodiversity action and policy (Bull et al., 2019; IUCN, 2022; Locke et al., 2021; WWF, 2022).

While there is increasing momentum to use the nature-positive objective amongst many actors within and beyond traditional conservation professions, it is not necessarily clear what this objective means or what achieving it would imply. The diversity of definitions and understandings that are emerging makes it difficult to find common ground. It has been argued that this could also weaken the relevance of the term and dilute it away from measurable net gains for biodiversity (IUCN, 2022; Milner-Gullard, 2022).

Defining nature-positive

The momentum that the nature-positive concept is gaining, therefore comes with the responsibility of not having this term simply mean to indicate any improvement in nature. While any betterment of nature is to be welcomed, this report refers to nature-positive development as the set of actions that aim to both halt and reverse biodiversity loss. The objective of nature-positive development implies an important shift in the framing of global biodiversity policy, from halting and no-net biodiversity loss towards reversing this

loss and restoring nature (Mace et al., 2018). Such framing has the potential to contribute to the creation of positive visions for nature and for people to work towards (Bulkeley, Kok and Van Dijk, 2020).

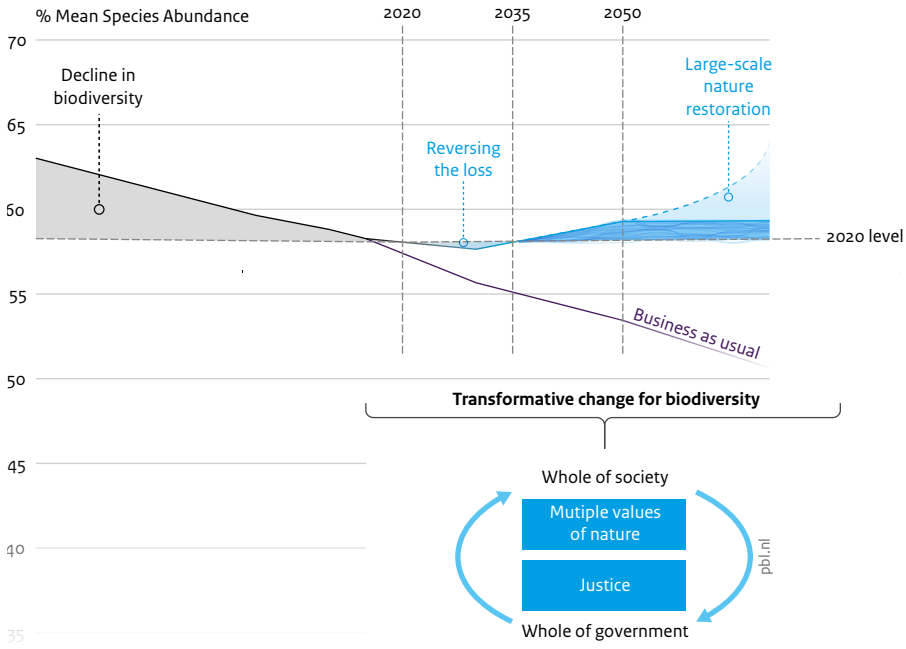
In line with this, the nature-positive framework, described by Locke et al. (2021) calls for the post-2020 Global Biodiversity Framework to include ambitious biodiversity targets to immediate halt nature decline, measured from the baseline of 2020, and then reverse nature loss to have a net improvement by 2030 (having more biodiversity and nature by 2030, compared to today), with full recovery by 2050. The UK Nature Positive 2030 report suggests that achieving the nature-positive objective by 2030 means reversing current biodiversity decline so that ecosystem restoration is underway, species populations are increasing in abundance and fewer are threatened with extinction. This is considered a critical step on the way to thriving nature by 2050 (Brotherton et al., 2021). Do note, however, that these different definitions of a nature-positive goal for 2050 all struggle to define what restoring nature towards full recovery would mean exactly. Defining such a definition is also beyond the scope of this report.

Nature-positive concept needs to consider multiple values of nature

This report suggests to couple the objective of nature-positive development with a framework that considers the multiple ways people value and depend on nature for their livelihoods and well-being. Such development can only truly be positive when it works for both nature and people and when it includes the various ways people live with and care for nature. As clearly stated by the recent IPBES methodological assessment on values (IPBES, 2022), the way nature is valued through policies matters for the success of transformative change. Despite people valuing nature in multiple ways, IPBES found that policies across the globe have prioritised the economic aspect; nature as a commodity for achieving economic growth. The IPBES report suggests that this narrow focus that policies have had is not only dangerous as it overshadows the ways people value and depends on nature, but also because this contributes to the dire state of biodiversity (IPBES, 2022). As suggested by IPBES, biodiversity governance and practice should acknowledge and be based on the fact that people may value nature for its intrinsic value, for the benefits it provides to them (instrumental value) and for the meaningful relationships that are formed between people and nature (relational value). It follows that nature-positive developments should integrate conservation and restoration targets to reverse biodiversity loss and achieve a full recovery. Targets should include supporting and maintaining nature's contributions to people in both its biophysical (provisioning, regulating and supporting services) and socio-cultural components. This is considered a critical step on the way to thriving nature and people thriving along with it, and one that this report explores in the following chapters.

Figure 2.1

Pathways to a nature-positive future



Bron: PBL

Pathways to a nature-positive future. Transformative change as conceptualised in this report becomes possible when efforts by all stakeholders from society and government build on the multiplicity of nature's values and include justice in working towards a nature-positive future. This requires productive links between whole-of-society and whole-of-government approaches.

Achieving a nature-positive future requires paying full attention to justice

In achieving nature-positive development pathways, issues of justice are very relevant and need attention in the face of rising global injustices (UN DESA, 2020). Apart from the moral imperative of ensuring a just transition to a nature-positive future for all, addressing justice has also proven to be fundamental to long-term success for conservation efforts (Oldekop et al., 2015). A focus on justice not only implies addressing the distribution of risks, costs and responsibilities amongst various stakeholders (i.e. distributive justice), but also calls for dealing with the structural causes of environmental problems. This, in turn, means devising procedures that include relevant stakeholders and are not blind to the unequal distribution of power between those stakeholders (i.e. procedural justice). Finally, the basis for nature-positive transformations needs to recognise that there are multiple interpretations of what is just and desirable. As such, this requires a rethink of the way biodiversity governance is conceptualised and implemented to make room for those various ways of thinking about nature and human–nature relationship (i.e. justice as recognition) (Martin et al., 2013; Pickering et al., 2021).

In addition, justice requires a rethink of how power and resources are distributed across stakeholders, so that multiple values and perspectives can actually be included in measures to implement a nature-positive transformation. Looking through the lens of justice, therefore, requires to first consider who gets to define which values are important and how they matter for nature-positive development. The principles of justice and the multiple values of nature are intertwined and provide the basis for the whole-of-society approach, as is described in the following sections (see Figure 2.1).

2.2 Understanding transformative change for biodiversity

The need for significant and rapid action to address the challenges of continued biodiversity loss and the decline in nature's contributions to people is made abundantly clear in the IPBES Global Assessment (2019). The world can no longer rely on business-as-usual or incremental biodiversity policies to restore nature. It is necessary to act on the underlying causes (indirect drivers, root causes) that lead to biodiversity loss, in order to achieve the nature-positive objective. With respect to global ecosystem change, the indirect drivers are land-use and sea-use change, exploitation of organisms, climate change, pollution, and invasive alien species (IPBES, 2019). This is formulated by IPBES in a call for fundamental changes in production and consumption structures and the underlying value systems that regulate them, which is referred to as transformative change. The demand for transformative change for biodiversity is part of a growing consensus across science and policy communities on multiple sustainability issues and could help to integrate the agendas on climate change, pollution, circular economy and biodiversity (e.g. IPCC, 2018; UNEP, 2019, 2021; Pörtner et al., 2021).

Transformative change is a significant change in both the extent and essential character of the change that is needed (Bulkeley, Kok and Van Dijk, 2020). Here, we highlight the various approaches to transformative change, which have been identified as systemic, structural and enabling (Scoones et al., 2020). All the approaches need to be taken into account when deciding on how to govern transformative change, depending on the context. Transformative governance implies modifying specific production and consumption systems, which more concretely means producing food differently in order to conserve biodiversity (i.e. systemic approach). At the same time, transformative governance should look at fundamental questions about the economic structures, values and identities of specific sectors which are necessary for change and empower or limit stakeholders in achieving change (structural approach). What do stakeholders such as companies or interest groups value in the production and consumption of food; for example, do they value biodiversity, food security or profits? Finally, transformative governance should also focus on creating enabling environments for actors to achieve their objectives and their visions for change (enabling approach), to support them to achieve collective objectives, such as nature-positive ones. When governance acts according to these three approaches, it has the potential to become transformative.

Following Bulkeley, Kok and Van Dijk (2020), this report suggests a number of principles of transformative change (Table 2.1) that can help policymakers navigate the three approaches to transformative change in specific situations and that, ultimately, can support biodiversity governance towards nature-positive goals. These principles are applied in the analysis of the three configurations in Chapters 4, 5 and 6. Chapter 7 returns to these three approaches to transformative change and reflects on what national and international governance can do to enable transformative change through whole-of-society approaches.

Table 2.1

Principles of transformative change

Principle of transformative change	Explanation
Address root causes	The pursuit of transformative change requires addressing the root causes and underlying/indirect drivers of the problem at hand.
Take multiple paths	Transformative change cannot be achieved through 'silver bullet' solutions or with blueprints. Efforts by multiple actors will be required, following various development pathways that are compatible with biodiversity goals.
Expand action arena	Transformative change for biodiversity cannot be achieved through action that is confined to traditional conservation arenas, but needs to be expanded to encompass multiple areas of the economy and society
Realise diverse co-benefits	Efforts to generate transformative change generate multiple trade-offs and co-benefits. Harnessing co-benefits can enable greater traction for ambitious biodiversity efforts while also achieving other societal goals.
Design deliberative and inclusive processes	In addition to taking place through inclusive processes, transformative change also may generate disagreement and contestation that require in-depth consideration.
Adopt proactive approach to resistance	Resistance is an inevitable part of transformative change and approaches need to be designed to ensure 'just transitions' while also overcoming the resistance in those with a vested interest in the status quo.

Source: slightly modified from Bulkeley, Kok, Van Dijk (2020).

2.3 A 'whole-of-society approach' to transformative change

Whole-of-society initiatives are the seeds of transformative change for biodiversity

Governments on their own will not be able to reverse biodiversity loss and restore nature. This requires the full involvement of all stakeholders within society and this report argues that 'whole-of-society' initiatives in fact are the seeds of transformative change for biodiversity (Pattberg et al., 2019). In the coming decade, the whole-of-society approach may become an important pillar of the CBD governance framework, next to its traditional emphasis in government policy on nature conservation and the mainstreaming of biodiversity in other governmental policy domains (referred to as whole of government). It could strengthen implementation as it helps to create momentum for biodiversity at all levels of society and builds on societal efforts of actors on the ground. To our knowledge, a whole-of-society approach has not yet been explicitly defined in biodiversity governance.

Defining a whole-of-society approach

While the inclusion and participation of societal actors in nature governance is nothing new, a whole-of-society approach is one that recognises and builds on the society-wide mobilisation of actors for biodiversity. Whole-of-society approaches have become increasingly popular in policy debate, over the past years, with subjects ranging from public health and risk management to climate and energy. There have been increasing contributions from non-state and sub-national state actors to conserve and restore nature. The Post-2020 Global Biodiversity Framework could build on this 'groundswell of action'. This report defines whole-of-society approaches to biodiversity conservation as follows (loosely reformulating the definition by Maatta et al. (2021)):

> *The 'whole-of-society' approach is a governance approach to a nature-positive future and, more broadly, to sustainability by means of broad, multi-scale and multiple-actor partnerships that extend beyond government. It is characterised by a bottom-up society-wide mobilisation of actors, resources and narratives towards shared biodiversity and sustainability goals and arises from multiple and increasing calls for inclusivity and equity as well as from the urgency of bending the curve of biodiversity loss.*

CBD theory of change for Post-2020 Global Biodiversity Framework

The CBD bases its theory of change for the Post-2020 Global Biodiversity Framework on both a whole-of-government and a whole-of-society approach and are grounded in broad partnerships between state and non-state actors on various levels of decision-making.
In the governance of biodiversity conservation, non-state and sub-national state actors have not only been active in direct conservation efforts, but have also become more influential within the policy arena, providing a range of governance functions that address the direct and indirect drivers of biodiversity loss (Arts, 2006; Pattberg et al., 2019).

Recent calls for inclusivity and diversity — as also emphasised in the focus on multiple values of nature and justice discussed above — have contributed to generating interest towards the whole-of-society approach since the inclusion of multiple actors would bring multiple perspectives to the table of biodiversity governance. Next to this, a renewed focus on issues and targets around equity and justice — in light of rising levels of global inequality (UN DESA, 2020) — have spurred interest in a whole-of-society approach, too. The inclusion of, for example, indigenous peoples and local communities as well as other groups, such as women, youths and private sector parties, is made explicit in the Post-2020 Global Biodiversity Framework. In fact, the objective of bending the curve for biodiversity solidly rests on the necessity for broad collaboration and partnerships between various actors, well beyond the Parties to the CBD (Kok et al., 2020).

Emerging groundswell of action

Real world examples of nature conservation and ecosystem management are showing that a whole-of-society approach in fact already exists at multiple levels. Global surveys show the multitude of international initiatives for biodiversity conservation and sustainable use of nature beyond those on state level (Kok et al., 2019; Curet and Puydarrieux, 2020; Negacz et al., 2022; see also Text box 2.1). The contributions from indigenous peoples and local communities (IPLC) to the protection and conservation of biodiversity are well-known and are increasingly acknowledged at the international level (Forest, Declaration Assessment, 2022; Local Biodiversity Outlooks, 2020). Other non-state actors and local and regional government that increasingly take on the role of new actors of change in global biodiversity governance include cities, business and finance. The question however is if this 'groundswell of action' is sufficiently recognised and builds on its potential in biodiversity governance at national and transnational scales (Hale, 2016; Hajer, 2015, Hajer et al., 2018). All in all, these elements signal a turn in biodiversity governance towards a larger role for non-state actors on sub-national actors as new agents of change for biodiversity.

Contribution from the whole of society to principles of transformative change

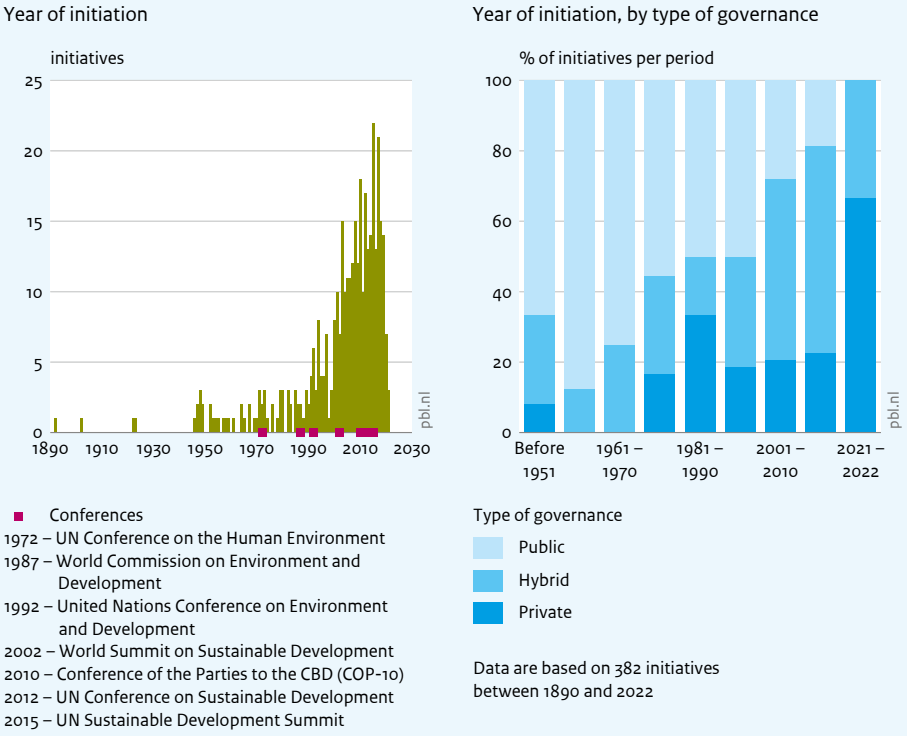
A whole-of-society approach to transformative change in biodiversity governance resonates with most if not all of the principles for transformative change, as mentioned in Section 2.2 (see Table 2.1). More specifically, it may contribute to addressing root causes, an expansion of action arenas, taking multiple pathways towards nature-positive development, the design of inclusive and deliberative transformative processes and creating opportunities to overcome the resistance of vested interests. Whether these opportunities will actually materialise at levels needed to bend the curve for biodiversity will depend on governments being able to facilitate whole-of-society approaches in fundamental ways and build productive linkages between whole of society and whole of government.

Text box 2.1 Shift towards private and hybrid forms of global biodiversity governance

The trend towards increasing involvement of private and private–public (hybrid) actors in international biodiversity governance is indicated in Figure 2.2. This figure gives an overview of 382 international collaborative initiatives that have an aim related to biodiversity or relevant aspects of biodiversity or biodiversity policy (e.g. sustainable use or forestry). This figure is derived from the IVM/PBL database Bio* 2.0. Information from this database will be used to provide overviews of international cooperative initiatives for biodiversity for the three configurations covered in this report: landscapes, supply chains and cities. Negacz et al., (2020, 2022) provide a detailed overview of the database.

Figure 2.2

International cooperative initiatives for biodiversity



Source: IVM/PBL Biostar 2.0

Increase in international cooperative initiatives on biodiversity. Private hybrid (public– private) collaborations have become more prevalent, next to public initiatives

This report recognises that a whole-of-society approach comes with its own challenges. The CBD has clearly built the post-2020 Global Biodiversity Framework around both a whole-of-government and a whole-of-society approach and there is a societal and political urgency for a more inclusive approach to biodiversity. However, a whole-of-society approach cannot imply that government authorities hand over their responsibilities. This would seriously compromise the achievement of the nature-positive goal. Apart from this, doubts have been expressed about how it is possible to ensure that the actions by especially non-state actors actually contribute to nature-positive objectives. While it is clear that non-state and sub-national state actors s do contribute to biodiversity conservation and governance by sharing information, networking, setting standards, providing finance and implementation, it remains essential to devise ways to ensure that these contributions do not pass unnoticed and that they will actually add to the nature-positive objective (Milner-Gullard, 2022). This requires putting accountability and monitoring mechanisms in place, amongst other things, to ensure the credibility of non-state commitments and contributions towards nature-positive development (Widerberg et al., 2021).

In a whole-of-society approach, government authorities still have to play a fundamental role in transformative processes; however, they are part of a polycentric governance system where multiple public and private actors participate in networks to achieve nature-positive goals. This report, therefore, considers the contributions that non-state and sub-national state actors can and may make to achieve transformative change towards a nature-positive future and, in turn, how government policies and instruments can catalyse transformative change inspired by whole-of-society approaches. The question is however, if the efforts by these non-state actors are adequately acknowledged and enabled by national governments and international institutions. This report, therefore, elaborates on how national governments and international institutions can support and enable a whole-of-society approach to achieve ambitious biodiversity goals (see the concluding sections of Chapters 4, 5, 6 and 7).

3 Insights from scenarios towards a nature-positive future

There are multiple pathways to realise nature-positive goals, reflecting multiple values of nature and including various approaches to conservation and sustainable use of biodiversity. To explicate these multiple values and explore the consequences for conservation and, more broadly, sustainability policies, this chapter presents two alternative solution-oriented scenarios for nature-positive futures, based on various values of nature: Half Earth (HE) and Sharing the Planet (SP). These scenarios were developed as part of the PBL CBD post-2020 project and published in Immovilli and Kok (2020) and Kok et al. (under review).
This chapter first introduces the two scenarios — Half Earth and Sharing the Planet — and explains how different conservation strategies are built starting on alternative values of nature (Section 3.2). Section 3.3 discusses the quantitative results from the scenarios and identifies the efforts needed and the pathways towards achieving a nature-positive future. Section 3.4 draws some conclusions from the scenario exercise that inform the following chapters).[1]

3.1 Use of alternative scenarios

Alternative strategies to achieve a nature-positive future
From the outset, developing two alternative scenarios was intended as a way to envision and assess different strategies to achieve a nature-positive future and identify the related efforts that include multiple values and facets of nature (Rosa et al., 2017; Quintero-Uribe et al., 2022). The strength of a multiple perspectives analysis lies in highlighting that many more facets of nature can be protected to achieve nature-positive development. Although we created two alternative scenarios and analysed them separately, here we emphasise that a nature-positive future can only be achieved within a policy and societal framework that is inclusive of multiple ways of valuing, conserving, using and living with nature. For strategy and policy development, maintaining the HE and SP scenarios as separated and alternative options does not make sense. We are inspired by examples that have tried to integrate land sparing and sharing approaches to agriculture and biodiversity conservation in a way that taps into the potential of each strategy (Kremen, 2015; Locke e al., 2019).

[1] This chapter draws on Immovilli and Kok (2020) and Kok et al. (under review).

Scenarios help to identify and broaden the solution space

While the quantitative model outputs of the HE and SP scenarios show that a nature-positive future is within reach for both scenarios, it would be wrong to think of the scenarios as irreconcilable or a them being the only pathways. This would only pit one conservation strategy against the other and limit any future space for action. The logic of nature-positive development requires to do the exact opposite and to include and preserve all those facets of nature, also those inevitably intertwined with human lives and activities that can serve to reach positive outcomes. In other words, the scenarios help to identify and broaden a solution space and for future conservation efforts to be successful they strategies will need to be developed that protect wild areas as well as support and enhance working landscapes where people and nature can thrive together. The chapters on the three configurations also identify more local nature scenarios that help to envision nature-positive development pathways. The challenge for policy remains in understanding where the synergies are between multiple approaches to conservation, such as those represented by HE and SP scenarios or other more locally adapted scenarios, and tap into them to achieve nature-positive development. Evidently, this will greatly vary between regions and social and ecological contexts. Varying conservation measures will have to be adopted at a national level, depending on these contexts, as also suggested by the 'Three Conditions' by Locke et al. (2019) where different conservation measures are applied to different contexts and areas.

Functions of the scenario analysis in this report

In this report, the scenario exercise serves two purposes:

- it identifies the efforts needed and possible global pathways that would help to create a solution space to achieve nature-positive development (this chapter);
- as input for the analysis of the governance for nature-positive development in the three configurations (rural landscapes, supply chains and cities), acknowledging the distance between global scenario analysis and the situation on the ground (Chapters 4–6).

3.2 Pathways towards a nature-positive future: 'Half Earth' and 'Sharing the Planet'

The narratives for the Half Earth (HE) and Sharing the Planet (SP) scenarios (Immovilli and Kok, 2019) envision desirable futures up to 2070 in which goals related to biodiversity, climate and food are achieved. We used these narratives for a model-based scenario analysis, in which the scenarios are designed to bend the curve of biodiversity loss and restore nature while limiting global temperature increase to 1.5 °C or 2 °C and ensuring food security. They do, however, follow different pathways towards achieving these goals. The differences between the two scenarios relate to the assumptions that differ with respect to nature–human relationships, nature conservation and agricultural strategies, and they reveal multiple perspectives on nature. Relational values were not explicitly included in these narratives, although these are in different ways important in both scenarios. The perspectives in these scenarios help to broaden the solution space for nature-positive development and to identify possible actions for national and international processes on biodiversity governance (see Immovilli and Kok, 2019, for a detailed description of the narratives).

Half Earth — creating space for nature

The Half Earth scenario prioritises the intrinsic value of nature, which is the belief that nature has value in itself and, as such, needs to be protected (Cassman and Grassini, 2020; Wilson, 2016). This recognition of nature's intrinsic value has historically been at the centre of conservation efforts, and relates to the first CBD objective. This objective now enters the political mainstream in new ways; for example, with the adoption of legislative measures that establish Rights of Nature, such as in Bolivia, New Zealand and Colombia amongst other countries. Protecting nature's intrinsic value translates into the attempt to minimise human interference with ecological processes and resort to the creation of protected areas and other conservation measures where nature can thrive by itself. Under the Half Earth scenario, efforts to achieve nature-positive development aim at protecting intact ecosystems and areas that are important for species, as well as restoring these. This scenario envisions an expansion of conserved areas to 50% of each world ecoregion by 2050, with an intermediate goal of 30% coverage by 2030. Such a 30% goal is proposed within the CBD by the High Ambition Coalition, a coalition of 70+ countries, which is also supported by a wide range of stakeholders. The creation of space for nature will limit land availability for the expansion of cropland and pasture. It follows that the agricultural strategy in the HE scenario relies on increasing the agricultural productivity to close yield gaps and spare land which can then be allocated to conservation purposes. Agriculture is therefore separated from the attempts to increase biodiversity and is aimed to limit any further negative environmental impacts in agricultural areas. This principle, which is commonly known as land sparing, is coupled with principles and practices of sustainable intensification where increases in yields and high levels of productivity are realised via technological developments and innovations, such as more efficient application of irrigation and nutrients and use of pest management and genetic modification (Cassman and Grassini, 2020; Locke, 2018: Locke, 2015; Wilson, 2016).

Sharing the planet — human activities coexisting with nature

The Sharing the Planet scenario, in contrast, prioritises the instrumental value of nature, which is the belief that nature should be protected for the benefits that is can deliver to people, either directly or indirectly. This scenario highlights the second CBD objective of ensuring the sustainable use of nature and it responds to increasing the scientific, political and societal attention that is paid to the potential of landscape protection for achieving a nature-positive future (Garibaldi et al., 2021; GLF, 2021; Meijer et al., 2022). Unlike under the HE scenario, nature-human interaction is not minimised but, rather, encouraged within the limits of sustainable use. Under this scenario, conservation prioritises protecting and enhancing ecosystem services in mixed landscapes. Mixed landscapes are areas where human activities coexist with nature; protection of these landscapes is premised on the idea that protecting wilderness areas alone will not be sufficient to achieve sustainability goals and that biodiversity can thrive also where people are living and working (Kramen and Merenlender, 2018). This scenario envisions that, by 2030, 30% of the global terrestrial area will be conserved through protected areas and other conservation measures, and urban and agricultural expansion will not be allowed within these conserved areas. At the same time, however, efforts will be needed to protect and enhance mixed landscapes, particularly in the agricultural sector. Political momentum has been increasing around the idea of setting

specific protection targets for mixed landscapes for nature-positive development and achieving at least 20% protection of native habitats in all mixed landscapes (Garibaldi, 2021; Meijer et al., 2021). The agricultural strategy is based on what is commonly known as land sharing, which is an approach where agriculture is not intensified to spare land for conservation but rather is made biodiversity-friendly. Ecological intensification combines natural elements within agricultural plots through practices such as agro-ecology and organic farming. In other words, under this scenario, agricultural landscapes become important areas for biodiversity conservation.

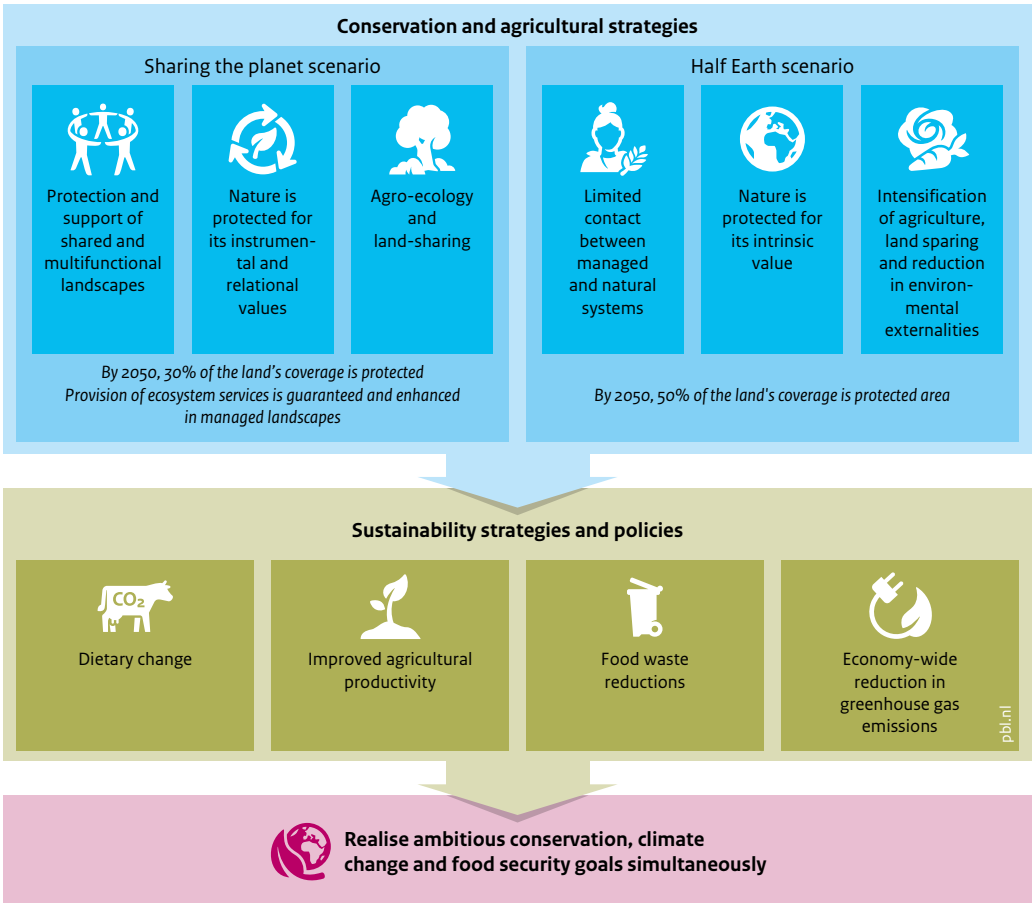
3.3 Integrating biodiversity, climate and sustainability agendas for a nature-positive future

Model-based analysis

The narratives presented in the previous section are the basis for a quantitative, model-based analysis to identify what efforts are needed to meet ambitious nature, climate mitigation (Paris Agreement) and food security objectives (SDG 2) (for a detailed description and further results, see Kok et al., under review). Figure 3.1 shows how the scenario analysis was conducted. The scenarios are analysed with PBL's integrated assessment model framework GLOBIO and IMAGE (see www.globio.info and https://models.pbl.nl/image). A scenario in which social, economic and technological trends do not shift markedly from historical trends was used as a baseline (i.e. the SSP2 'Middle of the road' scenario, O'Neil et al., 2016). Under SSP2, countries are making slow and little progress towards sustainability and policies on nature and climate mitigation and adaptation are only limited. As a first step, we analysed the implications of the HE and SP conservation strategies for nature, climate change and food security (conservation only). We then combined the area-based conservation and restoration under the HE and SP scenarios (conservation only) with a broader set of sustainability strategies and policies (integrated sustainability) that include dietary changes away from meat consumption, changes in agricultural production and food consumption (in particular, reducing food waste, animal product consumption) and a further increase in agricultural productivity) and a shift away from fossil fuels. Countries prioritise human well-being as a policy objective, markedly shift away from unsustainable practices and strongly commit to nature-positive development, net-zero emission pathways and broader sustainability objectives.

Figure 3.1

Conservation, agriculture and sustainability strategies to inspire nature-positive pathways



Source: PBL

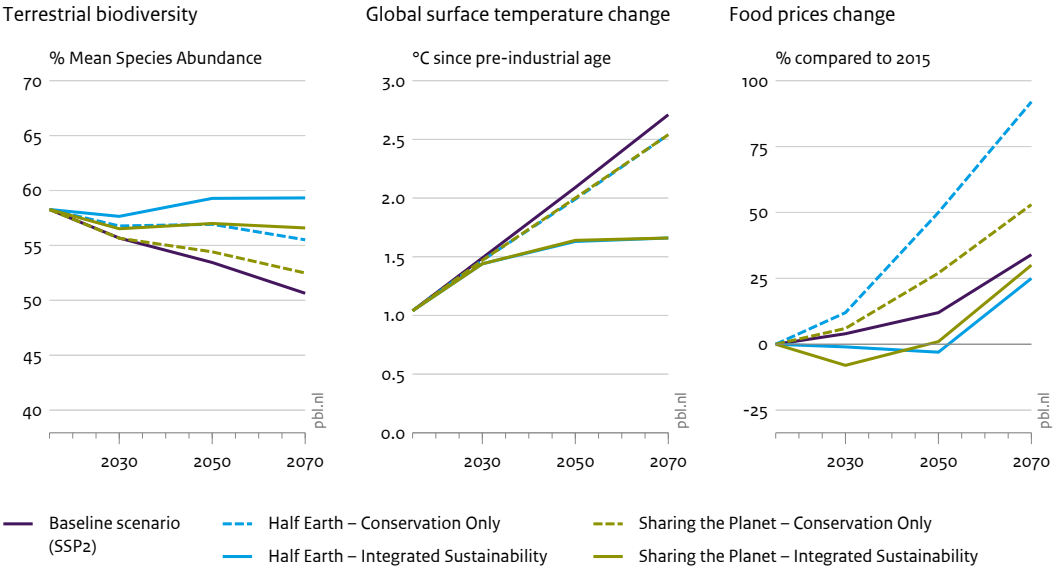
Sharing the Planet and Half Earth: alternative strategies for nature-positive development. The strategies differ in how nature is conserved and to what extent. Both, however, are subsequently coupled with the same sustainability policy package that is necessary to bend the curve of biodiversity loss.

Ambitious conservation scenarios are not enough to bend the curve of biodiversity loss...

The analysis showed that conservation as well as climate and food related goals will not be achieved in the conservation-only pathways under the Half Earth and Sharing the Planet scenarios. In the conservation-only pathways, both scenarios fail to bend the curve of biodiversity loss to keep the global temperature increase at or below 2 °C and are unsuccessful in avoiding further increases in food insecurity. As is shown by the dashed lines in Figures 3.2 and 3.3, ambitious actions on conservation alone — as under the HE and SP-conservation only scenarios — will not suffice to achieve future nature, climate and food security objectives.

Figure 3.2

Scenario results for terrestrial biodiversity, climate change and food security



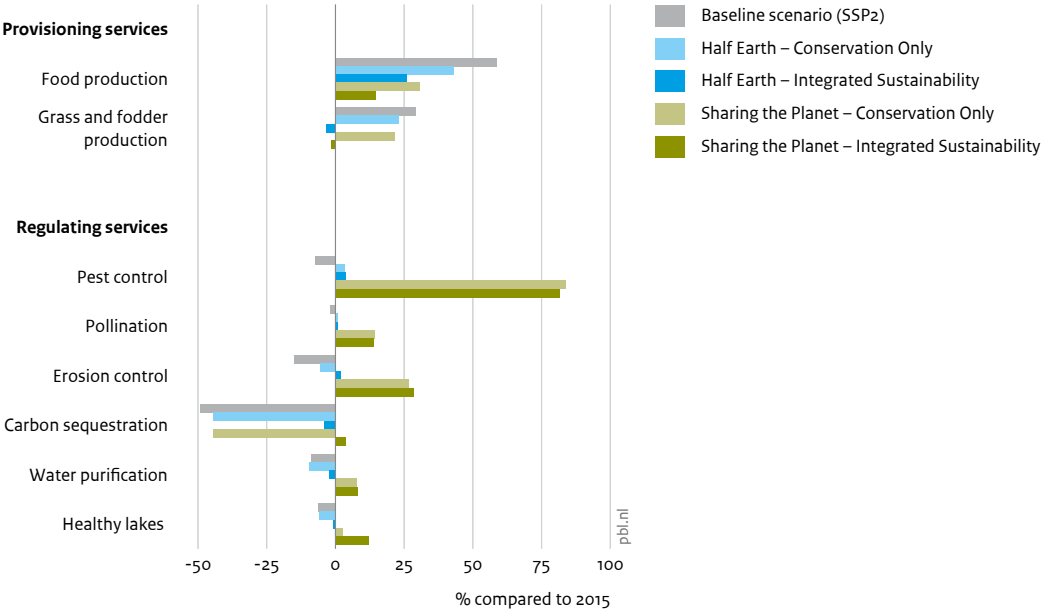
Source: Kok et al. (under review), GLOBIO, IMAGE

Figure 3.2 shows that conservation measures alone (dashed lines) will slow down biodiversity loss and in the case of Half Earth will bring it to a halt. At the same time, the Paris Agreement target of limiting global temperature increase to 1.5 °C – 2.0 °C will not be achieved, and conservation-only measures will increase food prices under both scenarios, particularly under the Half Earth scenario. Only by combining conservation measures with others related to sustainability will generate nature-positive pathways, while also realising reductions in global temperature increase and food prices. Figure 3.3 shows that, while the HE scenario performs better for biodiversity, the SP scenario has higher scores when it comes to ecosystem services. This depends on the different conservation strategies. Again, integrating conservation and sustainability measures will improve ecosystem services outcomes.

Figure 3.4 shows where the projected changes in biodiversity will occur, globally (using the Mean Species Abundance indicator), and compares the current situation with the baseline trend and the HE and SP scenarios. It shows that the Half Earth scenario polarises the results, with very high and very low MSA results in different areas. The Sharing the Planet scenario, instead, shows a more moderate MSA response with a moderate increase and moderate reduction in MSA in different areas of the world. The maps show that conservation efforts will differ between countries under the scenarios. For instance, conservation will be more widespread throughout Europe under Sharing the Planet than under the Half Earth scenario.

Figure 3.3

Change in ecosystem services, 2015 – 2070



Source: Kok et al. (under review), GLOBIO, IMAGE

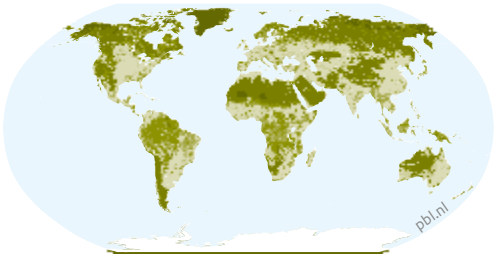
…but need to be combined with a broader package of sustainability measures, including strong climate change mitigation efforts

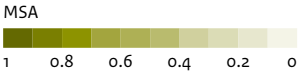
Biodiversity, food and climate objectives can only be achieved if the conservation-only scenarios are combined with a package of sustainability measures that tackle production and consumption — a pathway that we call 'integrated sustainability'. As represented by the solid lines in Figures 3.2 and 3.3, both scenarios with combined measures will halt the loss of biodiversity and ecosystem services and, to a different extent, even succeed in restoring nature. The climate target of staying below 2 °C is only achieved thanks to the broader mitigation efforts in industry and the energy sector and aided by measures to avoid deforestation and agricultural emissions and to restore nature (HE and SP conservation measures). Finally, food security increases, compared to the baseline scenario, thanks to waste reduction, dietary changes and increased agricultural productivity. These results are also confirmed by other recent analyses that emphasise that nature-positive development can only succeed by integrating biodiversity protection and sustainability efforts into a wider framework that includes changes in production and consumption and by addressing indirect and direct drivers of biodiversity loss (Leadley et al., 2022; Leclère et al., 2020).

Figure 3.4

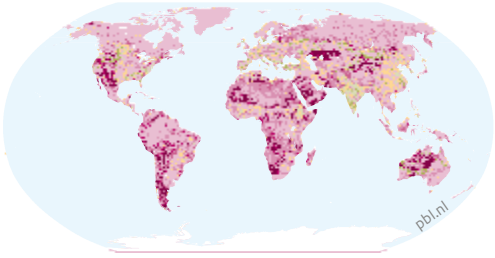
Projected change in Mean Species Abundance (MSA), 2015 – 2050

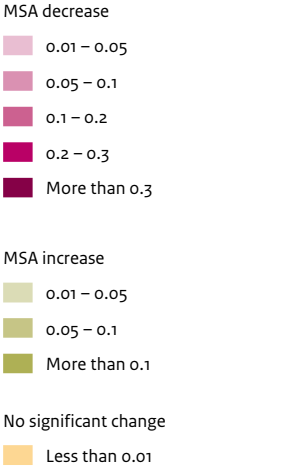
Situation in 2015



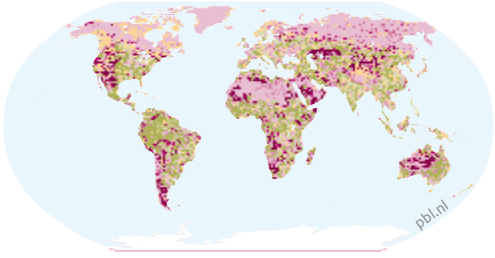


Baseline (SSP2 scenario)

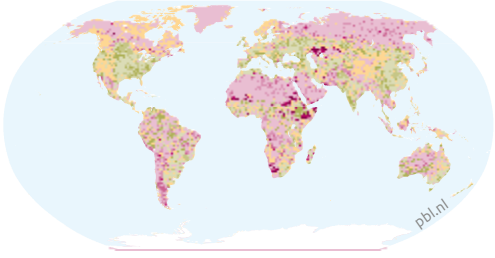




Half Earth – Integrated Sustainability



Sharing the Planet – Integrated Sustainability



Bron: Kok et al. under review, GLOBIO, IMAGE

Efforts assumed in the scenarios that are positioned within the conservation hierarchy
Table 3.1 provides an overview of the efforts that are assumed in the HE and SP scenarios (for both the conservation-only and the combined measures), showing the concrete actions that are needed to realise nature-positive development and indicating what actionable measures can be taken in a whole-of-society approach. These efforts are organised according to the so-called Conservation Hierarchy, a tool that was developed based on the well-known 'Mitigation Hierarchy', which is a conceptual framework initially used within the infrastructure and extractive sector to mitigate and compensate for their impact on biodiversity. The Conservation Hierarchy, as presented by Milner-Gullan et al. (2021), builds on this Mitigation Hierarchy and presents a framework for companies that helps in 'coordinating, prioritising and tracking the many and various actions that collectively contribute to achieving biodiversity goals'. The Conservation Hierarchy consists of four steps: the first two are about preventing negative impacts on biodiversity (refrain, reduce), the other two are about compensation (restore, renew). Similar to the authors of the Conservation Hierarchy, here, we also stress that the hierarchical design of this framework is essential. The stepwise approach is meant to prevent companies from turning to compensation before they have taken all possible measures to change their own operational processes. The third column in Table 3.1 lists the sustainability policies that need to be combined with conservation efforts, as explained above. Chapter 5 applies this framework for individual companies in the collective and cooperative setting of supply chains. There, the element of transformation (introduced in WBCSD (2021)) is discussed further, a proactive and strategic element to fundamentally 'renew' business models instead of improving them.

3.4 Main conclusions of the scenarios

This section presents the main conclusions from the scenario exercise (for full results, see Kok et al., under review) that are useful to further define nature-positive development pathways, implications for transformative change for biodiversity in relation to climate and food security goals and to inform the transformative change agenda about the types of efforts needed as well as their magnitude (see also Table 3.1).

There are multiple pathways towards nature-positive development: the Half Earth and Sharing the Planet scenarios are only two of the many possibilities, but they exemplify the need for an approach to transformative change that considers and taps into the potential of multiple pathways
Various pathways may realise nature-positive development, with differing values of nature being prioritised and resulting in different approaches to conservation and sustainable use. The Half Earth and Sharing the Planet scenarios represent two alternative scenarios for nature in which the intrinsic, instrumental and relational value of nature is given priority in a different order to orient the conservation strategy. Despite the differing strategies, both scenarios are developed (and then quantitatively assessed) to ensure that they simultaneously achieve ambitious biodiversity, climate and food security goals. This shows that alternative pathways towards nature-positive developments can work in parallel in different spatial contexts — although results differ per type of nature that is protected and ecosystem services provided and

for other societal factors, such as food security. This highlights the importance of considering a multiplicity of values of nature when discussing how ambitious goals could be achieved.

Table 3.1

Overview of the efforts that are assumed in the HE and SP scenarios

	Half Earth — conservation only	Sharing the Planet — conservation only	Sustainability package
Renew	Greening cities: expansion of protected areas in urban and peri-urban areas through rewilding practices	Greening cities: expansion of green infrastructures and nature-based solutions in urban areas Greening of agricultural lands by agro-ecological intensification: creation of green borders in agricultural areas	Waste reduction (50% from current levels, by 2050); for example, by promoting circular use of materials and minerals Dietary change (50% less consumption of animal products, compared to the expected animal consumption by 2050 Curtail energy production from bioenergy and hydropower to avoid negative impacts on nature (as part of 'net zero' energy systems);
Restore	Ecological restoration in conserved areas In cities: wetlands, treescapes and coastal restoration, renaturalisation of rivers	Restoration of nature and ecosystem functions in mixed landscapes in order to increase Nature's Contributions to People (focus on mixed landscapes); agroforestry Restore riparian zones In cities: wetlands, treescapes and coastal restoration, renaturalisation of rivers	
Reduce	Sustainable intensification to increase crop yields and reduce negative impacts on the environment Reduce cropland and pasture Increase fertilisation and irrigation efficacy Reduction in ecological footprint of cities as sites of consumption/production	Agro-ecological intensification to make agriculture in mixed landscapes more 'nature-friendly'; Reduce pasture Increase fertilisation and irrigation efficacy Reduce water use Reduction of ecological footprint of cities as sites of consumption/production	
Refrain	Protection of current Protected and Key Biodiversity Areas and expansion towards 30% protection by 2030; 50% protection by 2050; No expansion of urban and agricultural areas in Protected Areas as well as in ecologically important areas within cities	Protection of current Protected and Key Biodiversity Areas and expansion towards 30% protection by 2030; 30% protection by 2050 No expansion of urban and agricultural areas in Protected Areas as well as in ecologically important areas within cities	

Conservation efforts alone will not bend the curve of biodiversity loss

The quantitative analysis of the Half Earth and Sharing the Planet scenarios shows that expanding conservation efforts to protect larger swaths of land and sea — even to the point of imagining the protection of 50% land surface under the Half Earth scenario — will not succeed in bending the curve of biodiversity loss and, in addition, might even increase trade-offs between conservation and other sustainability agendas, such as food security. The quantitative analysis found that complementary sustainability measures would need to be integrated into conservation actions to achieve nature-positive development. This package of measures contains ambitious climate mitigation actions, including dietary changes away from meat and dairy consumption, changes in agricultural production and food consumption (in particular, reduction in food waste and in animal protein consumption and a further increase in agricultural productivity) and a shift away from fossil fuels.

It is necessary to integrate biodiversity, climate and sustainability agendas, in which consumption change and demand-side management are key to avoid trade-offs for biodiversity

The main conclusion of our analysis is that, if nature-positive objectives are to be achieved by the international community, it is necessary to integrate biodiversity, climate and sustainability agendas. Trade-offs between climate change mitigation and biodiversity usually arising from the large-scale application of biofuels and hydropower, as well as afforestation, can only be avoided through consumption change and other measures that reduce the demand for natural resources.

Who may bend the curve for biodiversity and how?

The scenario analysis does not address the question of how these efforts could be realised on the ground. To fill this gap, the following three chapters examine three specific configurations: rural landscapes, supply chains, and cities. These three configurations bring together non-state and sub-national state actors on national and sub-national levels and cover nature and nature–human relationships in their various dimensions as well as direct and indirect drivers of biodiversity loss.

4 Landscape governance for a nature-positive future

4.1 Introduction

To bend the curve for biodiversity, the conservation and sustainable use of biodiversity needs to be integrated into the governance of wider rural landscapes (and seascapes) (IPBES, 2019a). This is supported by an increasing awareness of indigenous peoples and local communities (IPLC) playing a crucial role in protecting biodiversity (Estrada et al., 2022; FPP, 2020; WWF et al., 2020). It is also supported by calls for biodiversity protection within multifunctional landscapes that highlight its importance (Garibaldi et al., 2021; Western et al., 2020). In this report, rural landscapes refer to those areas where people and nature coexist, more or less harmoniously, and where agricultural production and other human activities, such as forestry and tourism, are combined with nature conservation.

Rural landscapes are key for nature-positive development, but multiple agendas must be taken into consideration in transformation processes

Rural landscapes and other configurations have become contested areas where multiple actors, policy agendas, discourses and land uses compete to shape what these areas will look like and how they are governed (Van der Ploeg et al., 2008). Globally, urbanisation trends are emptying out rural areas across both the Global North and South, while the inhabitants of growing urban areas are all the more tightly dependent on and connected to rural areas for their resources and nature's contributions to people (Seto et al., 2013; Cohen, 2006; IPBES, 2019). Rural areas are key to many sustainability challenges and, as emerged from the scenario exercise (Chapter 3), they are fundamentally important for achieving ambitious conservation objectives and contain the largest share of food production systems.

Any transformation towards nature-positive development must take into consideration the power asymmetries between the actors in rural areas, their visions and needs

Dynamics of change in rural areas are complex and vary between areas. Taking all of those changes into accounting was beyond the scope of this report. However, rural areas, both today and in the future, do not solely depend on local actors. Historically, local communities, farming communities, indigenous peoples and rural inhabitants, more in general, have had a marginal role in decision-making processes for biodiversity governance.

Rural policies were often sectoral and top-down implemented. Within that context, biodiversity policies drove a discourse and practice of conservation in which people and nature were separated (Buscher and Fletcher, 2020; Hecht, 2010; Mbatha, 2022,). In rural areas, major drivers of change, therefore, should also be looked for in dynamics unfolding outside these areas (Van der Ploeg, 2008, REF). For example, urban food demand and the choices made by companies in the supply chains heavily shape rural landscapes and have an impact on both ecosystems and communities (see Chapter 5). The struggle of IPLC against mining activities or large-scale, export-oriented agriculture are examples of possible tension, on a local level, between certain needs and the definitions of what a rural landscape should look like, what purposes it is to serve and how external actors might want to use it (Vermunt et al., 2020; Wiegant et al., 2022). Clearly, rural landscapes are contested as there are different claims on nature and natural resources (Arts and Buizer, 2009).

Content and structure

This chapter identifies ways to combine sustainability agendas, values and the needs of a wide variety of stakeholders to sustainably manage rural landscapes so that people are able to benefit from what nature can contribute, while conserving the areas with high levels of biodiversity and increasing the biodiversity value of the managed systems. This report suggests that a way of fostering transformative change in rural landscapes would be by fundamentally changing the governance of spatial development and planning processes that often still fail to integrate the various societal and ecological objectives in the same policy framework (Meijer et al., 2021). The following section (4.2) introduces the landscape approach as a viable tool to deal with multiple pathways of change and values of nature and to work towards a whole-of-society approach. It can be used to integrate different sectors (e.g. conservation, agriculture, tourism), combine managed and natural ecosystems and include multiple landscape values (e.g. natural, economic, cultural, spiritual, historical, heritage-related, nutritional) as a strategy to deal with trade-offs and optimise synergies towards a nature-positive future. Section 4.3 summarises the result from an analysis conducted on International Landscape Initiatives as a way to explore already-existing whole-of-society approaches towards nature-positive development on the landscape scale. Section 4.4 subsequently highlights how several principles of transformative change can strengthen current landscape approaches. Finally, Section 4.5 provides a list of suggestions for national government policies on implementing landscape approaches to nature-positive development in rural landscapes.

4.2 Nature-positive development from a landscape perspective

Landscape approaches aim to move past sectoral policies

Landscape approaches have become increasingly popular in discussions around sustainable development, conservation and climate change mitigation, since the landscape level has been recognised as the appropriate spatial unit of action for these agendas (Arts et al., 2016). Despite multiple attempts to embrace an integrated landscape approach, the ecosystem approach remains the primary framework for action under the CBD (CBD, 2004). The latter approach often fails to integrate the various sectors and ecosystems and, therefore, results in limited possibilities for addressing trade-offs and tapping into synergies (Arts et al., 2017). Landscape approaches, on the other hand, recognise that multiple ecosystems (e.g. agricultural, forest, wetland, water, coastal and peri-urban systems) as well as multiple claims over nature and resources usually coexist, and that it is exactly this coexistence that needs to be addressed to deal with trade-offs, create synergies and co-benefits from multi-functional land uses. Landscape approaches view nature as a holistic, integrated ecosystem and put a stronger emphasis on anthropogenic factors and nature's contributions to people within the spatial context of a landscape. These approaches not only refer to land-based activities or objectives, but also aim to cover freshwater, coastal and marine environments (e.g. seascapes). The frequently applied 'ridge-to-reef' approach is a typical landscape approach that integrates activities relating to terrestrial, freshwater, coastal and marine ecosystems (see Figure 4.1) (Saito et al., 2020; Karimova and Lee, 2022; UNU-IAS, 2019). Landscape approaches can support nature-positive development, because it considers and favours the integration of conservation, restoration and sustainable use of biodiversity as a prerequisite for well-being and development in all sectors of society, including agricultural production, climate change adaptation, consumption and human health (Meijer et al., 2018; Meijer et al., 2021; Runhaar and Driessen, 2009). This aligns well with the main messages of the scenario exercises of Half Earth and Sharing the Planet (see Text box 4.1).

Text box 4.1 Insights from half-earth and sharing-the-planet scenarios for rural areas

The Half Earth and Sharing the Planet scenarios show two different options for rural landscapes to achieve nature-positive development (for details, see Chapter 3). The Half Earth scenario imagines rural landscapes where specialised and sustainably-intensified agriculture are combined with large conservation areas for wilderness that, globally, cover 50% of the Earth's surface. The Sharing the Planet scenario, instead, envisions rural landscapes characterised by multifunctionality where small-scale, agro-ecological, organic agriculture is combined with the enhancement of nature's contributions to people. There are limitations to these scenarios; they are storylines that do not include all of the important human activities, such as tourism and mining, which are the elements of rural landscapes; they are two of the many possible scenarios that could be developed for rural landscapes (Felipe-Lucia et al., 2021; Quintero-Uribe et al., 2022; Saito et al., 2019). These scenarios should not be

seen as incompatible, but rather as nature-positive developments that work towards including the multiple values of nature. However, these two scenarios show how rural landscapes offer opportunities to conserve, restore and sustainably use nature at the same time, and that there are multiple pathways to achieve these objectives, with different facets of nature being conserved, restored and sustainably used.

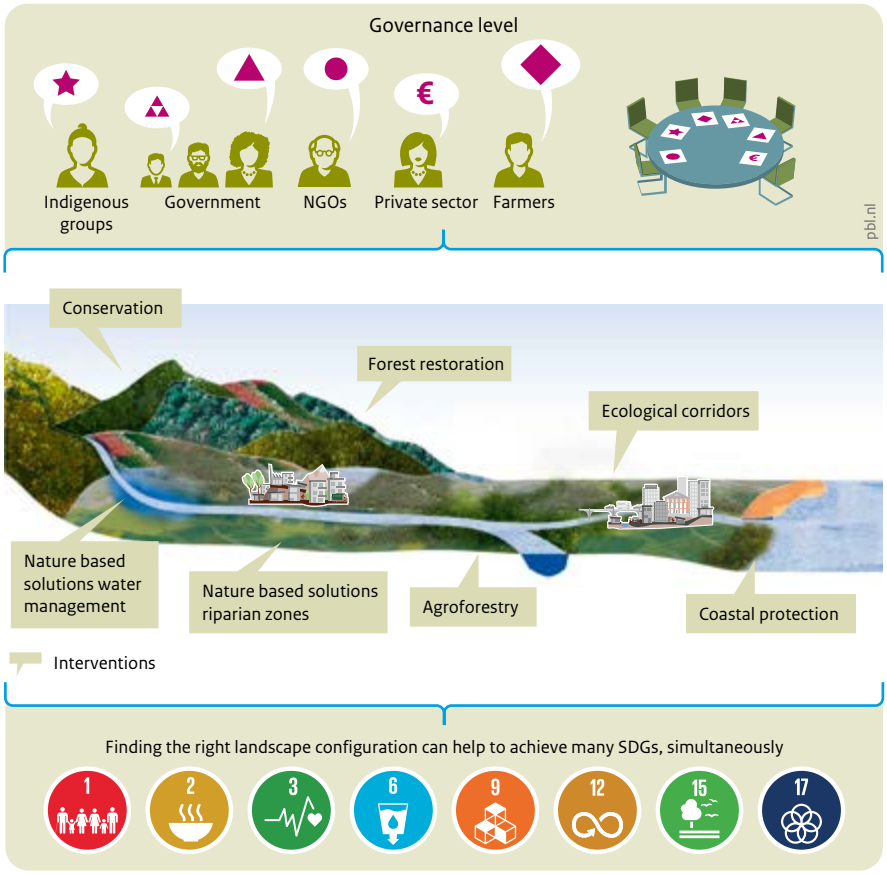
Another finding from the scenario analysis is that conservation measures will have to be combined with other sustainability agendas to achieve nature-positive development. This speaks greatly to rural landscapes where multifunctionality — the presence of multiple activities and values of nature — is key. Conservation combined with sustainability forms a central target for rural landscapes, because it is at this level that ecological, social and economic objectives meet the spatial realities of river systems, forested areas, drylands, coastal zones and agricultural and urban regions. This is also the level at which the most impactful land-use decisions and trade-offs are made, and where conflicting policy objectives become apparent. Here, diverging stakeholder objectives are to be combined to form balanced outcomes of sustainable economic and social development and biodiversity conservation, supporting the increasing demand for nature-based solutions (Albrechts et al., 2020; Djenontin et al., 2020; Hedden-Dunkhorst et al., 2019; Van der Horn and Meijer, 2015).

Recognising the multiple values of rural landscapes is key to bringing all stakeholders together for a whole-of-society approach to change

Traditional landscape thinking involved a top-down perspective with a focus on government land-use planning for biodiversity conservation, leaving little attention for local communities. Over the past two decades, a more bottom-up, multi-stakeholder perspective has developed, with the landscape objectives and values of multiple stakeholders which are taken into account in decision-making. Companies and the private sector have, for instance, jumped on the bandwagon and embraced landscape approaches as a way of tackling sustainability while developing economic revenues (Arts et al., 2016; Reed et al., 2015). Further importance has also been given to the concept of cultural landscapes that recognise the interaction between human activities and nature in shaping rural landscapes. This has helped to prioritise issues, such as sense of place and identity, as crucial factors affecting governance and to include them in decision-making processes on rural landscapes (Agnoletti and Rotherham, 2015; Arts et al., 2016; Escobar, 2001). However, past experiences of landscape approaches have also shown that bringing a diverse group of stakeholders to the table is not easy (Arts et al., 2016; Chan et al., 2007; McWilliams, 2015). Moreover, involving increasing numbers of stakeholders will not necessarily result in more just decisions — because of the differences in power relationships between them — nor will it automatically lead to more innovative and inclusive conservation and governance schemes (Arts et al., 2017; Clay, 2016). However, landscape approaches have the potential to provide an inclusive and participatory framework that can stimulate stakeholders to work together and become aware of the benefits of greater landscape sustainability (Milder et al., 2014). In addition, landscape approaches resonate well with non-environmental actors,

Figure 4.1

The landscape approach integrates multiple values and objectives in landscapes and seascapes



Source: PBL

Landscape approaches include various stakeholders, bringing them together to facilitate the negotiations on their different needs, objectives and visions. At the same time, landscape approaches integrate the various sectors and sustainability dimensions as a way to navigate trade-offs and maximise synergies.

organisations and sectors that may otherwise struggle to engage in sustainability issues (Nishi and Yamazaki, 2020). The matter is one of governance and how decision-making processes are organised and managed when various stakeholders are brought together. In this regard, landscape governance arrangements can play a central role in catalysing nature-positive development. These arrangements can be initiated by both endogenous (locally crafted, bottom-up, local government authorities) and exogenous initiatives (fostered by national governments, non-governmental organisations or international

funds). In both cases, their high level of local embeddedness, holistic and multi-layered nature harbours a huge potential for bridging state and non-state actors, knowledge systems and policy sectors, once institutional hurdles have been overcome (Garcia Martin et al., 2016; Kozar et al., 2014; Mijatovic et al., 2018; Sayer et al., 2013; Van Oosten et al., 2018). It is worth repeating that it is exactly at the landscape level that stakeholders are already meeting, putting forward their own needs and negotiating, and, as the following section (4.3) shows, have already started to mobilise and act in what is called here a nature-positive way. Effective landscape governance should recognise what is already there and should further support the capacity building, participation and cooperation of stakeholders at the local level of integrated policy implementation (Van Oosten 2021; Scherr et al., 2022) (for a practical example, see Text box 4.2). This includes indigenous peoples and local communities and directly speaks to CBD's goals and targets of ensuring equity, protection of associated traditional knowledge and rights over resources, the Sustainable Development Goals (SDGs), as well as the support for mechanisms and enabling conditions of the implementation of the post-2020 Global Biodiversity Framework. Policymakers would need to recognise that realising many of the targets set by the CBD will rely largely on landscape-level actions and better and integrated spatial planning.

Text box 4.2 A shared vision for landscape planning and governance of Greater Kumasi, Ghana

Over the past decades, the Greater Kumasi Sub-Region and its adjoining districts (collectively called the Greater Kumasi landscape) have changed in very notable ways. Once known as the 'garden city', with its urban and peri-urban expansion, Kumasi, the second largest city of Ghana, is rapidly encroaching on essential green and blue infrastructure (GBI). This is reflected by the loss of biodiversity and the urbanisation, agricultural expansion and mining activities encroaching on the remaining peri-urban green spaces, forest reserves and protected zones. Also, water resources are polluted and water quality parameters for several water resources are far below the desirable quality levels or excessively exceeding acceptable limits. Green spaces and water resources are often seen as public goods, but as blue and green infrastructure, they provide important ecosystem services that contribute to overall human well-being and development. Various actors (e.g. government agencies and authorities, the private sector, CSOs and farmers) are already involved in the management of blue and green infrastructure within the rural landscape. Given the complexity of the challenges related to the Greater Kumasi landscape, a collaborative and integrated landscape approach is expected to bring about synergies for achieving interconnected and multiple goals. A two-day workshop was organised on 28 and 29 October 2021 by the Bureau of Integrated Rural Development of the College of Agriculture and Natural Resources (CANR) of Ghana, in collaboration with PBL Netherlands Environmental Assessment Agency, to offer a space for academics, traditional authorities, practitioners from public agencies, private firms and civil society organisations to deliberate and think about the future and possible

pathways for the Greater Kumasi landscape. An agreement between stakeholders in the Greater Kumasi landscape on various ambitions to be pursued remains an important condition for the implementation of an integrated landscape management plan. The 2030 landscape vision that was developed during the workshop was one of inclusive and sustainable development, agriculture and urbanisation with a focus on the preservation and restoration of natural areas. This vision covers seven main themes: green spaces, water resources, agriculture, urbanisation, livelihoods and governance. In addition to a consensus on prioritising GBI conservation and climate adaptation, several participants indicated the relevance of such development for smallholder livelihoods in rural areas. In the urban context, the importance of green and blue infrastructure (GBI) was associated with liveable settlements, human health and flood management. This vision was combined with ideas of regulating and improving various productive aspects of the landscape, such as food production, commercial forestry and urban services. Participants agreed on the centrality of establishing strong urban–rural linkages, urban densification and efficient transport systems in achieving greater productivity, while causing less of a negative impact on the natural environment. These aspects were also considered integral aspects of safe urban settlements, affordable housing and a reduction in crime, together with mix-use development.

For more information see Nesi et al. (2021) and the BIRD KNUST website (https://bird.knust.edu.gh/node/77).

4.3 Whole-of-society approach towards nature-positive development within the rural landscape level

Over the past decades, numerous stakeholders around the world have increasingly become involved in actively contributing to nature-positive developments at the rural landscape level, with starting their own initiatives and developing strategies that combine sustainable development with conservation, restoration and sustainable use (Arts et al., 2017; Pattberg et al., 2019). These initiatives are reflected in numerous projects, networks, platforms and coalitions by citizens, young people, farmers, cooperatives, landowners, companies and other landscape actors taking on active and often voluntary roles in environmental stewardship. While struggling with harsh realities and facing various challenges, many of these initiatives have also been able to initiate the development of innovative and participatory approaches to land-use planning, new types of locally managed conservancies and new ways to incorporate biodiversity benefits in livelihood strategies (UNU-IAS and IGES, 2019). They also inspired the transformation of agricultural systems for the benefit of biodiversity and financial innovations to improve economic and development planning by including biodiversity information and natural capital accounts in decision-making (ALD, 2019; Meijer et al., 2020). What these initiatives represent, in other words, is the 'groundswell of action' mentioned in Chapter 2. They also show that a whole-of-society approach to transformative change is already happening in many landscapes, worldwide.

The many emerging landscape initiatives and arrangements provide tangible examples of how multiple landscape values can be combined, by creating more spatial and sectoral synergies and by guiding the process of adequately dealing with trade-offs. At the same time, these initiatives show the transformative potential of a whole-of-society approach on landscape level. An increasing number of landscape initiatives are connected to large international networks and platforms facilitating a better connection between global commitment and local action, sharing of knowledge and experiences for spatially explicit integration of sectoral policies, recognising important urban–rural linkages in landscapes (e.g. the Satoyama Initiative, the 1000Landscapes Initiative and the Global Landscapes Forum) and increasingly developing practices for monitoring and reviewing progress (e.g. Landscale, SourceUp and the ISEAL Alliance).

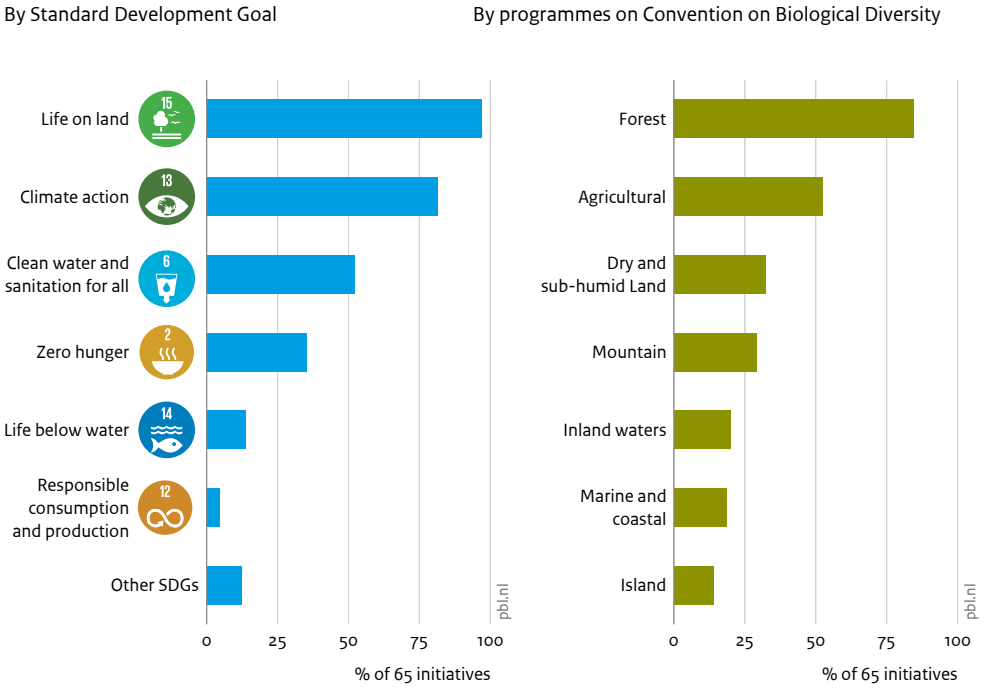
An analysis was conducted of 65 International Cooperative Initiatives (ICIs) focused on landscape management (Negacz et al., 2022). The analysis highlighted various aspects that characterise landscape initiatives, with the intention of supporting governance schemes that can build on what is already happening at landscape level. A first result of this analysis concerns the actors that are involved in such initiatives. Three categories of actors were considered: civil society organisations (CSO), companies and government authorities (national, regional and local levels). The vast majority of the 65 ICIs analysed are hybrid, which means they emerge from some form of collaboration between actors. The largest share of initiatives involve all three categories of actors (29%). Individual actor groups were found to be less likely to embark on actions directed to landscape management. While this is true and government-only and CSO-only initiatives each account for 15% of ICIs, there are no landscape initiatives by companies alone. The main finding, therefore, was that landscape initiatives profit from the mobilisation and collaboration of several actors.

The various goals that these landscape initiatives contribute to were also analysed. All these initiatives contribute to different CBD goals, highlighting, once again, the importance of non-state actors in the run-up to nature-positive development. More specifically, our analysis showed that the initiatives contribute to both conservation, restoration and sustainable use targets (Negacz, Widerberg, Kok, et al., 2020). Conservation refers to both land and biological diversity; sustainable use ties in with production and consumption where genetic resources must be used in a sustainable way (CBD, 2011, p. 8). Access and benefit sharing, lastly, refer to 'the fair and equitable sharing of the benefits arising from the utilisation of genetic resources' (CBD, 2011, p. 4), especially with indigenous peoples and local communities. The analysis showed that initiatives are more likely to have more than one action goal. The most recurring CBD goal is that of sustainable use, with 92% of ICIs having this as their objective, followed by 78% of initiatives working towards the CBD goal of conservation and 38% towards access and benefit sharing.

A further breaking down of the results showed that the analysed landscape initiatives contribute towards six SDGs (see Figure 4.2), with the vast majority of them (97%) focusing on SDG 15, Life on land, and 82% on climate action (SDG 13). This shows a clear potential for these initiatives to create synergies and co-benefits across biodiversity and climate agendas.

Figure 4.2

Focus of landscape oriented international cooperative initiatives, 2021



One initiative can address multiple SDGs or thematic programmes

Source: IVM/PBL Biostar 2.0

Percentage of landscape oriented Integrated Cooperative Initiatives acting towards SDGs and CBD priority areas (CBD programmes).

Finally, from the analysis we also found that most of these initiatives are focused on both forest and agricultural biodiversity (85% and 52%, respectively) showcasing the potential of these initiative for bringing people and nature together in harmony and merging traditional biodiversity conservation targets with other sustainability agendas around human needs and values.

4.4 To achieve nature-positive development, landscape approaches must be coupled with an understanding of how power works on a rural level

The pathway of continued business-as-usual practices has a high risk of 'stranded landscapes' with disruptions and conflicts that compete in a race to the bottom, for both nature (biodiversity loss, nature's contributions to people, degradation, climate change impacts) and people (deteriorating livelihoods, food insecurity, conflicts, migration). Many initiatives aimed at transitioning towards alternative pathways and that apply landscape approaches resonate with the various principles of transformative change highlighted in Chapter 2. These principles can help to harness the transformative potential of landscape approaches. At the same time, nature-positive development cannot solely be reached within the landscape configuration. While landscape approaches address some fundamental aspects of transformative change, they should also be see in relation to supply chains and the urban context and other configurations not considered in this report. As mentioned already, rural landscapes are shaped within broader dynamics of change occurring from local to international levels. While it is true that a landscape approach can facilitate the negotiation between these different levels, transformative change for a nature-positive future would require deeper and structural changes that expand well beyond the landscape level (Buizer et al., 2016)

Landscape approaches can help *to expand the action arena, realise various co-benefits and design deliberative and inclusive processes*. According to landscape approaches, multistakeholder collaborations need to involve the whole of society, including indigenous peoples and local communities, look for additionality and synergies between the various interventions and programmes, avoid trade-offs and prevent implementation processes that are carried out in splendid isolation within the same landscapes. Designing cross-linkages between sectors (e.g. agriculture, conservation, fishery), on various spatial scales and across time are important steps towards more integrated approaches. To go beyond the current impression that any realised synergies are merely the result of coincidental collaborations in landscapes, the planning and implementation of such cross-linkages explicitly needs to happen at multiple levels: between actors and sectors in specific landscape projects, within programmes operating in multiple landscapes, and between policymakers responsible for funding and designing new programmes. This will not be easy, processes involving multiple stakeholders are complex as they include a large range of objectives (Chan et al., 2007). Here, we also stress that power imbalances between actors should not be ignored and simply creating participatory and inclusive arenas for discussion is not enough to ensure that all actors have an actual say and impact on the way decisions are taken and, subsequently, implemented (Cooke and Kothari, 2001; Morse, 2008). These processes adopt a proactive approach to resistance, and will not only create inclusive platforms for dialogue but allow a redistribution of resources that may achieve actual shifts in power and solidly bridge rural landscapes to justice and multiple values of nature.

Governance can play an important role to facilitate these complex processes of designing different types of collaborations, balancing options, negotiating trade-offs, and ensuring that local stakeholders are heard and included in the resulting plans (Fagerholm et al., 2020, Karrasch et al., 2017; Kuenkel et al., 2021; Kusters et al., 2020; Sarmiento Barletti et al., 2019).

In light of the growing interest in a transformative approach to sustainability within the environmental sector (both CBD decisions and IPBES assessment results), it is possible to envision a governance process at the landscape scale that tackles issues of power, acknowledges and is designed to address challenges and identify solutions within socio-ecological systems. This would be a shift from conventional entrenched governance approaches of sector-based implementation towards inter-sectoral, multi-level and multi-actor policy coherence. The context-dependency of landscape approaches and the required spatial planning ensures that multiple pathways are taken at the landscape level (see also Chapter 3 and Text box 4.1). Adopting a landscape approach helps to overcome 'silver bullet' type of interventions and favours more locally led and crafted solutions (Soanes et al., 2021).

While landscape approaches could address some fundamental steps towards transformative change and a nature-positive future, it must be noted that an approach to change requires a more nuanced understanding of the barriers and opportunities that exist both inside and outside rural landscapes. Innovations and changes on a landscape level, which could also be facilitated by a landscape approach, will still face and need to interact with institutionalised policies and other dominant discourses. Taking power seriously requires considering three crucial elements that shape landscape governance: natural conditions, discourses and institutional practices (for a detailed discussion on these dimensions, see Buizer and Arts (2016)). Natural conditions refer to the physical elements that characterise each rural landscape, such as a river, forest, or mountain range. These conditions have an impact on the way governance unfolds, because they may limit and define the people, resources, know-how and financial flows within a certain rural landscape (Görg, 2007; Louman et al., 2021).

The *discourses* referred to here are 'interpretative schemes, ranging from formal policy concepts and texts to popular narratives and storylines, which give meaning to a policy issue and domain' (Buizer and Arts, 2016, p. 451). They are profoundly multi-level, in the sense that they arise from, exist within and impact governance and society from local to international levels. By including multiple stakeholders, landscape approaches can facilitate alternative discourses between people and may include those on multiple levels, bringing together local and national narratives around the very same rural landscapes. Taking the Half Earth and Sharing the Planet scenarios as an example, we see that these discourses both arise from the scientific literature and are initiated by conservation practitioners. However, these discourses might be contested by local actors living and working within the rural landscape, and there are also many alternative landscape scenarios. Landscape approaches, therefore, will need to explore alternative futures in an inclusive and just

manner to avoid some of the discourses being pushed to the periphery by the more dominant ones (Walker and Fortmann, 2003, Wyborn et al., 2020).

The term *institutional practices*, here, refers to how the discourse has been consolidated into practices, for example in the way networks are formed, resources are allocated, or rules are established (Buizer and Arts, 2016, p.456). We looked at how institutional practices legitimise and materially reproduce certain discourses. Negotiations as part of landscape approaches need to be able as well as enabled to modify existing institutional practices that rule over rural landscapes and legitimate certain discourses over others. This might be particularly difficult because the various sectors included in rural landscapes (e.g. forestry, agriculture, fishery) may have been structured around institutional practices that can hardly be changed, and because new institutional practices emerging from landscape approaches may suffer from a lack of legitimation (Van Oosten et al., 2021).

All in all, landscape approaches may initiate transformative change, but attention must also be paid to the possible impact of power, barriers and opportunities within the governance system. The following section presents a discussion on what national governments can do to support a whole-of-society approach to nature-positive developments in rural landscapes. This can help to consider and act on discourses and institutional practices that might otherwise be difficult to deal with in rural landscapes (see Text box 4.3 for an example of integrated landscape visions grounded in ideas of justice and aimed at tackling power imbalances).

Text box 4.3: The Kigali call to action for people and nature, committing to conservation and sustainable use of nature, and human well-being, integrated in African landscapes and seascapes

More than 2400 participants from 53 African and 27 other countries participated in the inaugural IUCN Africa Protected Areas Congress (APAC) that was held in Kigali, Rwanda, from 18 to 23 July 2022. It was organised, jointly, by the Government of Rwanda, the International Union for Conservation of Nature (IUCN) and the African Wildlife Foundation (AWF). The Congress attracted participants from across the African continent and beyond, representing governments, African regional bodies, NGOs, national and international experts and organisations, local communities, indigenous peoples, youths, academia, the judiciary, development partners and the private sector. It was a congress by Africans and for Africa — celebrating and acknowledging the skills and commitment of Africa to conservation, sustainable use of nature and human well-being. Under the theme 'For People and Nature' the Congress identified priority actions to strengthen Africa's protected and conserved areas in a manner that is just, equitable and fair and will deepen the involvement of indigenous people and local communities. Participants committed to act with urgency to address the biodiversity, climate change and health crises and their relationship to human development and well-being in an inclusive and integrated

way, to achieve a nature-positive objective. They also called for greater public and private financial investment in nature conservation and protected and conserved areas concomitant with their value and the flow of ecosystem services in the wider production landscapes and seascapes, to support human livelihoods and well-being. Various critical actions were distilled for effective governance and management of protected and conserved areas in landscapes and seascapes informed by Africa's context and in ways that benefit African people. These include: (1) promoting more inclusive and equitable governance relating to access to land, rights, derived benefits from natural resources and improving knowledge on other effective area-based conservation measures (OECMs); (2) putting people at the centre of effective and equitable conservation, so that the various benefits that are vital for the livelihoods and culture of African people are included in decision-making and are central to achieving global and national biodiversity and ecosystem targets. This also requires improving effectiveness of conservation activities by identifying, recognising and involving all governance authorities and improving their capacities; (3) mobilising the economic value of protected and conserved areas and sustainable financing as they are generating services that support the surrounding production landscapes and seascapes, and are supporting the livelihoods of local communities through sustainable use and employment (e.g. tourism). This needs to enhance conservation governance and management effectiveness and to catalyse the direct involvement of indigenous people, local communities, women and youths; (4) conservation actions can contribute as natural solutions to the biodiversity and climate change crises, with a focus on restoring fragmented and degraded ecosystems and avoiding or mitigating the impacts of climate change, new infrastructure and environmentally destructive activities, thereby maintaining ecological connectivity through networks of protected and conserved areas, including OECMs and transboundary areas.

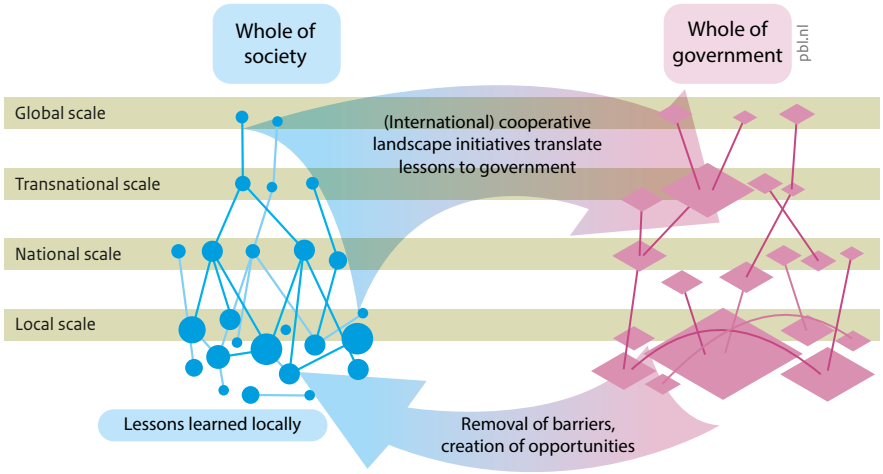
More information via the African CSOs Biodiversity Alliance (ACBA) at https://africancba.org/apac

4.5 Lessons from integrated landscape initiatives for national government and international policymakers

As discussed in the sections above, creating participatory and inclusive processes at the landscape level is important and we need to move past silo-type of interventions that hamper the simultaneous achievement of multiple goals. The previous sections outline the ways in which an integrated landscape approach could integrate various sustainability agendas and the elements needed for such a transformation. However, it is clear that such an approach will not be a silver bullet and cannot be taken lightly. Designing and implementing such holistic policies is effective only when supported by governance structures and higher level plans (Reed et al., 2020b). If there are mismatches between land-use preferences, stakeholder prioritisation, participation and the generation and distribution of benefits, then landscape-level governance principles, including inclusivity

Figure 4.3

Collective definition and implementation of nature-positive pathways through integrated landscape approaches



Source: PBL

Nature-positive pathways on landscape level refer to the interactions between local and global levels and non-state and state actors. Lessons can be learned from local landscape initiatives that can then be applied on all scales, thanks to the mediation of international networks of cooperative landscape initiatives. Lessons can be translated into actions for government authorities, on various levels, to act on removing barriers and create opportunities for change.

and diversity preference, can become disrupted. This implies the need for engagement and effective communication between stakeholders at multiple levels, and policy innovation should be enabled through innovative governance arrangements based on spatial contexts and identities. The various actors involved in landscape arrangements could address these challenges by promoting institutional development via landscape partnerships, participation in formal environmental assessments, developing governance strategies and supporting processes of joint learning, negotiation and refection within and between multiple levels of governance (Arts et al., 2017; Burgi et al., 2017, Kusters, 2015; Meijer et al., 2021; Reed et al., 2020a and 2020b; Sayer et al., 2016; Scherr et al., 2022; Van Boven, 2020). This section identifies the possible challenges and opportunities for landscape approaches for national governments and governance arrangements in general.

National governments are provided with a large opportunity to build on already-existing initiatives and arrangements to repeat them and contribute to realising the ambitions set in the post-2020 Global Biodiversity Framework

The support of such initiatives, however, will require governments to adopt long-term perspectives on land-use management and long-term financial and policy commitment. Governments have a great responsibility to organise the process of land-use planning, secure land tenure and define environmental regulations. These are all government

responsibilities in response to both international and national agendas. The integration and mainstreaming of these various levels with that of the landscape is very urgent, but also very difficult, due to differences between policy cycles and objectives. However, the challenge to produce co-benefits from agricultural, water- and biodiversity-related restoration activities is addressed by actors in landscape arrangements, and it is at this level that these challenges — along with their trade-offs and synergies — become more visible and tangible (Cohen-Shacham et al., 2019; Djentonin et al., 2020; Wiegant et al., 2020). This visibility may be a cause of contestation, tension and struggles amongst local actors, yet it may also allow for context-specific improvements in tenure arrangements, something that would be difficult to achieve at a higher level of governance.

Governments need to promote synergies between landscape partnerships and the political and administrative territorial structures within and between countries

Landscapes tend to follow catchments, forests, coastal zones or otherwise socio-ecologically defined boundaries, whereas countries, provinces and municipalities follow territorial boundaries that have been politically shaped and implemented in regulations and often are not in keeping with landscape-related interests. This boundary mismatch implies that landscape realities may not always align well with national spatial decision-making structures. Such mismatches could lead to problems of accountability, legitimacy and otherwise perceived democratic deficits, or even lack the political will to support ongoing collaborations between actors to produce environmentally sustainable and socially just land-use outcomes (Hedden-Dunkhorst et al., 2020; Gaugitsch et al., 2020; Kusters et al., 2020; Ravikumar et al., 2018; Reed et al., 2020a). Governments need to recognise and support landscape initiatives and arrangements to overcome internal inconsistencies of sectorial planning frameworks, and to ensure that integrated land-use planning takes into account ecological, socio-cultural and economic processes for optimal realisation of co-benefits, from a range of ecosystem services (ALD, 2020). There is significant overlap between landscape and territorial approaches, and they are linked through common principles and frameworks. Territorial governments and multi-stakeholder landscape partnerships can be supported in joining forces to build cooperative, co-creative, and co-managed initiatives at a landscape or seascape scale to achieve the SDGs in a holistic and integrated manner, leaving no one — and no place — behind (Scherr et al., 2022; UNCCD, 2022; UNFSS, 2021a).

Governments have to enable multi-level governance

We need national and sub-national policy and legal frameworks that embrace territorial, landscape, city and regional action as the focus of multi-level governance for sustainable development. These frameworks should structure government law and policies to empower and support landscape and territorial partnerships that are responsive to local stakeholders (Meijer et al., 2021). Furthermore, these frameworks should be fully sensitive to local landscape specificities and the needs of local communities so that they will not become barriers to nature-positive transformations (Clay, 2016; Wiegant et al., 2022). The frameworks should help coordinate government agencies and deploy public financial resources not mainly in sectoral silos, but towards integrated landscape development plans.

Governments could facilitate institutionalised technical assistance for landscape and territorial partnerships

Government, private-sector and philanthropic actors need to shift from short-term projects to long-term institutionalised support to strengthen landscape, territorial, city and regional partnerships. Such support includes capacity development for leaders and facilitators, inclusive and green market development, mobilising finance, facilitating connections with public agencies and experts, and supporting scientific research and other forms of knowledge and data infrastructure for landscape management (Meijer et al., 2021). Local communities and actors who are already active at the landscape level should be provided with financial, legal and logistical support.

Governments could support innovation in the financial systems and support tools for integrated local investment

Financial systems innovations are needed. These should bring together landscape and territorial projects and local businesses by directing financial flows from public, private and philanthropic sources to investment portfolios that reflect the landscape stakeholders' joint vision and food system transformation strategy (Shames and Scherr, 2020). With structured support, landscape partnerships can mobilise actions that increase returns, reduce or share costs, manage holistic risks, address change across supply chains and enable more investment.

Governments could create opportunities for knowledge-sharing, solidarity and support

Knowledge-sharing and collaboration amongst and between territorial networks is essential for these messages to resonate on global policy agendas. To achieve nature-positive and move past silo-type of interventions, it is necessary to craft ways for stakeholders to come together, share their knowledge and expertise as well as support the creation of solidarity and support networks (Providoli et al., 2019). Since landscape approaches are iterative (Sayer et al., 2013), creating these spaces for sharing — or more importantly, supporting the existing spaces for sharing — is crucial in order to ensure justice and the respect of a plurality of values and knowledge systems amongst stakeholders. At the landscape level, formal and informal relationships between actors are fundamental to support the whole-of-society approach and retain local knowledge applied in sustainable development and nature-positive transformation. In creating such platforms, governments need to address issues of power, because simply giving certain stakeholders a louder voice will not ensure justice or an actual participation in decision-making and implementation (Cooke and Kothari, 2001; Morse, 2008).

4.6 Conclusion

Rural areas are key to achieve many sustainability transitions and, particularly relevant to this report, to achieve nature positive. Socio-economic and ecological dynamics of change within rural landscapes make these areas contested spaces where multiple stakeholders, agendas, interests and visions coexist and, sometimes, it is a struggle to combine them. In the face of this complexity and of the power imbalances between stakeholders and agendas, this chapter suggests that an integrated landscape approach to rural areas provides opportunity to deal with these issues of power and complexity and navigate opportunities

and trade-offs. The chapter particularly highlights that such approaches could be instrumental to a whole-of-society approach as they build on the existing efforts by local, non-state actors. It describes how an integrated landscape approach is a viable tool to orchestrate the various agendas of rural landscapes and pays attention to the physical geography of an area, discourse and institutional practices; all elements that contribute to shaping landscape governance. If landscape approaches are to make a difference, the process of negotiation needs to consider the power of competing discourses on rural areas as well as the negotiation process itself. Furthermore, landscape approaches must result in change in the distribution of material resources across stakeholders, thus empowering those who have been historically marginalised and oppressed, such as indigenous peoples and local communities, women and youths. This leads to the conclusion that to enable nature-positive approaches in rural areas and support a whole-of-society approach, national governments have a variable set of policy tools that could be deployed, including financial aid and support of local actors, the creation of local partnership and knowledge-sharing.

5 Supply-chain governance for a nature-positive development

5.1 Introduction

To bend the curve for biodiversity, actors in business and finance need to be part of transformative change. The CBD acknowledges the potential role of companies in reducing the environmental pressures on biodiversity and their contribution to restoring nature, inspired by increasing commitments and action from pro-active front runners against biodiversity loss. This chapter focuses on the collective role of business and finance in the configuration of international supply chains. Supply chains are the link between consumption and production, and interventions along the whole chain are needed to reduce drivers and pressures on biodiversity. Supply chains connect companies with differing capabilities for contributing to the reduction in biodiversity loss, depending on their position and relationship to this loss. The consumer perspective was not included as this is beyond the scope of this chapter.

Worldwide biodiversity loss is driven by the demand for and processing and supply of resources
Many environmental pressures are related to the extraction and processing of resources and raw materials (e.g. minerals, metals, fossil fuels, food and biomass). These pressures caused by corporate activities are driving global biodiversity loss and degradation of ecosystems and natural capital. In 2011, resource extraction and processing accounted for more than 90% of land use-related biodiversity loss, especially through agriculture, and caused about half of global greenhouse gas emissions (IRP, 2019; IPBES, 2019). Resource use has been growing steadily since the 1970s and is expected to double by 2060 compared to 2017 (Lucas et al., 2022). On a local scale, the mining sector is having a severe impact through resource extraction.

Companies also depend on ecosystem services
In addition to the impact that companies have on biodiversity through the pressures they generate, many of their operational activities also depend on the services that ecosystems provide (NCFA and WCMC, 2018; NCC et al., 2018). This is the case for services such as plant

pollination, soil fertilisation, and crop irrigation, which are important for agriculture. As is the case with the impacts they have, the corporate dependence on these services can also be either direct or indirect, through their resource supply chains. This dependence is also relevant for the financial sector, through corporate loans and investments in companies that highly depend on ecosystem services for their operational processes. Supervisors on the financial markets, such as at the central banks, are increasing the awareness of these dependencies by analysing the financial exposure to these physical risks and by conducting stress tests. As has happened with climate change risks, biodiversity risks may also be included in their supervisory role (NGFS, 2022).

Companies need to cooperate in supply chains to realise transformative change

The position of individual companies within the supply chains is an important factor that determines their potential contribution to a nature-positive future. It is important to distinguish between direct and indirect impacts of businesses and financial organisations. The direct impacts are caused by companies working in primary sectors close to nature, while the indirect effect is related to secondary and tertiary sectors that process resources and provide all kinds of services through their resource supply chains, in addition to the pressures they exert on their own production sites (Wilting and Van Oorschot, 2017). Companies in the financial sector are also indirectly responsible for biodiversity loss via the activities of the companies that they invest in. Due to their differences in positioning and their capabilities for reducing environmental pressure, companies will not be able to implement all of the measures available to them (see Section 5.3). Cooperative governance arrangements within and across supply chains will be needed to align the contributions by individual actors and realise transformative change for nature-positive development.

In addition to being a major cause of environmental pressures, international supply chains are also associated with issues of social injustice

There are numerous issues concerning social sustainability issues in supply chains, including child labour, diversity, gender, discrimination and livelihoods of especially smallholders and indigenous and local communities. Companies are increasingly being held responsible for the social and environmental issues in the supply chains of their products, and have to assess whether the interests of local stakeholders are being addressed (i.e. farmworkers, local communities; D'Eusanio et al., 2019). Therefore, corporate agendas should, next to changing drivers of biodiversity loss, also include social sustainability, as this is a precondition for creating responsible and sustainable supply chains. For primary producers, this is especially relevant, as their production directly impacts indigenous and local communities (also see Chapter 4).

Objective and structure

This chapter describes the potential of private actors in business and finance as part of a whole-of-society approach to transformative change in creating nature-positive development. Individual companies have a certain capacity to implement measures, but through resource supply chains they are connected to other companies with other possibilities, capabilities and motivations to implement measures, both upstream and downstream. All supply-chain actors bear part of the responsibility for direct and indirect

pressures on biodiversity and nature. Thus, the configuration of companies in and around supply chains provides a useful and logical lens through which to investigate the cooperative potential of companies and that can be used to analyse incentives and governance arrangements to activate companies and look for leverage. We also note that with a focus on changing product supply chains, a wider perspective on a more radical restructuring of the economy will stay out of sight (Geels et al., 2015).

5.2 Moving towards nature-positive supply chain futures

There is a large potential in business and finance to contribute to reducing biodiversity loss and realising a nature-positive future

By both causing impacts and being dependent on nature's services, companies in business and finance can potentially reduce impacts on nature, and help to attain the nature-positive objective (WBCSD, 2020). Reducing impacts is not only beneficial for nature and for local communities, but corporate nature dependencies and opportunities also serve the self-interest of companies. This also holds for financial institutes such as banks, pension funds, insurance and investment companies, because of the financial risks that are related to biodiversity loss and ecosystem services (Leach et al., 2019; WEF and PWC, 2020; Chandelier and Malacain, 2021).

When taking nature-positive measures, companies can be guided by the mitigation or conservation hierarchy

We used the mitigation and conservation hierarchy of measures to describe the solutions individual companies can take (BBOP, 2018; Arlidge et al., 2018; Milner-Gullan et al., 2021; also see Section 3.3). The hierarchy was first developed for the mining sector. In this sector, the approach was applied at both project and site level, during mining operations as well as after closure (de Silva et al., 2019). The hierarchy has been further promoted in several initiatives to activate companies, such as the Business and Biodiversity offsets Programme (BBOP, 2018), the Science Based Targets Network (SBTN, 2020) and by the World Business Council for Sustainable Development (WBCSD) (2021). The SBTN added new elements, such as conservation, and expanded the application to actors outside the private sector, such as cities (SBTN, 2020).

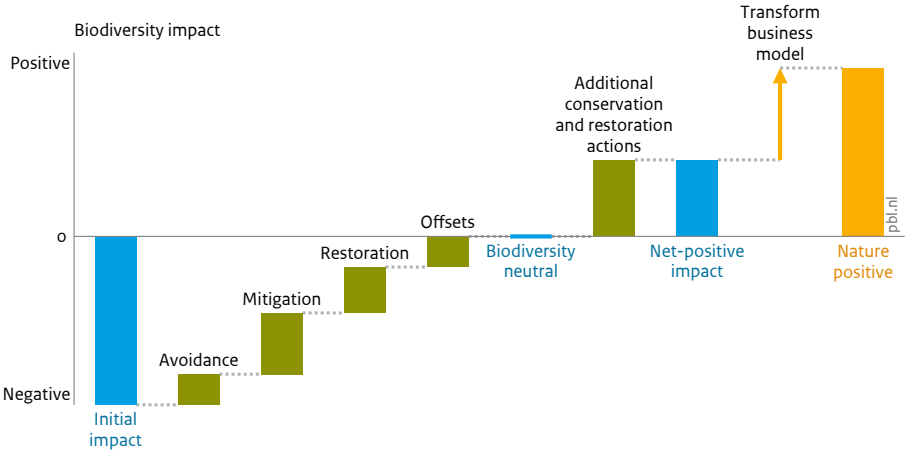
The stepwise structure of the mitigation and conservation hierarchy

The hierarchy is structured as a stepwise implementation process that can be visualised as a ladder of measures taken consecutively (Figure 5.1). The steps can be summarised as avoid, reduce, restore/regenerate and compensate. On top of this, a more fundamental change can be added, referred to as 'transform' (WBCSD, 2021).

First, the initial pressure and impact of an operation or company should be assessed which then serves as a benchmark for tracking progress (SBTN, 2020). This can be done, for instance, by performing a company or product footprint analysis (Lammerant et al., 2019). Next, avoiding and mitigating measures should be implemented to reduce pressures and impacts. An example

Figure 5.1

Measures for companies in the mitigation and conservation hierachy working towards nature positive



Source: BBOP

The various measures that companies use to reduce their impact on biodiversity and try to reduce its loss to zero or even a net positive situation can be visualised in a number of steps. First, preventative measures are taken, such as avoidance and mitigation, followed by on-site restoration. Compensation in other locations to offset residual impacts is the final step in the net-zero approach and should only be taken after all other types of measures have been used, so as to prevent greenwashing. Additional conservation efforts after such offsetting enables reaching a net-positive situation for individual companies (Source: BBOP). To achieve nature-positive developments for economy and society, a phase of transformation is also added where companies redesign the products they offer.

of avoidance is that of using recycled rather than new primary resources, thus avoiding extraction. Avoidance is also about rethinking whether an action or operation should be developed at all. This could for instance result in not developing new mining sites, due to ecological considerations or to diminishing demand for primary resources. Mitigating measures means pressures and impacts are reduced by applying more environmentally friendly techniques — for instance, by implementing emission reduction techniques to comply with a higher environmental standard, or by a forestry operator applying sustainable production standards in which biodiversity hotspots are mapped and protected and improved logging methods are used to reduce any damage to other trees. To achieve restoration and regeneration, local measures are taken to bring a negatively affected area back to its more natural state. For instance, by turning a closed-down gravel mining pit into an aquatic habitat, or by replanting degraded agricultural lands.

When all such measures have been taken, companies may turn to compensating (or offsetting) the remaining impacts. This is often done by creating or restoring nature in a location other than the production location, which could lead to a more-or-less biodiversity-neutral situation, depending on the status of the habitats involved. Finally, additional

compensation and restoration measures will be needed to create a net-positive situation for individual companies or operations (Arlidge et al., 2018; Milner-Gullan et al., 2021). The stepwise approach has been designed as a safeguard to prevent companies from converting natural ecosystems and simply compensating for the loss at other locations. The hierarchy and especially the compensation step have nevertheless received quite some criticism. In cases where not all steps of the hierarchy have been considered seriously, there is a risk of greenwashing. Offsetting, in particular, raises all kinds of concerns: the permanence of offsets cannot be guaranteed, and there is the risk of social injustice when offsetting in other locations. These issues also raise the question of whether offsetting would be ethically acceptable, at all (Tupala et al., 2022).

To achieve nature-positive objectives, more fundamental and radical elements need to be added to the hierarchy

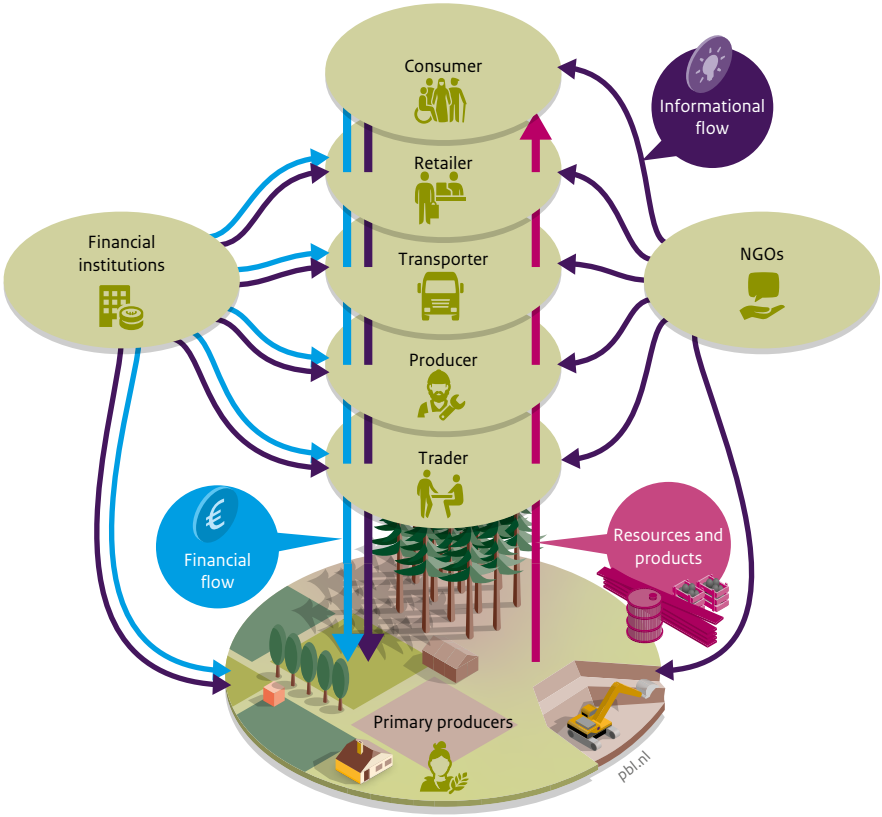
An important question refers to whether applying the hierarchy will be sufficient to achieve transformative change. The protein transition provides an illustrative example of the need to add an element of transformation to the hierarchy (Westhoek, 2019). That study assesses several types of supply chain interventions based on the mitigation and transformation hierarchy for a more sustainable Dutch food system. Interventions include the implementation of measures such as producing more sustainable produce within the regenerative capacity of local ecosystems, making efficient use of resources by producing more with less, reducing waste from consumers and manufacturers, and developing alternatives for animal-based proteins. Combining such interventions showed a potential reduction in total land use and greenhouse gas emissions of about 40%. Developing innovative food products based on plant-based proteins (Chapter 3) could be categorised as a measure of avoidance, as it prevents the pollution otherwise generated by livestock farming. However, this entails much more than just adapting the existing business model in an incremental way, as it requires a more fundamental change in production and consumption patterns, and a rethinking of the products that companies are manufacturing and offering to consumers — which are essential elements of transformative change (Van Tulder and Hendriks, 2019). Therefore, the phase of transformation has explicitly been added to the hierarchy, for instance by the World Business Council on Sustainable Development in their Nature-positive narrative (WBCSD, 2020).

There is a need for combined and collective interventions along and across supply chains

A decade of practical experience has shown that individual companies find it difficult to implement all the steps of the hierarchy. Companies have a limited capacity for implementing measures, some of which are simply beyond their reach and sphere-of-influence (BBOP, 2018; WBCSD, 2021). Instead, companies choose to act on specific measures that match their supply-chain position and capabilities (Van Oorschot et al. 2020). Especially for the reform phase, a radical change in business models is needed. Incentives and stimuli need to be in place to provide an enabling environment to innovate and restructure conventional ways of working.

Figure 5.2

Influence through the supply chain



Source: PBL

Through their position in supply chains of resources and products, companies in different sectors have both direct and indirect links to nature and biodiversity. The major flows between companies have a physical, financial and/or informational character. These flows provide a pathway for influence and alignment along supply chains.

The position of companies in supply chains determines their relationship with biodiversity and their role in contributing to a nature-positive future

Applying the hierarchy on company level only is not enough to steer towards transformative change. Some form of coordination is required to bring the potential of individual companies together and create leverage through cooperation and interaction. The joint actions of resource supply chain parties structure the many relationships and dependencies between companies and the natural environment, and therefore form a configuration of actors for which the international whole-of-society governance approaches to transformative change can be analysed. Nature-positive development then becomes the result of coordinated action and innovation across supply chains.

The scenarios presented in Chapter 3 give an indication of the various measures and efforts needed, including several radical changes (Text box 5.1) The position of companies in supply chains determines whether they are directly or indirectly linked to biodiversity, and this then relates to the types of measures that are available to them (see Van Oorschot et al. (2020) for a compilation of examples of Dutch companies). Companies can be categorised as belonging to primary, secondary or tertiary sectors. Primary sectors (agriculture, forestry and mining) include the companies that are directly involved with producing resources and extracting materials from the natural environment (Figure 5.2), with a significant impact on nature and biodiversity. Companies in secondary sectors (e.g. manufacturing and construction) purchase raw material resources from primary sectors and process them into consumer products. The processing of resources also drives biodiversity loss as it causes pollution. An important part of this sector's impact on biodiversity, however, is indirect and is caused by the companies further upstream that provide them with the resources they need. Companies in tertiary sectors (e.g. transport and banking) provide mostly non-material services. Their own direct impact may not be very high, as their relation to biodiversity loss is mostly indirect through the companies that they provide services to (Wilting and Van Oorschot, 2017).

Text box 5.1 The hierarchy of mitigation measures applied in the various scenarios

The Half Earth and Sharing the Planet scenarios (Chapter 3) clearly show that reversing biodiversity loss and restoring nature will only be possible with a combination of strong conservation efforts and a broad set of sustainability measures. Business and finance have a major role to play in shaping new nature-positive pathways, as they are directly and indirectly responsible for the environmental pressures that drive biodiversity loss, such as land-use and climate change. They are therefore also responsible for implementing sustainability measures.

The scenarios are not alternatives, but different ways of organising, integrating and governing efficient and/or nature-inclusive measures along the various steps within the supply chains that link production to consumption. For businesses, different pathways are also being explored that build on a framework with various nature–human perspectives (Pereira et al., 2020) or on the needed transitions (WEF and AlphaBeta, 2020). Table 3.1 (Chapter 3) lists the efforts needed for the HE and SP scenarios and links them to the elements of the conservation hierarchy. For instance, both scenarios refrain from applying large-scale hydropower to avoid additional damage to aquatic biodiversity.

The Half Earth and Sharing the Planet scenarios differ in the emphasis that they put on the elements of the hierarchy and in how governments harness nature's potential for sharing and sparing strategies. Both scenarios integrate sustainability measures targeted at 50% less meat and dairy consumption compared to the projected levels

by 2050. The agricultural approach in the Half Earth scenario rests on mitigating agricultural impacts through sustainable intensification, avoiding pollution and nutrification from agriculture,

whereas in the Sharing the Planet scenario, the focus is on integrating natural elements in production landscapes, creating different types of nature and therefore also on different values of nature. The transformative elements in the hierarchy are present as well, such as transformation of the food system to include more plant-based protein, and changing the energy system to follow low-emission pathways.

The financial sector has a potentially large role to play in achieving nature-positive development, based on mitigating risks and stimulating opportunities

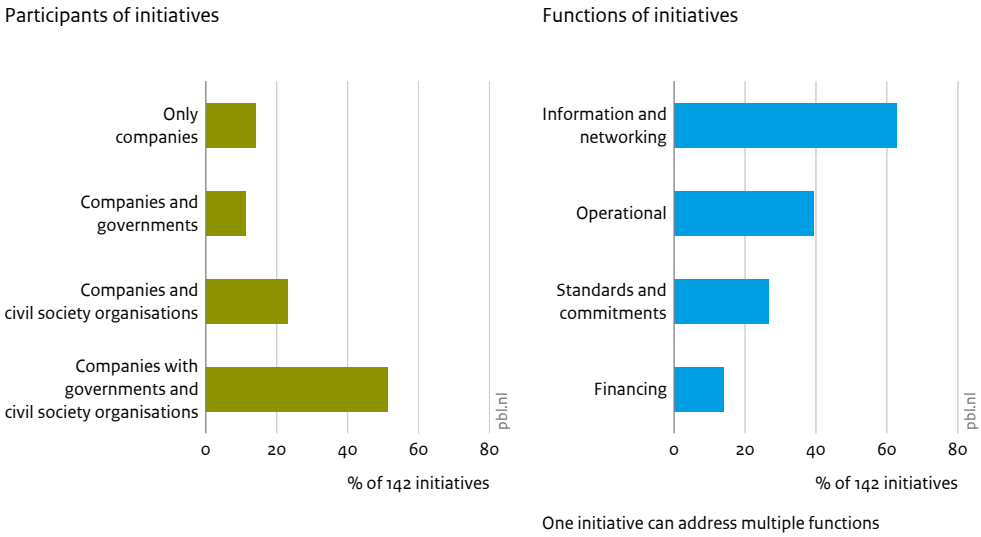
The financial sector includes the banks, investment companies, pension funds and insurance companies. All these private actors, collectively referred to as financial institutions, are indirectly affecting biodiversity as they make financial capital and services available to companies (Figure 5.2). By providing loans or making investments, they can exert a potentially large influence on the companies in their portfolios by applying sustainable investment principles (Van Tilburg and Achterberg, 2016). They may change the performance of individual companies by setting sustainability criteria for loans, and by direct interaction with companies (so-called engagement) to improve their environmental and social performance (Sewell et al., 2018). They could implement preconditions that require companies to take certain measures, such as those to reduce the use of energy, not sourcing from biodiverse-rich regions, following proper monitoring and reporting protocols, or using certification systems for sustainable production standards (Section 5.3).

Selecting or precluding companies for investment or engaging with them on concrete measures is often based on risk analysis. The various values of nature can be relevant for risk reduction, to prevent capital losses for investors, financiers and shareholders. Managing the risks can for instance be done by identifying the investee companies with a physical dependence on nature for their operational processes (DNB and PBL, 2020). Next to this functional value of nature, other such values can also determine engagement, when investee companies operate irresponsibly and thus cause damage to nature reserves, which in turn, for them, may lead to reputational damage and related financial risks.

To achieve a net positive impact, it is relevant to also look at opportunities (WEF and AlphaBeta, 2020). This is the area of intentional impact investment (linked to transform), and is based on specific preferences of certain investors, leading to investment in front-runner companies and innovative projects committed to transformative change.

Figure 5.3

International cooperative initiatives with participation of companies and their functions, 2021



Source: IVM/PBL Biostar 2.0

Companies prefer to take part in international cooperative initiatives that also include other types of actors, such as civil society organisations and government authorities (on the left). The international cooperative initiatives in which companies participate currently mostly focus on networking and information sharing.

5.3 International cooperative biodiversity initiatives by companies

Companies participate in international cooperative initiatives

Figure 5.3 shows international cooperative initiatives on biodiversity in which private actors (companies) are actively involved. In these initiatives, government, civil society organisations and companies partner up in various combinations (Negacz et al., 2020). About 14% of this selection of initiatives is made up of companies only, showing a preference of companies to take part in multi-stakeholder initiatives. This preference can be interpreted as a way of increasing the legitimacy of the measures that companies take to change their mode of operation (Long et al., 2018).

International cooperative initiatives fulfil various governance functions

The initiatives that also involve companies are serving various purposes, related to the challenges that companies face in transforming their businesses. The initiatives have a certain overlap, but most initiatives (over 60%) are about gathering knowledge and networking (Figure 5.3). The second largest category (40%) is about integrating biodiversity in their operational processes, and the third largest (almost 30%) is about making commitments and implementing market standards for resource production. Initiatives that focus on finance

form a minority amongst cooperative initiatives. These percentages provide a rough indication of the transformation process and of the multiple ways in which companies are shaping the change towards nature-inclusive modes of operation through international cooperation. High scores for information and networking indicate that there is a high demand for knowledge to build awareness of how biodiversity is relevant for their business. Many companies find it difficult to understand their relationship with biodiversity (Lambooy et al., 2018), because of the multi-faceted concept of biodiversity, their limited knowledge of direct and indirect impacts and dependencies, and a general lack of seeing the value of biodiversity and ecosystem services for their business model.

Cooperation provides several benefits to companies that are willing to change

The ability of companies to cooperate and participate is an important enabling factor for change. Partnering with other companies can for instance be used to gain influence, or to co-create production standards together with societal stakeholders. A multi-stakeholder setting is important to increase the legitimacy of the chosen standard and adds to company credibility (Long et al., 2018). Cooperation is crucial for companies that want to realise nature-positive development. Front runner companies are actively changing their mode of operation and often do so by building partnerships with societal interest groups that operate closer to nature. Teaming up with nature management organisations is a way of gaining access to ecological knowledge and for implementing appropriate measures.

The Capitals Coalition (CC) and the Business for Nature (BfN) networks are examples of cooperative initiatives that include hundreds of organisations. The CC network consists of seven broad stakeholder groups: business, finance, government, science, accounting and standards, civil society and multi-stakeholder groups. They have defined a standard for Natural Capital Accounting that is also referred to in the EU directive for reporting. The BfN network is about demonstrating credible business leadership and calling for governments to adopt new policies, such as on stricter proposals for mandatory reporting, meant to create a level-playing-field for companies.

The role of collective initiatives and networks of financial actors in creating a nature-positive future and reducing climate change

To date, the financial sector has been focusing primarily on the risks and opportunities of climate change (Sewell et al., 2018; Van Tilburg et al., 2022). Engagement of financial institutions in combatting the risks of biodiversity and natural capital loss is still in an initial phase, but interest is gaining momentum. There are many different initiatives in which various actor groups are actively cooperating.

Front runners from the financial sector, such as the Finance for Biodiversity Pledge, are setting targets and stating their commitments to nature-positive objectives. Such initiatives show the rising awareness and commitment within the financial sector to managing the risks of biodiversity loss. There are also several pilot projects and experiments still ongoing about taking biodiversity into account, often performed by and communicated in networks and platforms. Guidance and methodologies are being developed and promoted by

platforms, such as the Partnership for Biodiversity Accounting Financials (PBAF), to analyse biodiversity-related risks for finance. Their 2022 standard consists of general guidance, an overview of approaches and a standard on biodiversity footprinting for financials. The TNFD Taskforce on Nature Related Financial Disclosure (with members from financial institutions, companies and financial market service providers) drafted several recommendations to help companies in assessing the risks and opportunities (TNFD, 2022), as a parallel to developments in climate change policies. They developed the so-called LEAP: Locate the interface with nature; Evaluate impacts and dependencies; Assess risks and opportunities, and Prepare to report to investors (TNFD, 2022). The TNFD recommendations reflect the ones put forward by the TCFD (Taskforce on Climate Related Financial Disclosure) that has provided recommendations on disclosure aspects, such as metrics, sector guidance, strategy development and risk governance.

In this initial phase, financial market supervisory organisations, such as national banks, play an important role by addressing possible risks as part of their mandate to guard the financial stability of the sector. In the Network for Greening the Finance System, over a hundred central banks and supervisors share knowledge and best practices on risk exposure and stress testing and contribute to the development of environmental risk management, all meant to mobilise financial resources to support the transition towards a sustainable economy (NGFS, 2022).

5.4 Cooperative governance strategies in international supply chains

Connections between actors in supply chains provide entry points for cooperative governance
The production, processing and use of resources have become more and more spatially distinct, due to increasing trade flows (Liu et al., 2013). This also has consequences for the governance of sustainability in supply chains, as the multi-country setting has created an institutional void where governments are not able to regulate over jurisdictions. Instead, the multiple connections between non-state actors in supply chains provide entry points to work towards sustainable cross-border supply chains and contribute to nature-positive pathways.

Companies are connected through supply chains, they depend on and influence each other in different kinds of flows. The major flows between supply chain actors are physical, financial and informational in nature (Figure 5.2). The flows are an important part of the power relationships between actors and shape the influence of non-state actors on companies' motivations to change and improve their sustainability performance. The flow of resources provides the basic physical pathway for connections, while the capital flow to the various supply chain actors builds economic structures. The flow of information consists for instance on preferred modes of resource production (e.g. organic and fair), criteria for responsible investment, and rules for environmental and social risk management.

Governing sustainable supply chains over jurisdictions by using voluntary production standards

Over the last few decades, several cooperative initiatives have appeared in response to the institutional void. They are meant to govern and guarantee the sustainability and traceability of international supply chain. These so-called voluntary supply chain systems (VSSs) are an important example of relatively well-researched multi-actor supply chain governance arrangement (Lambin and Thorlakson, 2018; Marx et al., 2022). They can be seen as mitigating interventions, aimed at reducing the environmental impacts of production to a broadly agreed and responsible level, while also reducing social, financial and equity impacts (SCSKASC, 2012). A VSS is an example of information flows in the shape of well-known consumer logos, such as Fair Trade, FSC and Rainforest Alliance. Certification is used to communicate preferred practices between consumers and producers (Figure 5.2). The voluntary supply chain systems are defined by the aim to produce better with less negative impact. They are not intended to cover supply chain interventions, such as processing more efficiently or changing consumption patterns.

Cooperative multi-stakeholder processes are used to establish VSSs

The process to establish, use and manage standards for responsible and sustainable production is commonly referred to as standard setting, certification and evaluation (SCSKASC, 2012). For a number of traded agro-commodities, the process involves multi-stakeholder consultation that has become institutionalised with standards and platforms. This has resulted in a codification of broadly accepted management practices, and covers an array of social and environmental issues, covering also biodiversity issues and the CBD targets (Potts et al., 2017). The establishment of market standards and supply chain traceability tools is an important enabling factor in managing production impacts in a more sustainable way, serving the supply chain responsibility and accountability of actors, such as manufacturers and retailers.

The impacts that VSSs are trying to achieve are varied and include several sustainability domains

Standards contain criteria that take local biodiversity values into account. Local hotspots in concessions have to be identified, excluded from use and protected against conversion (Potts et al., 2016). Several elements of national and international law also have to be complied with, such as respecting workers' rights and land tenure by indigenous groups. Such less voluntary aspects may also lead to biodiversity gains, as indigenous groups are well-acknowledged for their actions for conservation and sustainable use. Organisations that define and manage the standards may set up knowledge transfer platforms, as part of collective support programmes. Sometimes, financial rewards, such as price premiums, are available to primary producers.

After several decades of experience, there is evidence of VSSs having merit, but they do not present a silver bullet

There are more studies on impacts of market-based sustainability tools and supply chain certification that results in positive or neutral effects than those that result in negative effects. But this observation does not hold across all individual VSSs, commodities and countries. A compilation of results from impact research can be found on the EVIDENSIA website, where relevant and reliable primary and secondary literature is collected in a database. The included evidence covers environmental, social and economic subjects.

It appears not easy to draw general conclusions as impacts vary widely and are case-specific (Marx et al., 2022). Overall, 50% of the impacts of agricultural certification are positive on conservation issues, while the other half show no significant effect on agricultural certification. There is evidence of reduced deforestation rates on farms and plantations certified by Rainforest Alliance (RA) and the Roundtable on Sustainable Palm Oil (RSPO) in studies on Ethiopia and Colombia. But studies conducted on Brazil and Indonesia do not report a significant effect. Enhanced plant biodiversity is recorded on certified farms in Ethiopia and several Latin American countries. With regard to MSC-certified fisheries, a limited number of studies find an improvement in the status of the harvested population, over time, as a result of certification. A review of impacts related to the FSC system for sustainable forest management finds an almost equal number of studies with positive and neutral impacts on environmental and social issues (all cited in Marx et al., 2022).

There is broad criticism of the intended positive impacts of VSSs not having materialised in practice
Even though VSSs can contribute to solving sustainability problems, there are also barriers to attaining positive impacts and limitations to reaching this type of market intervention. The barriers are geographical, financial and institutional in nature (Potts et al., 2017; Grabs, 2020, 2021), and have given rise to discussions on the cost-effectiveness, credibility and market uptake of VSSs. The examples below give some further insights, without the intention of being exhaustive.

A large portion of global production falls outside the influence of VSS initiatives, as they mostly serve consumers in Western economies. This means that the markets reached by VSSs are limited, and unacceptable production practices will continue, serving the demand in other economies (displacement effect). An institutional barrier is that of certification with VSSs having a relatively large chance of success in areas with already good production practices and countries with a reliable governance environment, while not reaching the places with weaker governance and absence of enforcement of regulations on, for instance, forests — an area where most improvements need to occur.

It is also easier and cheaper to certify production sites that are already complying with criteria, compared to achieving change at production sites that do not yet comply . Furthermore, the transaction costs of verification are quite high, especially when strict criteria on traceability are used (e.g. identity preserved). The cost issues raise questions about who will be able to access the required technologies to comply with the criteria and prove compliance with a certification process, and what the equity consequences will be (e.g. see Bresnihan, 2019).

Standards are set-up to influence the supply chain from the side of consumers and users, which may influence their effectiveness. For instance, standards in the coffee sector have adapted to and are focused on the preference of Western buyers, which may hamper the sustainable practices and economic opportunities for farmers (Grabs, 2020). The setting of environmental targets and commitments for certifying supply chains is used by UK firms to legitimise their business by 'managing their public image', whereas commitments and targets do not necessarily translate into improved environmental performance (Moussa et al., 2021).

Complementary governance approaches are needed

The various examples of doubts about effectiveness, costs and reach lead to the question of whether mainstreaming standards and certification can successfully push back detrimental environmental and destructive outcomes. The caveats of standards clearly point to a need for regulations and enforcement mechanisms, instead of relying solely on voluntary sustainability standards (Moussa et al., 2021). Under conditions of uncertainty and cross-jurisdictional governance complexity, policy mixes are most likely to be the necessary way forward in addressing multiple objectives (Pacheco-Vega, 2020; Ingram et al., 2020).

Complementary governance arrangements to stop deforestation

One of the intended impacts of VSSs is to stop deforestation in mostly tropical regions, where land is converted to make room for crop production. Deforestation is primarily caused by expansion of the production area of key agro-commodities, with soya, beef and palm oil being responsible for a major part of tropical deforestation worldwide, next to the unsustainable production of timber. Consumption in the European Union plays a significant role in global deforestation, as it is related to international trade in agro-commodities. A new policy on deforestation-free products is now proposed by the European Commission (2021). This could build on and include already existing and new approaches and instruments from state and non-state actors.

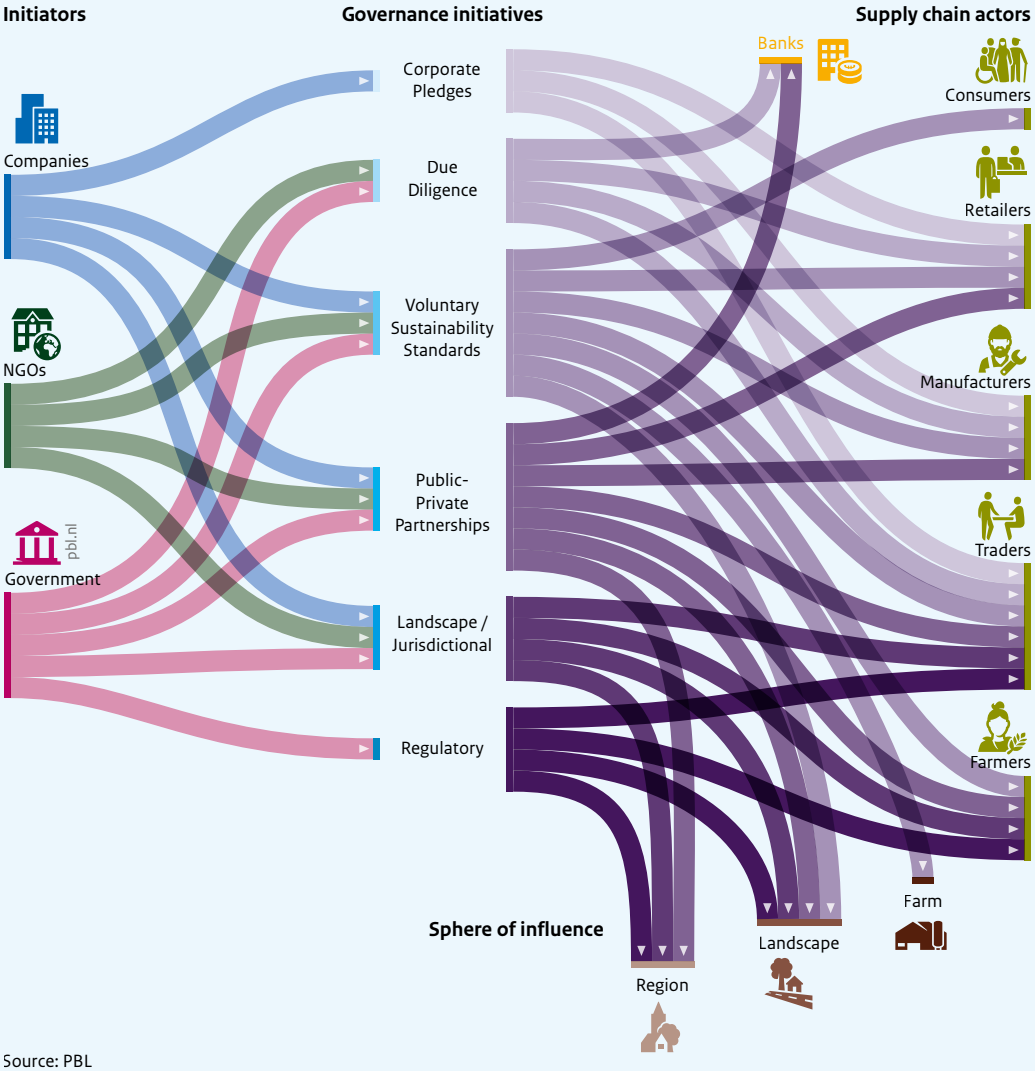
Many companies have committed to zero-deforestation targets by endorsing the New York Declaration on Forests (2014) and again in the Glasgow Leaders' Declaration (2021), which were both signed by hundreds of stakeholders (https://forestdeclaration.org/). For companies, it is not sufficient to depend on VSS and certification. A major shortcoming with respect to the deforestation target is that production standards are aimed at primary producers (e.g. farmers, foresters) at the front end of the supply chain (Figure 5.4). They manage their own production area and concessions, but do not have control over land use on a regional scale, which is where deforestation takes place. This spatial level is not part of their sphere of influence. Furthermore, Van der Ven et al. (2018) point to the inability of eco-labels to slow down deforestation, due to a lack of market uptake and regulatory loopholes.

To reach zero-deforestation, an orchestrated and coordinated supply chain approach is needed

To tackle a complex problem, such as trade-induced deforestation, whole-of-society and whole-of-government approaches are clearly needed (Ingram et al., 2020; Grabs et al., 2021). To create zero-deforestation supply chains, the interventions need to be broadened beyond VSS systems, using complementary governance approaches and policies that include public and private actors from both Western economies and the global South (Text box 5.2). Here, we elaborate on zero-deforestation supply chains, but our findings are also valid for supply chain governance, in general.

Figure 5.4

Relationships between actors, initiatives and spheres-of-influence in establishing zero-deforestation supply chains



Source: PBL

Complementary governance arrangements to establish zero-deforestation supply chains. Establishing such supply chains calls for a multi-level and multi-actor cooperative approach, where each actor fulfils in a specific task and role. They combine arrangements that are shaped and defined by different combinations of actors, while the arrangements target different groups of actors and spatial settings. Filling all the 'niches' may create a situation in which all preconditions for the success of a cross boundary setting are being met. Private supply-chain actor initiatives are accompanied by other initiatives, with both state and non-state actors, which are either directly related to the physical supply chain or work in parallel with it.

Text box 5.2 Zero-deforestation supply chain governance: an example of complementary and cooperative approaches

Impact research on various complementary governance approaches

To investigate the potential for effective action, an analysis of underlying assumptions, possible impacts and the effectiveness of six initiatives for attaining zero-deforestation were analysed by Ingram et al. (2020). The six approaches are corporate pledges (CP); voluntary sustainability standards (VSS); public-private partnerships (PPP); regulatory approaches (REG); landscape and jurisdictional approaches (LJ); and due diligence instruments (DD) (Figure 5.4). The approaches are based in various discourses and represent alternative political preferences on how to achieve zero-deforestation in multiple geographical regions.

The available evidence on impacts of individual approaches was assessed and found to be limited

As the six approaches were initiated in different years, they each have a different time span in which the impact can be created and studied. VSSs are amongst the longest running approaches. They are also used in other approaches, such as in corporate pledges. Except for voluntary sustainability standards and regulatory approaches (moratorium on land conversion), a lack of clear evidence on the impact of approaches was found, particularly for those started more recently, such as public–private partnerships and landscape approaches. Most approaches lack convincing accountability and traceability mechanisms. A critical aspect of limited effectiveness is the lack of enforcement and loopholes, which undermine their credibility and therefore effectiveness.

A smart mix of approaches which combines the strength of each approach may overcome limitations

Cooperation between actors, both public and private, is needed and should incorporate multiple strategies to compensate for single-solution boundaries and their limited spatial focus. A smart combination of approaches should meet many or even all of the success criteria for delivering on the zero-deforestation target, given that they incorporate credible practices and guarantees for system transparency. For example, combining VSS with PPP and landscape approaches can tackle both direct and indirect local supply chain drivers of deforestation. Due diligence approaches have sought to increase company accountability by showing how companies live up to the commitments they make.

Combined and cooperative approaches may only emerge from wide political debate to overcome the preferences for single approaches

To investigate the potential for effective action, the underlying assumptions, possible impacts and the effectiveness of six initiatives for attaining zero-deforestation and avoid related biodiversity loss were analysed by Ingram et al. (2020; see Text box 5.4).

Several general insights were derived from the analysis. A discourse analysis shows that preferences for a single instrument to stop deforestation are based on theories of change anchored in political opinions about market dynamics. But there is a clear limit to what single solutions are able to achieve. Therefore, a combination of approaches can reasonably be expected to be effective to stop deforestation (Ingram et al., 2020). An effective approach requires a cooperative political setting. This will only emerge from a wide debate on drivers of and solutions for forest loss in which civil society and the private sector both actively participate to overcome political preferences for instruments, and join their efforts in different combinations.

5.5 Lessons for national government policies to activate business and finance in a supply chain setting

Government action needed to incentivise business and finance to contribute to transformative change and nature-positive pathways

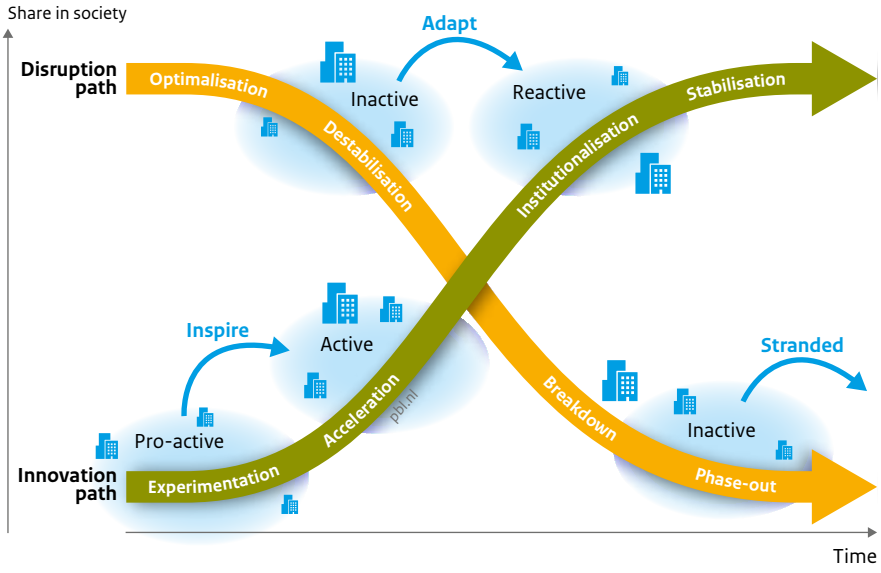
Creating a nature-positive development depends on many changes happening in parallel, brought about by a collective and cooperative process with distinct roles for citizens, NGOs, business, finance and government authorities (SBTN, 2022). This collective process of interaction has been coined the 'infinity loop' by the Capitals Coalition (NCC, 2022), showing that whole-of-society and whole-of government approaches are needed to make progress towards a nature-positive future. Business and finance networks, such as WBCSD, B4N and the Finance for Biodiversity Pledge, have committed to the CBD objectives. This has raised awareness with governments about the potential of specifically private actors to contribute to achieving the targets of the post-2020 global biodiversity governance framework; for example, through the Action Agenda for Nature and People.

Fundamental changes in the production and consumption structures of an economy (IPBES, 2019) depend on the ability of companies to adopt new modes of operation and redefining their business models as well as their products. It is necessary for government authorities to use appropriate incentives and instruments to create an enabling and regulatory environment for business and finance (Van Oorschot et al., 2020). Both policy instruments for individual companies and policies for cooperative configurations are needed, in which actors work jointly towards a nature-positive future.

An effective way for government authorities to develop policies around the supply chains of various consumption domains (i.e. food, goods, construction, transport, energy) would be to make use of the leveraging power of already committed, responsible and powerful actors in supply chains, and combine the measures and actions of directly and indirectly involved actors. In this way, private non-state actors from various sectors can be aligned. The approach to zero-deforestation supply chains provides insights for such an arrangement of cooperative and multi-level initiatives. It is built on the expectation that, in this way, the strengths of each individual approach and actor group can be utilised and weaknesses will be overcome.

Figure 5.5

The role of different company strategies in transformative change



Source: DRIFT Erasmus 2018; Van Tulder Erasmus RSM; Adaptation by PBL

Companies with alternative strategies on biodiversity integration can be positioned in different phases of transformation pathways. Specific government incentives and policy instruments should be used in the related phases of the transition process, aligned with the motivational factors and capacities of companies to change and move forward. Facilitating and soft instruments are used to engage pro-active companies in the early phases of development, while regulating instruments are needed for inactive companies to adapt to new institutionalised norms. If inactive companies do not change and adapt, they may fail (figure inspired by DRIFT and RSM).

Business strategies and phases of the transformative change process

Transition processes consist of several developments working in parallel, with, on the one hand, an innovation path that leads to new modes of operation and, on the other, a simultaneous disruption path for breaking-down routines that are no longer wanted (Figure 5.5). In the bottom-up innovation process, phases of experimentation, acceleration, emergence and normalisation can be distinguished, while the disruption process contains destabilization and disruption phases.

Companies occupy specific niches in this landscape, based on their sustainability strategy. Four general strategies for nature-inclusive business models can be distinguished that are an indication of the ambition for nature integration: inactive, reactive, active and pro-active (Text box 5.3). Pro-active companies are crucial to shaping the early innovation phase as they are motivated to create new business models for their position in the supply chain. These front runners completely transform their business models by developing alternative products and services that carry a far lower environmental pressure.

Text box 5.3 A typology of company strategies to integrate biodiversity in business models

Companies differ in their drive and aspirations regarding sustainable entrepreneurship, and in their commitment to integrate biodiversity and change their environmental performance. Four general strategies for sustainable and nature-inclusive business models can be distinguished that provide an indication of the status of nature integration: inactive, reactive, active and pro-active. Each of these archetypes has its own rationale for managing organisational change, based on a conceptual framework of Corporate Social Responsibility (Van Tulder 2018; Van Tulder and Hendriks 2019). Cooperative capacity is an essential part of the distinguished sustainability strategies, and this characteristic provides entry points for other supply chain actors (e.g. governments and other companies) for interaction, engagement and stimulating change (see Figure 5.5).

Pro-active strategies are explicitly targeted at sustainability challenges. Companies with this type of strategy develop business models that aim to create multiple societal values. A positive attitude towards learning, adaptation, cooperation and partnering in multi-stakeholder arenas is essential. In this business case, sustainability is the driver of innovation, which will help to find new business models for advancing systemic transitions.

Active companies are looking for new market opportunities, and this drives their innovation. Sustainability is a strategic element in their long-term vision. This can be achieved, for example, by actively steering their product innovation towards addressing environmental challenges, or by reducing their dependence on non-renewable resources. They engage in strategic partnerships with societal stakeholders for multiple purposes (Figure 5.3).

Reactive companies manage sustainability risks with a defensive strategy. They do not alter their business models, but incorporate sustainability measures as a tactical way of avoiding financial loss and stricter legislation. They mostly act to protect their reputation and to respond to external triggers. Reactive companies engage in sectoral partnerships on a limited set of issues.

For companies with an inactive or passive strategy, continuation of the company is the main target. Sustainability is seen as a task for government regulation, and is incorporated when it leads to concrete, financial benefits for the company (e.g. saving energy to reduce fuel costs). Partnering is usually not a part of their strategy.

Active companies will play an important role in shaping the acceleration phase, in which promising innovations are used by a broader group of companies to build new market opportunities. Reactive companies must be mobilised once new ways of operating (the 'new normal') have been developed and market demand is rising. They change their existing business model, for instance, by implementing measures from the mitigation hierarchy. Passive companies that do not or cannot change will become obsolete, and will disappear as they will be unable to comply with new regulations.

Barriers for companies to contribute to cooperative transformative change
play an important role in shaping the acceleration phase, in which promising innovations are used by a broader group of companies to build new market opportunities. Reactive

A number of incentives are needed if companies are to promote and scale up nature-inclusive business models, beyond the voluntary action of impact-oriented pro-active and active front runners (the so-called 'coalition of the willing'). At the same time, barriers need to be removed through appropriate government policies. Several barriers can be identified that prevent companies from cooperating and contributing to transformative change. Barriers are found along both innovation and disruption paths and relate to awareness and knowledge, availability of assessment methods, operating standards and norms, responsibility and accountability on supply chains, and financial rewards for new business models.

Knowledge and awareness
Many companies find it difficult to understand the relevance of biodiversity and ecosystem services for their business (Lambooy et al., 2018). Companies that are intrinsically motivated will actively look for knowledge platforms, whereas those that are inactive of reactive will not.

Assessment methodologies
New assessment methods are rapidly being developed, and guidance documents provide insight into how to navigate the various ways of covering the different aspects of biodiversity (NCC, 2016; Lammerant et al., 2019; WBCSD, 2021; TNFD). Still, due to the polymorphic definition and the multiple values of biodiversity, it is impossible to develop uniform indicators and impact assessment methods. Including biodiversity indicators in company footprints is a much-discussed subject, as indicators and data availability show significant uncertainties, both conceptually and quantitative. Biodiversity indicators that can be used in footprint analyses need to be developed further to cover more aspects of the biodiversity definition (IEEP, 2021) and to take local contextual values into account.

Data availability
There is a general lack of data about companies' supply chains, which are needed to enable the assessment of indirect impacts and dependencies. Many companies are not well-informed about the performance of companies upstream their supply chain on biodiversity issues (IEEP, 2021), and will face difficulties in implementing Due Diligence requirements. The traceability of supply chains to sourcing areas is difficult, certainly for agro-commodities that are traded in bulk (e.g. soya). The same data limitation is also hampering

financial institutions in their assessment of supply chain risks. Especially large companies, such as retailers, are involved in many different supply chains that are not always easy to trace and monitor, while these powerful actors are important as their biodiversity strategies may act as leverage factor in supply chains. Collecting the necessary data requires screening methods and prioritisation.

Credible standards
To help companies in stimulating nature-inclusive production, standards have been developed. However, compliance with these VSS standards (Section 3.3) is voluntary and will have a limited market uptake, certainly for international supply chains that connect various jurisdictions. Furthermore, a decade of experience with VSS systems does not provide a perfect solution that is able to deliver on all issues, so additional government incentives are needed to strengthen the working and credibility of standards (Ingram et al., 2020). This can be done, for instance, through benchmarking against good conduct principles (e.g. those of ISEAL).

Reporting and accountability
The absence of uniform assessment methods and limited supply chain data are barriers for company reporting on impacts, dependencies, risks and opportunities . Such knowledge is needed for the accountability process towards shareholders, stakeholders and governmental market supervisors. Until recently, transparency regulation had a mostly guiding character, awaiting further development (Sewell et al., 2019). The new EU Directive on Corporate Sustainability Reporting (CSRD) might be able to improve the effects of the transparency instrument.

Financial rewards
A major barrier to innovation and the creation of new business models is the high costs and limited market uptake of sustainable products. This is partly due to the fact that environmental externalities of conventional products are not reflected in market prices, giving sustainably produced products a market disadvantage. Initiatives to define more inclusive prices ('true pricing') are used to inform internal strategy decisions and are used in marketing to communicate societal benefits (True Price et al., 2014). Obtaining financial rewards for the created societal values is a necessary step to create a level playing field and scale up viable business models.

Financial support
Financial instruments (e.g. subsidies) for innovation and taxes on unwanted practices could play a stimulating role, similar to CO_2 taxation and caps in climate change mitigation. These could for instance be coupled to land use intensity (Kalkuhl et al., 2017). Furthermore, perverse incentives in the form of subsidies in support of conventional production are still widespread, and removing these is part of the disruption path.

Government approaches and instruments building on company strategies
For each of the company strategies, entry points for interaction can be given that relate to motivational factors, with a distinction between soft policies, financial instruments and

regulative instruments (combining Figure 5.5 and Table 5.1). For instance, active and pro-active companies can be stimulated through facilitation and rewards, while on the other end of the spectrum, inactive companies can be mobilised by taking regulative measures that affect company costs (e.g. taxation, sector caps and quota).

Mobilising *front runners* can be done by using soft polices, such as on facilitation and partnering, establishing networks for innovation and knowledge-sharing, inviting front-runner dialogues for co-creating the new normal, and using partnerships for piloting new business models. Governments can provide guidance on innovation and support start-ups and experiments.

Active *companies* can be supported by creating conditions that help to establish sustainable and financially viable business models. This can be done via *soft* and *financial* policies and instruments, such as raising the financial rewards for good performance. To facilitate the acceleration phase, participating in networks for sharing knowledge is helpful. Creating a larger and broader market is important to move away from niche positions. Public procurement can help by explicitly endorsing innovative practices.

To stimulate *reactive companies*, a government approach can be used that combines financial costs with regulative instruments. Endorsing the use of credible market standards (labels) can help to provide clarity for market uptake, translating the standard into a market opportunity. Taking away financial barriers can be done, for instance, by differentiating VAT levels.

To mobilise **inactive companies** (laggards), *regulatory* policies and effective enforcement seem the most appropriate approaches. A level playing field can be created by increasing what is minimally required in terms of environmental performance. Change for inactive companies can also be spurred on through the right financial incentives, such as raising the costs of environmental impacts and externalities (e.g. a CO_2 tax or tax on land and resource use).

The policy styles and instruments that touch on the motivational aspects of company strategies are not alternatives, but are ways of addressing the different types of companies in different phases of the transformative change process. An important starting point for all companies is that of setting clear policy targets for company reporting and accountability, to stimulate company assessment of biodiversity impacts and dependencies.

Table 5.1

Government styles and instruments for supply-chain sustainability

Soft policies	
Endorsing	Uptake in public procurement / Endorse VSS governance principles / Promote development of footprint methods/ Screening credibility of VSSs
Facilitating	Information sharing on sourcing risks / Subsidies for standard development
Partnering	Set up public–private partnerships / Promote voluntary CSR agreements (through covenants)
Financial instruments	
Awareness raising	Promote true pricing, including environmental and social supply chain externalities / Financing impact research of ISEAL approved VSS
Promoting	Co-funding PP platforms / Financial reward for societal value creation (tax cuts)/ Develop carbon and biodiversity credits
Costs	VAT reductions to create level playing field on costs; Tax rules for unsustainable production practices (land use-based)
Impact investment	EU Taxonomy rules to promote green investments (Doing good / Do no harm)
Regulatory	
Enforcement	National targets for sustainably produced commodities
CSR Conditions	Due diligence requirements for supply chain impacts / Mandatory reporting on supply-chain risks
Bans	Habitat conversion moratoria

5.6 Conclusion

To reach transformative change, economy-wide transitions are required at both the consumption, processing and production parts of supply chains

Collective action by actors from various economic sectors, knowledge institutions and governments is required to harness the full potential of a whole-of-society approach. This requires alignment and orchestration of individual actors. Supply chains of resources and products provide a logical and potentially effective configuration of actors to organise such a cooperative challenge. In this way, companies with both direct and indirect links to the drivers of biodiversity loss can be targeted.

There is a large potential for business and finance to contribute to halting biodiversity loss and restoring nature

Many measures are available to companies that can be structured as a hierarchy for stepwise implementation. These measures range from avoiding, mitigating, restoring and compensating types of actions that help to change current impacts. But this will not be enough to reach a net positive situation. Rethinking and reforming types of actions and measures are also needed for transformative change.

Leverage can be found in collective action, combining the abilities of individual actors with different but complementary types of potential and spheres of influence, both in supply chains and production landscapes

Companies will not be able to apply all solutions, measures and innovations by themselves, as they have differing capacities, abilities and motivations for change. Fortunately, they do not work in isolation but are connected to other companies through supply chains and landscapes (Chapter 4). Supply chains for various consumption domains (food, energy and materials) provide a logical and potentially effective configuration for organising the cooperative challenge of reducing impacts, and changing economic consumption and production patterns. A cooperative and whole-of-society approach can partly be built on the measures of the hierarchy (stepping stones towards nature-positive development), on the innovative capacity of front runners, and on the numerous international cooperative sustainability initiatives in which companies collaborate with other societal actors to access knowledge and define sustainable operating standards.

Changing existing business models will not be enough to achieve the nature-positive objective

Next to reducing environmental pressures, more fundamental changes are needed with respect to how business sectors operate, such as changing food consumption patterns (innovative protein sources) and radical changes towards a more circular use of resources that include biomass, materials and nutrients (e.g. reuse and recycle). Such systemic changes have to be stimulated, while high costs and barriers related to changing existing production structures have to be overcome. The financial sector has an important role to play in making these changes possible, not only by managing financial risks from environmental degradation in existing business models, but also by investing in the required innovations and supporting new business models to achieve them. The financial sector is increasingly taking risks of climate change into account and is starting to become aware of the risks related to biodiversity loss. Obligations in the CBD Global Biodiversity Framework on business and finance accountability could do for biodiversity what the Paris Agreement is doing for climate change.

Governments have to take the motivational factors of companies into account in choosing appropriate policy instruments to activate them as part of supply chains

Measures can effectively be combined by targeting all actors that are directly or indirectly responsible for biodiversity loss. The international character of many supply chains calls for a governance approach that takes historical, cultural and welfare differences into account — also because there are different jurisdictions involved. Special attention is needed for fairly distributing the costs and benefits of changing current production practices in such cross-border settings. For this, government-to-government cooperation is needed, combining incentives and rewards for consumers, retailers and manufacturers in the Global North with traders and producers in the South.

An important example of a collective supply chain governance challenge concerns the ambition of the EU as a consuming Northern economic region to establish deforestation-free supply chains for agro-commodities mostly produced in the tropical South

Over the past few decades, many voluntary initiatives to guarantee the sustainability of production practices have appeared, based on broadly accepted market standards. But relying on the use of these certification systems is not sufficient, as decades of practical experience have shown several shortcomings. Checking all the criteria for success for this international challenge requires a combination of approaches involving actors from both supply- and demand-side economies. In this multi-actor, multi-level setting, a combination of regulatory, financial and soft instruments have to complement each other to overcome the shortcomings of approaches targeted at individual companies.

6 Urban governance for a nature-positive future

6.1 Introduction

While the impact of urbanisation on biodiversity is an important concern that needs to be addressed...
Over the years, urban growth and land conversion are increasingly considered critical drivers of biodiversity loss. Urbanisation is seen as a significant driver of biodiversity loss, both directly in the form of, for instance, habitat loss, and more indirectly through pressures such as from climate change and urban consumption (Elmqvisk et al., 2013; Simkin et al., 2022). The impact of urban expansion on habitat loss is an important concern that needs to be acknowledged, especially when 40% of the protected areas are located within 50 km of urban areas and 855 species are directly threatened by a small sub-set of urban clusters (McDonald et al., 2018; Simkin et al., 2022).

...this tends to ignore the dynamics in cities that address both direct and indirect drivers of biodiversity loss
Yet, the focus on how urban expansion and land conversion is threatening biodiversity, tends to ignore the importance of the dynamics within cities that address both the direct and indirect drivers of biodiversity loss. By addressing biodiversity loss in direct and indirect ways — from land-use change to climate mitigation — cities are contributing to nature-positive trajectories within and outside their boundaries.

Objective and structure
Historically, urban settlements include nature areas, such as botanical gardens, parks, rivers and waterfronts (e.g. Loughran, 2020). Although many of these were developed over the course of the Industrial Revolution, this era also inspired efforts to implement and formally protect parks as a way of addressing social problems and improve the health of urban residents (Ignatieva et al., 2011). Over the course of the 20th century, urban planning concepts, such as green belts, ecological networks, green infrastructure and greenways, have inspired new movements that emphasise the need for accessible urban green spaces and ecological restoration (Ignatieva et al., 2011; Wheeler, 2000). As a result of these movements and of the rising interest in ecosystem services, ecosystem-based climate adaptation and nature-based solutions (NBS) to urban challenges, expertise has been developed at city departments, knowledge institutions, infrastructure providers and other

urban actors on how to design, implement and manage urban nature and the possible role of policy. Building on this wealth of knowledge and experience, this chapter describes how city dynamics address both direct and indirect drivers of biodiversity loss and support international nature-positive goals, and the various ways in which national and local policymakers in turn could support cities. The chapter first describes how achieving the objective of mainstreaming nature in urban development for improved biodiversity requires fundamental shifts in urban structures, and how gaining a better understanding of how barriers to nature-positive development in dominant urban paradigms could be overcome. This is followed by a discussion on the role of transnational city networks in the biodiversity arena, and the various ways for them to steer towards nature-positive futures. Subsequently, the chapter describes nature-positive strategies available to decision-makers to help realise urban opportunities for improving biodiversity, which are often combinations of various smaller actions, or stepping stones as it is referred to in this chapter, that, together, build momentum for the change that is needed. This chapter closes with an overview of steering mechanisms at the disposal of national and international policymakers, together enabling a whole-of-society approach with scope for urban initiatives contributing to improved biodiversity.

6.2 Moving towards urban nature-positive futures

While cities are crucial areas to realise nature-positive futures within and beyond their boundaries...
An increasing number of cities are engaging in conserving and restoring nature and are thriving with nature and its multiple values by applying a plethora of solutions 'that are inspired and supported by nature' (Bulkeley et al., 2022), such as green roofs, coastal mangroves, wetlands and urban parks enhancing local biodiversity (EC, 2019). For instance, an analysis of a database of 976 NBS initiatives across European cities shows that 351 of them have explicit goals and actions aimed at biodiversity (Almassy et al., 2018). Moreover, urban nature is increasingly recognised for the multiple benefits it offers (Text box 6.1) (IPCC-IPBES report; Veerkamp et al., 2021b; EEA, 2021). Cities and urban stakeholders often recognise and use the multi-functionality of NBS in order to deal with multiple urban sustainability issues, simultaneously (e.g. climate change, public health and loss of biodiversity). Urban heat stress, increasing energy demand, water shortages and flooding are amongst the climate-change-related challenges that cities are addressing using NBS, which can generate co-benefits around the provision of green space, habitats or biodiversity protection ('Realise diverse Co-benefits' principle of transformative change). In addition, Veerkamp et al. (2021b) assess green spaces in more than 700 urban areas in Europe and demonstrate the contribution of NBS to climate mitigation and adaptation, public health and biodiversity enhancement. While some NBS are contributing directly to the conservation and restoration of biodiversity, others are contributing in more indirect ways, such as through addressing climate mitigation or by prompting new kinds of values for nature. Moreover, NBS can show how land could be used differently, such as by renaturalising former post-industrial areas. An example of this is the Emscher Landscape Park in the German Ruhr area, which is contributing in indirect ways to combat biodiversity loss (Text box 6.4). Yet, contributing in these direct and indirect ways requires evaluating the

potential trade-offs against the multiple benefits (Bulkeley et al., 2021). Situations where biodiversity is indirectly addressed through climate mitigation but directly harms native ecosystems, such as where NBS to store carbon NBS are destroying native ecosystems, should be avoided.

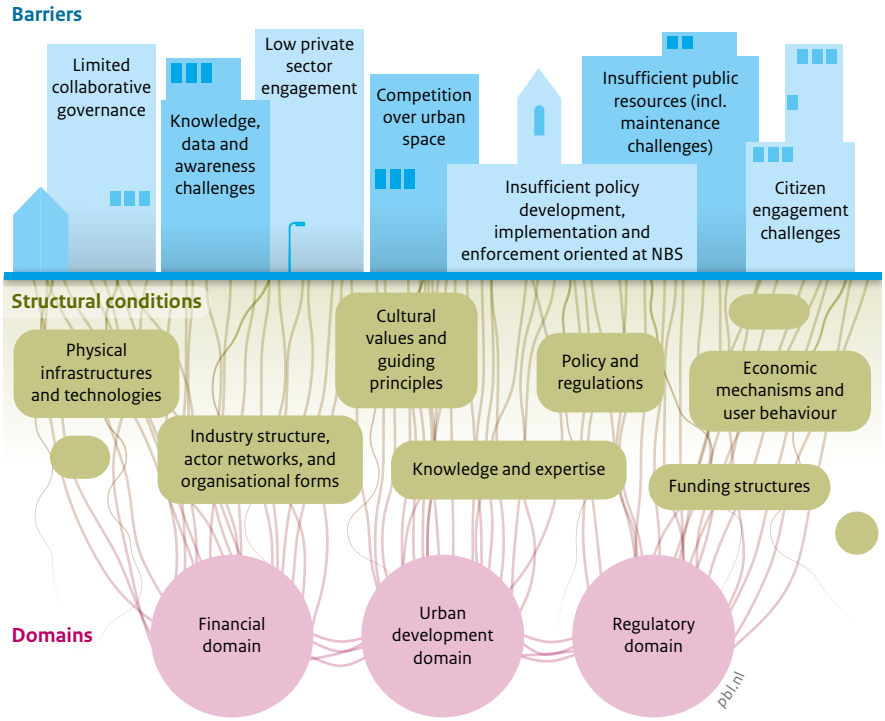
Text box 6.1: Fostering co-benefits in National Park Hollandse Duinen

The National Park Hollandse Duinen in the Netherlands provides an interesting example of how nature-positive trajectories can be formed by realising co-benefits, while addressing direct and indirect drivers of biodiversity loss (Kuiper et al., 2022). This park covers the entire coastline of the Province of South Holland and is situated in the most densely populated region of the Netherlands, including cities such as The Hague and Leiden. This park is an example of bottom-up development and is aimed at mitigating current pressures, such as pollution, climate change and urbanisation, by showcasing how people and nature can coexist and thrive simultaneously — fostering high biodiversity, cultural heritage and socio-economic prosperity. The park includes 4,610 hectares of Natura 2000 habitat, which is protected by green buffers that surround these vulnerable biodiverse areas, as well as by green corridors that increase ecological connectivity. At the same time, local actors work jointly to overcome trade-offs between biodiversity and human well-being, foster landscape multifunctionality and aim to connect people and nature through a range of projects, such as promoting the greening of private gardens. To achieve the park's goals, park management mobilises investment for nature-based adaptation and installing green infrastructure (e.g. green corridors), adopts a polycentric governance approach, creating stakeholder alliances across sectors, promotes experimentation (e.g. living labs) and aligns currently fragmented planning practices. This urban national park illustrates how people and nature can coexist, while also demonstrating the opportunities around capturing plural value perspectives using bottom-up, place-based visioning of nature-positive trajectories (Kuiper et al., 2022).

Skyline of The Hague, seen from the National Park Dutch Dunes.

Figure 6.1

Urban infrastructure regimes across the regulatory, urban development and financial domains



Source: Dorst et al. 2022

...fundamental shifts in urban development regime are needed to foster nature-positive development

Yet, despite the increasing deployment of NBS in cities, current urban planning and design, often, is not nature-positive. Moreover, the majority of urbanised regions in Europe are losing green spaces rather than acquiring more of them (Cortinovis et al., 2019). Many nature-based initiatives remain relatively small and mainstreaming them is a challenge (Frantzeskaki and McPhearson, 2022), because, for example, regulations, valuation approaches and funding mechanisms are not tailored to protect and develop NBS (Dorst et al., 2022; Wamsler et al., 2020). Instead, these tend to favour the development and management of traditional 'grey' infrastructure, such as roads and sewage systems. Therefore, improving biodiversity by mainstreaming nature in urban development requires fundamental shifts in the 'urban infrastructure regime' — the institutions, resources, routines and dominant technologies that shape urban development (Fuenfschilling and Binz, 2018; Monstadt, 2009). Urban infrastructure regimes extend across multiple actors and various interacting sectors or functional domains. Broadly, three domains can be distinguished: regulatory, financial and urban development (Dorst et al., 2022).

The *regulatory* domain encompasses the actors, instruments and practices that support the development and implementation of regulation, policy, spatial planning, visioning and political decisions. For example, urban municipalities can control land-use planning and regulate the protection of urban green spaces. The urban development domain concerns actors, instruments and practices relevant to developing urban structures and spaces, covering the stages of design, construction and operation. For example, housing providers might invest in sustainable urban drainage systems to future-proof new housing areas and meet the demand for sustainable living from their clients. The financial domain refers to actors, instruments and practices associated with financial support, investment and insurance. For example, banks or pension funds might invest in the development of a new metric to assess the impact of their investments on biodiversity as part of their corporate social responsibility programme. Some actors and institutions, such as transnational city networks, nature conservation charities and universities act as intermediaries connecting different domains.

Transformative change in the urban infrastructure regime for nature-positive urban development requires shifts across multiple domains, simultaneously. This is complex because the regime itself is subject to multiple overlapping cross-scale social, political, technological and ecological pressures. Hence, there are no silver-bullet solutions or single pathways towards the nature-positive objective, as is also illustrated by the scenarios (Chapter 3).

Figure 6.1 shows how each of the domains — regulatory, financial and urban development — is influenced by structural conditions that explain the status quo in urban development. Therefore, any barriers to urban greening for improved biodiversity can only be overcome by targeting the underlying structural conditions, (i.e. addressing the root causes). For example, limited private sector investment, often reported as a barrier to nature-positive urban development, can be linked to various root causes, such as a lack of customer demand for nature-inclusive design, a focus on short-term capital gains, uncertainty about cost and performance of nature-based solutions, limited knowledge and expertise related to nature-inclusive methods applied in the construction sector, and a lack of public mandate (Dorst et al., 2022). Overcoming barriers to mainstreaming nature in urban development, therefore, requires action across multiple policy domains and across interacting urban, regional, national and supranational scales. The role of institutions at the highest scales, including United Nations and the European Commission, should not be underestimated, as their actions, such as those related to regulating institutional investment or setting sustainable development and housing agendas, directly or indirectly impact urban regime dynamics at lower scales (Fuenfschilling and Binz, 2018).

Plethora of actors navigating towards urban nature-positive futures

While municipalities, local NGOs, and citizen groups or councils are engaged to varying extents in the development of urban nature, the roles of regional, national and transnational actors in shaping urban practices, including those in the private sector, are equally important. Local actors are influenced by national and transnational actors building capacity and resources. Simultaneously, what can be delivered by these national and transnational actors to achievement of internationally agreed goals depends on local actors.

Table 6.1

Overview of key actors in the urban infrastructure regime

Regulatory domain	Urban development domain	Financial domain
Supranational government National government Sub-national government (regional, urban) Government agencies (e.g. water dept.) Lobby groups/Trusts/Charities Politicians Policy advisory organisations (e.g. knowledge institutes)	Development companies Architects and landscape designers Utilities Transport infrastructure providers Housing providers (e.g. housing corporations) Urban development consultancies Large landowners	Banks Insurance companies Institutional and other investors Financial consultants Foundations Networks of financial actors Rating agencies Foreign Direct Investment Donor organisations

Source: adapted from Dorst et al., 2018.

Acknowledging these multilevel, interconnected governance dynamics is essential. Here, we focus particularly on the strategies that national and transnational actors can take. Based on primarily European research, Table 6.1 provides an overview of relevant regime actors for each of the regulatory, urban development and finance domains introduced previously, which are those with the power to influence policy instruments and practices. Actors can be involved in various and sometimes unexpected ways. For example, while most water, waste and energy utilities are not front runners in prioritising biodiversity, there is an increased push for developing expertise in this area in order to gain an advantage over competitors (Van der Jagt et al., 2020). National and transnational governments can play a key role by considering or reconsidering utilities' contractual obligations, such as by including a mandate to improve storm-water management or drought management for water utilities. There is also much to gain by engaging actors in the financial domain. For example, institutional investors, such as pension funds, could be lobbied or mandated to make ethical or environmentally focused investments. Taking this route, for example, the Swedish National Pension funds (AP Funds) is now an important funder of urban sustainability measures (Van der Jagt et al., 2020).

The configuration of actors alongside the domains of regulatory urban development and finance will vary, notably in cities across the Global South. These cities are generally speaking characterised by relatively high levels of informality, overlapping and complex jurisdictions, and capacity and funding constraints, resulting in a particularly diverse patchwork of relevant actors (Simon et al., 2021). However, this context is key as many of the projected mega-cities will develop in the Global South (United Nations, 2018). Yet, incoherent urban development leadership poses barriers to the provision of urban green spaces, resulting in bottom-up initiatives fulfilling a more dominant role in pursuing and managing such spaces (Pauleit et al., 2021). In addition, transnational and international actors are particularly important here — as well as international agreements, such as the CBD and the accompanied response of development banks, agencies, and charities.

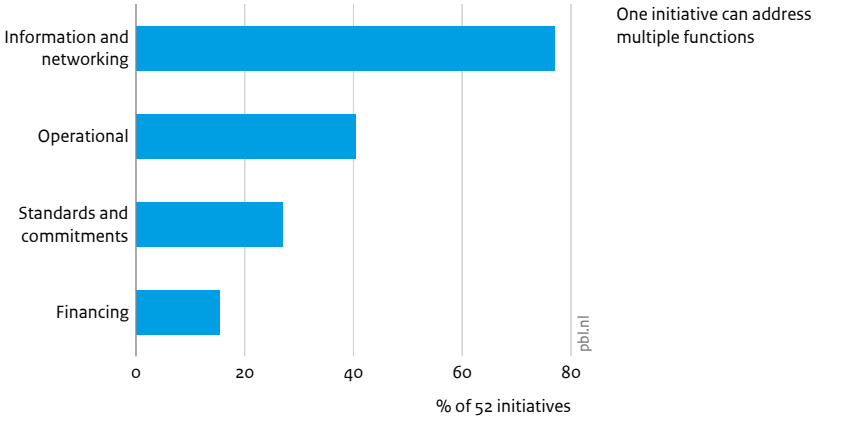
6.3 International urban cooperative initiatives for biodiversity

Transformative change cannot be achieved by efforts that remain limited to the traditional action arenas
Instead, a society-wide engagement of non-state actors is needed. Transnational city networks, which are increasingly interwoven with the biodiversity arena, play an important role in realising this ambition within and outside city boundaries. An analysis of international cooperative initiatives points to the existence of at least 52 international city networks supporting biodiversity (Negacz et al., 2022). Their role is primarily to share information. They also facilitate the networking between cities, followed by more operational activities and to a lesser extent the setting of standards and commitments or the provisioning of financing (Figure 6.2). Many of these transnational city networks undertake several functions at the same time. Their activities are key to providing inspiration and creating common ground, which is steering cities towards nature-positive trajectories in multiple ways. For instance, by sharing information and facilitating networking, city networks establish connections and facilitate cooperation amongst and between urban actors, which helps to overcome currently fragmented stakeholder landscapes. In addition, these networks assist in bridging the knowledge gap (Dorst et al., 2022). Lastly, they assist in establishing 'coalitions of the willing' on city level by enabling networking and building partnerships amongst and between public and private actors ('adopt proactive approach to resistance') (Bulkeley et al., 2020).

City networks are mainstreaming urban nature in numerous ways...
These international city networks, such as ICLEI - Local Governments for Sustainability, C40 Cities, IUCN Urban Alliance and Cities4Forests, help to leverage the capacity needed for generating nature-positive trajectories. For example, C40 contributes to mainstreaming urban nature in numerous ways, such as by exchanging knowledge and raising ambition levels with mayors of signatory cities committing to the C40 Urban Nature Declaration in 2021. In addition, the IUCN Urban Alliance aims to foster nature-rich cities by sharing knowledge and experience, facilitating partnerships and projects that promote urban nature. Moreover, these city networks mobilise action towards biodiversity goals within and outside their city boundaries — such as the Cities4Forests Programme, which aims to conserve and restore inner city, nearby and faraway forests. In addition, ICLEIs global network of more than 2,500 local and regional governments is one of the leading international networks in urban biodiversity governance, acting as a prominent actor in the negotiations of the GBF. They act as intermediary agent for urban change by translating, integrating and transferring knowledge in urban biodiversity agendas, as well as stimulating 'out of the box' thinking in connecting and providing coordination amongst and between urban actors (Frantzeskaki et al., 2019). For instance, the ICLEIs global network led the organisation of a coalition of cities and sub-national authorities who together developed the Edinburgh Declaration calling on Parties of the CBD to acknowledge their role in new international agreements. Moreover, together with IUCN, they developed the Local Action for Biodiversity (LAB), a programme, which aims to support local governments in conserving and restoring biodiversity at the local level. More recently, in 2018, ICLEI

Figure 6.2

Functions of urban international cooperative initiatives, 2021



Bron: IVM/PBL Biostar 2.0

launched the 'CitiesWithNature' platform, together with IUCN Urban Alliance and The Nature Conservancy (TNC). With this platform, urban actors connect and share commitments, which assists in leveraging urban action for biodiversity for example through the CBD Action Agenda (Bulkeley et al., 2021).

...addressing direct and indirect drivers of biodiversity loss beyond city borders

These networks mainly assist in supporting cities tackling biodiversity loss in direct ways. Yet, networks such as Cities4Forests and C40 also address indirect drivers of biodiversity loss beyond city boundaries. For instance, they are addressing the consumption-based greenhouse gas emissions of cities (C40) as well as focusing on urban action on 'faraway' forests (Cities4Forests). However, these impacts are rather marginal and the number of city networks governing these indirect drivers remain limited. Therefore, integrating direct and indirect urban contributions to biodiversity loss in the global biodiversity framework is crucial in attaining nature-positive futures (Bulkeley et al., 2021).

...while tailoring and adapting to diverse contexts, capacities and needs

These networks involve cities from all over the world, engaging with very diverse contexts and subsequently varying capacities and needs. Consequently, they also engage in translating and tailoring the generated urban nature knowledge to specific social, cultural, economic and political contexts (Rochell et al., 2022). For example, ICLEI Africa and their Urban Natural Assets for Africa Programme (UNA) are adapting urban nature programmes from the Global North to approaches which 'suit the complexity of the Global South' (Simon et al., 2021, p. 406). Moreover, they help to apply international policy frameworks to

address local challenges and, conversely, disseminating locally co-produced knowledge to high-level policy actors (Simon et al., 2021; 'design deliberative and inclusive processes'). Actions include new learning platforms and reflective knowledge creation in African cities, which assists to deal with the inherent complexities that surround decision-making in the Global South (Simon et al., 2021). Moreover, C40 contributes to building resilience in cities in the Global South by strengthening institutional capacity, which is often reported as insufficient (Sitas et al., 2021). By supporting cities in multiple ways, these city networks contribute to building and leveraging the capacity needed for pursuing nature-positive trajectories.

6.4 Urban strategies

Enabling urban experimentation while steering towards nature-positive development…
The important role of networks and cooperation in urban biodiversity governance points to the significance of engaging with the actors who become involved in a broader trend towards a whole-of-society approach. These actors and initiatives are addressing biodiversity loss in direct and indirect ways, contributing to biodiversity within and outside city boundaries. As part of this engagement, there has been a push for increased urban experimentation, given the realisation that traditional solutions in the form of regulations are likely insufficient to address complex and multifaceted sustainability problems (Bulkeley, 2019). While experimentation with innovative solutions has mainly been described in the context of climate action, a recent study shows that about a third of experiments with urban NBS in Europe explicitly support nature-positive development by setting biodiversity goals (Xie and Bulkeley, 2020). A growing body of work documents the experimental nature of sustainability governance in the modern city (Bulkeley et al., 2016; Karvonen, 2018).
For example, living labs and learning alliances that engage a combination of actors from public bodies, private enterprises and civil society are a popular instrument to experiment with innovative nature-based solutions, business models and policy instruments before their roll-out to multiple other locations (Bulkeley et al., 2016; Karvonen and Van Heur, 2013; Van der Jagt et al., 2019). Moreover, experimental place-based visioning practices could help to show how to organise the urban fabric differently (Text box 6.2).

Text box 6.2: Insights from the Half Earth and Sharing the Planet scenarios for urban areas

Identifying nature-positive trajectories through place-based visioning could assist in creating urban nature futures where humans and nature coexist and thrive (Kuiper et al., 2022; Lembi et al., 2020; Mansur et al., 2022). While there are diverging scenarios for urban nature development (Kuiper et al., 2022; Lembi et al., 2020; Mansur et al., 2022), here, we reflect on the two divergent nature-positive pathways Half Earth and Sharing the Planet. Both Half Earth and Sharing the Planet pathways acknowledge the need to go beyond tackling direct drivers and include indirect ways to limit

biodiversity loss — from climate mitigation actions to limiting urban consumption and production. Yet, while the Half Earth scenario focuses on creating space for nature and approaches green and blue spaces from a 'nature first' perspective, in the Sharing the Planet scenario, the city is 'shared' with nature, resulting in mixed landscapes with patches of biodiversity-supporting habitats. These two urban scenarios represent two extremes, and depending on the local context — including its urban layout, its morphology of the city and biodiverse hinterland — certain urban development aspects of each pathway may be preferred ('Take Multiple Paths'). Moving forward will require exploring these nature-positive futures through place-based visioning involving a diverse group of people, including less powerful actors in the visioning process, while facilitating deliberative spaces to deal with disagreement and conflict (design deliberative and inclusive processes as principle of transformative change) (Mansur et al., 2022).

...while ensuring that urban experimentation efforts benefit all of society

Additional to national and transnational actors and city networks, private firms, business districts, NGOs and community groups have also an increasing influence over the design, planning and maintenance of these areas. This allows for diversifying investment, strengthening social capital and urban resilience and creating policies and environments that are better attuned to the values and needs of various urban stakeholder groups (Buijs et al., 2016; van der Jagt et al., 2017). However, there are marked difference amongst and between cities, regions and countries with respect to the scope for governance through experimentation, the participants in such experimentation and the influence of these initiatives beyond individual sites, (Dignum et al., 2020; Van den Heiligenberg et al., 2017). Moreover, urban experimentation risks serving differing interests in unequal measure, favouring middle- and upper-class neighbourhoods at the expense of deprived areas. Hence, there is a need to ensure that urban experimentation efforts benefit all of society rather than only certain groups (Text box 6.3) ('design deliberative and inclusive processes' and 'adopt proactive approach to resistance' as principles of transformative change).

Text box 6.3: Overcoming uneven and inequitable urban nature provisioning: designing deliberative and inclusive processes

Envisioning cities as crucial action arenas points to the need for urban actors to think about alternative nature-positive and socially just trajectories, recognising the multiple and diverse values of nature that exist in the urban landscape. In imagining these urban nature futures in which urban areas are thriving with nature, it is essential to acknowledge the inequitable distribution of urban nature amongst neighbourhoods within cities (EEA, 2022; Mansur et al., 2022). Urban greening may exacerbate socio-spatial inequities as through green gentrification, displacing communities within low-income informal neighbourhoods (Anguelovski et al., 2018; Zeidermann, 2016). Therefore, in the pursuit of nature-positive futures, it is essential

to acknowledge the unequal distribution of urban nature and the risk that new interventions can reproduce these inequalities. Actions towards nature-positive trajectories need to address and compensate for past and present harm and be made 'reparative' (Castán Broto et al., 2021). Overcoming uneven and inequitable situations within urban landscapes requires the engagement of local communities and stakeholders across multiple societal domains to better understand place-specific environmental values and socio-economic dynamics. Moreover, overcoming such inequalities requires shifting current power structures and involving less powerful actors in these deliberative processes. Engaging with these inclusive forms of governance will inherently involve contestation and conflict, involving questions about the type of urban nature to be conserved, the locations at which this should happen and who would benefit from it. Adopting a proactive approach to resistance is therefore essential, creation spaces for negotiation and contestation, along the pathways towards nature-positive futures (Bulkeley et al., 2022). Cities could be viewed as sites of opportunity with 'innovative and even indigenous solutions to environmental crises in an as yet unforeseen manner' (Bulkeley et al., 2021; Myers, 2021, p. 43). Taking a perspective where people and nature are seen as intertwined is required to pursue transformative, nature-positive trajectories (Abson et al., 2017; Bina and Pereira, 2021; Shackleton et al., 2021). Here, reconnecting people with nature through NBS could alter people's views and attitudes towards a more nature-friendly behaviour, contributing to biodiversity in indirect ways (Welden et al., 2021).

Pathways of synergistic actions are needed to transform urban infrastructure regimes

Synergistic actions by regulatory, urban development and financial actors are needed in supporting mainstreaming nature and biodiversity in urban development. Drawing on research across several European countries, as well as the European Union as a whole, researchers have recently developed a portfolio of 20 possible action opportunities (Tozer et al., 2022; Xie, 2020). These actions are referred to as stepping stones and can be combined into urban sustainability pathways in order to generate an impact where the whole is greater than the sum of the parts. These pathways, and their underlying stepping stones, differ based on which urban sustainability challenges policymakers aim to address, as well as on the specific local context. For example, if cities already have good knowledge on NBS design, planning and implementation, introducing an NBS expert guide is likely to not significantly contribute to mainstreaming urban nature. Policymakers could derive their own specific pathway by identifying and collecting pivotal stepping stones based on their particular context, resulting in key actions to enhance urban nature (Figure 6.3, Xie, 2020).

Examples of stepping stones are the provision of a public mandate, e.g. through land-use planning frameworks or procurement regulation, the generation of new partnerships between public, private and third sector organisations, and the advancement of valuation models for urban nature. By analysing the main barriers to mainstreaming urban nature and the underlying structural conditions that explain them, governments can begin to

Figure 6.3

Stepping stones towards urban nature positive pathways

Source: Naturvation

navigate different strategy options — combinations of stepping stones — together forging a coherent pathway for transformative change (Tozer et al., 2022). In practice, this will include actions aimed at innovation and disruption. For example, innovation action might be needed around developing new business models, policy instruments or a new type of green roof, while disruptive action would serve to change existing standards in the construction industry — for example, to ensure that not only roads and pipes, but also nature is considered a critical infrastructure benefiting society, economy and biodiversity. The Scottish Government has for instance included natural infrastructure in their Infrastructure Investment Plan to ensure it would be put at an equal footing with investment in grey infrastructure as part of urban development (Scottish Government, 2021).

Below, an illustration of how stepping stones can be combined into pathways using the case of the Emscher Landscape Park (Germany), which involved large-scale ecological restoration within a post-industrial urban landscape (Text box 6.4)(Shaw, 2002).

Text box 6.4: Emscher Landscape Park, Germany: Greening a metropolitan area as a pathway to urban regeneration

The Emscher Landscape Park in the German metropolitan Ruhr area represents another example of a large-scale experiment with metropolitan green and blue infrastructure. It was created as part of the International Building Exhibition (IBA) Emscher Park — a demonstration project of EUR 2.5 billion, spanning 457 km2 across 20 cities — between 1989 and 1999. The project served to address the issue of the many contaminated post-industrial sites and disused industrial heritage of the German Ruhr area. This was done by funding the regeneration of residential neighbourhoods and preservation of industrial heritage by creating new cultural landmarks, while strengthening integration with the natural landscape by improving the connectivity between urban and nature areas and restoring the Emscher River system. In the first step, a small IBA project office was set up to develop a public mandate in the form of a vision. Local authorities, companies and foundations submitted innovative and creative ideas. These were evaluated and further developed by expert coaches at the IBA project office. Economic incentives were made available to develop and implement the winning ideas. The project resulted in new partnerships, bringing together actors from the public, private and civic domains. The Ruhr regional planning association, an intermediary responsible for the management of the landscape park, continues to build on this experience of integral working by aligning strategic priorities for green infrastructure to the climate, mobility, public health and cultural agendas. The Emscher River Restoration Project — at an expected cost of EUR 5.3 billion — was implemented in parallel. It involved creating a 423 km sewerage system to end sewage-related pollution, removing concrete, naturalising water edges, widening stream profiles and developing floodplains. The public mandate provided by the EU Water Framework Directive was a key driver for this project. The water board also played an important role by raising public awareness about the pollution problem, which inspired community-based action, and by co-funding demonstration projects connecting various players from government, industry and civil society. Both projects indicate that large-scale investment in urban nature can be unlocked given the right combination of stepping stones. By unlocking this urban opportunity, they are contributing to biodiversity in direct and indirect ways, showing how to renaturalise former industrialised areas and organise urban fabric differently.

Emscher Landscape Park.

Identifying these pathways requires closely reading the urban landscape...

Yet, as previously shown in the scenarios (Chapter 3), there are multiple pathways to nature-positive development and no single blueprint can be generated without closely reading the urban landscape. Depending on context-specific power structures, target species, urban layout and morphology of the city, different opportunities and constraints may arise in navigating nature-positive futures. Moreover, much of the urban NBS research is situated in the Global North, resulting in a lack of formal knowledge of potential mechanisms supporting urban NBS, and their benefits, in the Global South (Kuller et al., 2022; Veerkamp et al., 2021a). In fact, the overview of stepping stones to mainstreaming urban nature is derived from research conducted in Europe, raising questions regarding the applicability of these insights to other socio-ecological and socio-technical contexts. There are reasons to assume that stepping stones and pathways might look different in the Global South. The high rate of urban growth, combined with, on average, lower per-capita municipal budgets, results in comparatively weak strategic planning and governance of urban settlements (Shackleton et al., 2021). This is further compounded by limited political or budgetary autonomy for municipalities given typically lower levels of decentralisation (Myers et al., 2021; Simon et al., 2021). Moreover, urban agglomerations tend to encompass multiple overlapping jurisdictions, including national, peri-urban or rural authorities, and sometimes also traditional authorities (hereditary community 'chiefs'), with varying rules and customs (Simon et al., 2021). Similar to other parts of the urban fabric, green and blue

spaces are often managed more informally, and urban dwellers might be dependent on these places for provisioning services such as food, medicine or fuelwood. Relying on urban nature for basic livelihood needs around food security and natural disaster risk reduction can come at the expense of nature conservation for urban biodiversity (du Toit et al., 2021).

…taking into account disparities between the Global North and South

As a result of these and other disparities between the Global North and Global South, pathways to mainstreaming urban nature may look very different. However, while some stepping stones are more difficult to use, others may be easier and none should be ruled out entirely. For example, informality and a fragmented institutional landscape could be a threat to urban nature, but may also be an opportunity regarding 'creative and innovative governance interventions' (Simon et al., 2021, p. 427). Likewise, the inadequate planning capacity and limited public service provision in the Global South may contribute to direct and indirect drivers of biodiversity loss, but could also be an opportunity for aligning NBS with multiple strategic priorities around climate resilience, human health, food security and liveability. Given that many cities in the Global South are located near biodiversity hotspots, protecting peri-urban nature with high biodiversity value against urban encroachment can make a meaningful difference. This needs to be done in partnership with local communities, ensuring their basic needs around healthy and clean living environments, freshwater supply, food security and housing are met, and historical injustices around urban landownership, access and management are redressed (Simon et al., 2021; Tozer et al., 2020). For example, decision-makers should ensure a balanced enforcement of land-use regulations in low-income communities when compared to their wealthy counterparts, while ensuring more balanced access to urban nature and other resources important to communities (Anguelovski et al., 2016). Particular care should be taken to avoid green gentrification, especially but not exclusively in the Global South where socio-economic inequalities are often most profound and the need for protective green infrastructure is most urgent. Anguelovski et al. (2018) show how urban greening through 'Green Belt' Medellín (Colombia) led to green landscapes of privilege with 'aesthetical' nature for tourists and the middle and upper classes, displacing communities of low-income informal settlements. Similarly, Zeiderman (2016) demonstrate how Afro-Colombian waterfront settlers are facing displacement in Buenaventura (Colombia) due to climate adaptation programmes. This 'green gentrification' effect exacerbates socio-spatial inequities in urban areas further displacing people. Yet, the case of the Eastern Hills of Bogotá in Columbia provides an interesting example of inequalities being actively combatted, providing support for the most vulnerable communities — while protecting urban nature (Text box 6.5)

Text box 6.5: Eastern Hills of Bogotá, Colombia: Navigating informal development and nature protection

The case of the Eastern Hills of Bogotá (Cerros Orientales de Bogotá) in Colombia provides a good example of a partnership approach aimed at protecting and advancing urban biodiversity (Amaya-Espinel et al., 2021). Bogotá is a sprawling

megacity of approximately 8 million inhabitants, almost double the population of three decades ago. Informal urbanisation and socio-economic segregation are prominent issues, as the housing provision is not keeping up with demand. Informal settlements have also encroached on nature conservation areas, such as the Eastern Hills of Bogotá, which belongs to a 14,197 ha forest reserve, part of the city's main ecological network. To stop the degradation of this nature reserve, the Colombian Ministry of Environment, Housing and Territorial Development issued a resolution (2005/463), subsequently upheld by the Council of State, to subtract 973 ha from the reserve for the creation of an 'Adaptation Strip' with mixed social and ecological functions. The decision resulted in legalisation for the benefit of most informal neighbourhoods which allowed for service infrastructure improvements to provide support to the most vulnerable populations. New settlements in the nature reserve will, however, no longer be permitted (Secretaría Distrital de Planeación, n.d.). A border consolidation zone was created in the unoccupied part of the adaptation strip, providing a mixture of woodlands, quarries, agriculture, and recreational amenities, acting as a barrier to urban expansion in this direction (Bogotá City Council, n.d.). This decision prompted several partnership initiatives aimed to protect the Eastern Hills and improve socio-ecological connections in the transition zone. For example, the civil society foundation Cerros de Bogotá launched a new partnership initiative to create a nature reserve of three hectares, providing ecological improvements, such as replacing exotic plants with native plant species, along with art installations, art and nature workshops, gardens and regular public talks on urban ecology.

Urban sprawl in Bogotá, Colombia.

6.5 Lessons from urban initiatives for national government policies

Attaining a nature-positive future for cities requires action by national and transnational policymakers

Action is needed on many fronts, as is also indicated in the previously discussed stepping stones. Cities have a range of policy instruments available to them, to help support nature-positive development, including spatial planning frameworks with regulations (e.g. on green belts and urban trees), strategic citizen engagement, financial incentives (e.g. grants and subsidies), and demonstration projects on public land and buildings (Bush and Hes, 2018; Wamsler et al., 2020). However, only too often, successful local initiatives are a welcome excuse for national and transnational government to pull back from investing in actions aimed to bend the curve for biodiversity in cities. This is problematic because the conditions underlying the barriers to integrating nature in urban development are often best addressed on higher scales.

Policymakers could provide combinations of regulatory, economic and soft instruments

A range of steering mechanisms are available to national and transnational policymakers that can be broadly grouped into the clusters of regulatory, financial and soft mechanisms. The *regulatory* policy instruments introduce rules or treaties that impose enforceable obligations. *The economic* policy instruments provide financial rewards for nature-positive activities or impose penalties for actions coming at the expense of nature. The soft policy instruments refer to other non-binding steering mechanisms, such as knowledge-sharing, forging new networks, establishing public–private partnerships and negotiating voluntary agreements. These broad categories can be further broken down into specific sub-types. For each of these sub-types, examples are provided of instruments drawn from recent European research (Van der Jagt et al., 2020; Xie, 2020), complemented with examples from the Global South.

Regulatory mechanisms can be distinguished into 1) *planning regulations* that introduce particular targets and rule sets; 2) *environmental certification* that set standards, such as around production processes or sustainable investment; and 3) *technical requirements* around nature-positive action. An example of planning regulation is the Biodiversity Net Gain instrument in the United Kingdom, mandating urban developers to compensate for the related biodiversity loss by investing in nature elsewhere to such a degree that a 10% net gain in biodiversity can be expected. Similar biodiversity offsetting schemes, albeit slightly less ambitious, have also been implemented in other countries, such as Germany. Transnational government, in particular, plays a key role in regulating investment opportunities, for example by using certification systems. The EU Taxonomy classifies the sustainability of investment choices, which over time could increase the attractiveness of investing in large-scale urban greening projects. Examples of standards with an explicit biodiversity component include the certification schemes for the fruit, sugar and forestry sectors in South Africa that were developed under the Biodiversity Stewardship programme (SANBI, n.d.).

Concerning the economic instruments, a distinction can be made between: 1) *direct funding*, using subsidies and grants supporting research and development, green infrastructure and the sharing of knowledge and skills; 2) *loans* that support investment in nature and related capacity building; 3) *trading systems* around the use of natural resources for urban development similar to those for carbon emissions; and 4) *public procurement* to leverage demand for nature-inclusive urban development. A high-profile example of a loan instrument is the Natural Capital Finance Facility provided by the European Union via the European Investment Bank. It can be used for large-scale investments in natural capital for a minimum amount of EUR 5 million if expected to result in substantial revenues for the city. For instance, it was used by the Greek city of Athens to fund green infrastructure development for improved climate resilience and create green corridors. Loans can also come in the shape of green bonds to unlock private investment in sustainability measures (although not always including biodiversity targets), such as those issued by the City of Johannesburg and the City of Cape Town in South Africa for alternative water management solutions, amongst other things (Mboya, 2019). In order for procurement regulation to better support investment in urban biodiversity, governments could introduce the precondition of high-quality multifunctional benefits, such as in the Spanish Public Procurement Law (Law 9/2017). Alternatively, guidance on green procurement could be made available to public bodies for various urban development activities, following the example of DG Environment of the European Commission.

The cluster of soft steering mechanisms include: 1) *municipal co-learning forums* that support knowledge sharing between cities; 2) *award competitions* to stimulate and demonstrate best-practice approaches on integrating nature in cities; 3) *development of expert guidance and information campaigns* to share relevant knowledge and instruments amongst a wide audience; and 4) *innovation platforms* bringing together various actors in experimenting with new solutions that support nature-positive urban development. National governments vary considerably in the extent to which they aim to influence urban green space development by strengthening coordination and sharing of expertise. An inspiring example is the German White Paper 'Green Spaces in the City', which provides an overview of government support available to cities, such as green building certification, training opportunities, knowledge platforms and funding mechanisms to support urban greening. The Netherlands and the United Kingdom, for example, are sponsoring the establishment of City Deals, bringing together policy actors and urban professionals to address policy bottlenecks for sustainable action. For example, the City Deal 'Values of Green and Blue in the City' involved various Dutch city administrations in co-designing a new government-funded tool — the Green-Benefits Planner — for the economic valuation of urban green space. This also enabled a dialogue, informed by pilot projects, around practical opportunities and barriers around the use of this tool as an urban planning decision support system. Likewise, local and national governments are collaborating on biodiversity in South Africa by participating in the Local Government Biodiversity Learning Network, which resulted from a partnership between the South African Local Government Association (SALGA), the South African National Biodiversity Institute (SANBI) and ICLEI (SANBI, 2019).

Taking multiple pathways is preferred over putting all the eggs into one basket

In agreement with the principle of taking multiple pathways to transformative change, combining stepping stones — including these regulatory, economic and soft instruments — should be preferred over national and transnational governments putting all their eggs into one basket. To influence actors across multiple sectors and levels of decision-making, combinations of regulatory, economic and soft instruments should be employed, guiding and supporting various stakeholder groups, as a means of tackling direct and indirect drivers of biodiversity loss (e.g. Kern et al., 2017). Moreover, to fundamentally shift urban infrastructure regimes, actions should, as much as possible, be targeting a broad range of root causes of the barriers to nature-positive development — such as limited knowledge related to building with nature, a focus on short-term capital gains and a lack of public mandate. A comparative analysis across six EU Member States demonstrated that none of these countries do so successfully. The national policy instruments targeted at these root causes varied considerably between countries (Van der Jagt et al., *submitted*). The challenge of formulating policy strategies to bend the curve is possibly even greater in the Global South where there is often less budget and capacity for land-use planning, environmental monitoring and enforcement of regulations (Shackleton et al., 2021).

6.6 Unlocking the urban potential for biodiversity

Cities are important action arenas for biodiversity and, as such, engage in a plethora of interventions addressing both direct and indirect drivers of biodiversity loss. By tackling these drivers in multiple ways, cities are contributing to nature-positive trajectories within and beyond their boundaries. Going beyond a narrow 'cities as a threat' framing reveals the multiple ways that cities are supporting nature-positive goals and how national and transnational policymakers can support them. Moving forward requires combining the stepping stones that are targeted at various stakeholder groups, while addressing the inequalities involved in pursuing nature-positive futures, creating cities where people and nature can thrive together. This requires those policy makers to combine regulatory, economic and soft instruments, while providing scope for non-governmental action. These findings suggest a need for national governments to strategically recalibrate their efforts towards supporting nature-positive urban development, tackling biodiversity loss in direct and indirect ways. This is particularly important in countries that do not or not yet have sufficient access to relevant expertise or actor networks, or lack user demand or other conditions for transforming the urban infrastructure regime. Nevertheless, the consequences of government action — how it will reverberate within complex urban systems — remain difficult to predict. Momentum can build up in unexpected ways (e.g. the youth climate movement or the covid-induced boost to the use of urban green spaces), suggesting that a degree of adaptiveness in government responses remains important.

7 Government policies to foster whole-of-society approaches to transformative change

This chapter draws conclusions on how national governments and international policies can tap into and support existing societal efforts from non-state and sub-national actors to achieve nature-positive development, the post-2020 goals and targets of the CBD, and its 2050 vision of living in harmony with nature. Section 7.1 addresses the question of what national governments could do to realise nature-positive development by harnessing whole-of-society approaches. In Section 7.2, we turn to the question of how the implementation of the post-2020 Global Biodiversity Framework could further support whole-of-society approaches on a national level.

7.1 What can national governments do?

National governments must act on several levels to foster transformative change

This section presents some overarching conclusions based on the scenario results and the analysis of three configurations on what national governments can do to realise nature-positive goals by supporting a whole-of-society approach to transformative change. There is no agreement on a single definition of what transformative change is and there are multiple ways to approach change from each of these approaches (Scoones et al., 2020). Regardless of which specific pathway towards a nature-positive future is envisioned or which specific configuration is being addressed, it is suggested that governments need to work on three levels (i.e. interpretations) of transformative change: structural, systemic and enabling. These three levels of transformative change should be seen as complementary rather than mutually exclusive. Approaching transformative change on only one of these levels could result in trade-offs between the effectiveness and justice of policy interventions (Betsill et al., *forthcoming*) (for a more detailed discussion on the three levels, see Section 2.2).

Focusing solely on systemic approaches, for instance, may downplay the complexities in unequal power structures and politics (Scoones et al., 2020). And a single focus on structural elements of change might instead lack the detail and the context-dependent degree of change needed. Enabling approaches may neglect to look at significant underlying drivers of biodiversity loss and the need for systemic change in attaining nature-positive futures. All in all, it is necessary to build on these three levels of transformative change in conjunction, to identify policies that would achieve nature-positive goals. In this way, national governments can contribute to tackling underlying conditions and enabling whole-of-society approaches. Furthermore, analysis of the three configurations showed that all three context-specific policy approaches will be necessary, building on these three interpretations of transformative change.

Steering systemic change towards nature-positive pathways

Steering systems towards nature-positive development means changing interdependencies between actors, institutions and technologies within the individual systems, such as those on food and energy. Policy interventions are targeted at particular features within a system (e.g. its elements, levels, drivers) in order to reform it, building on niche-regime-landscape dynamics (Scoones et al., 2020). Here, we focus on two fundamental outcomes that emerged from the analysis of the three configurations and that should be taken into account by governments with regard to steering systemic change. First, interactions should be supported between actors within and across configurations to favour those that collaborate on nature-positive development. This was found to be essential because, although collaboration between actors is already happening, there are material barriers to scaling up their efforts. Enabling interactions between actors, therefore, can be a way of dealing with these barriers. Second, the need to a focus on the underlying conditions is needed in removing barriers and activating levers of change for societal actors who are involved in biodiversity actions.

The importance of interaction between actors within and across configurations emerged very clearly, as was shown by our analysis of actor collaborations. For nearly all configurations, we found collaboration to be an a crucial precondition for nature-positive development. National governments could therefore focus their interventions on the interdependencies between these elements of the system (actors, sectors and ecosystems), while taking individual situations into account. Across configurations, there would be several ways of doing so, ranging from favouring integrated landscape approaches, supporting local partnership across actors, to establishing partnerships and networks for innovation within urban contexts and standard-setting and knowledge sharing in supply chains. Governments should also pay attention to integrating sectors. This means that all socio-economic sectors, also those that are not normally considered in biodiversity policy agendas, should be involved in nature-positive efforts (Bulkeley, Kok, Van Dijk et al., 2020).

Another systemic intervention that applies to all configurations refers to the removal of barriers and the activation of levers of change for non-state actors, which also requires an understanding of the underlying conditions and root causes indicated for structural

approaches (see the following section). Clearly, although this will be context-dependent and different configurations will present their specific and unique barriers, we found that governments have several instruments available to steer systems towards nature-positive goals. Governments will need to apply combinations of regulatory, economic and soft instruments, depending on the particular stage of transition and the motivations of actors that need to be addressed.

Realising structural changes in the organisation of current systems

From the perspective of structural change, the fundamentally social, economic, cultural and political structures should be addressed (Scoones et al., 2020). This focus on deeper structural dynamics, such as altering current consumption and production systems and markets, points to the need to address the root causes of the barriers to achieving nature-positive development. This report touches on some of the root causes of the current ecological and climate crisis which are, arguably, standing in the way of transformative change. This report discusses structural change as a way of envisioning and realising an economic, societal and political system that is organised and managed according to multiple values of nature. Recognising multiple values arguably paves the way for multiple alternative pathways of transformative change. The recent IPBES value assessment (IPBES, 2022: p.4) clearly states that: 'The causes of the global biodiversity crisis and the opportunities to address them are tightly linked to the ways in which nature is valued in political and economic decisions at all levels'. A too-narrow focus on the economic value of nature, according to IPBES, is an indirect driver of the current biodiversity crisis. This is not to say that we should not try to bring nature into the economic system (e.g. the Dasgupta review, Dasgupta (2021)). However, policy should take the various valuations of nature into account, so that they contribute to an expansion of action arenas for biodiversity conservation, meaning that biodiversity conservation and sustainable use should become streamlined in every socio-economic sector.

The whole-of-society approach rests on the assumption that inclusion and empowerment of multiple actors with their own needs and values is essential for transformative change. Governments, therefore, need to be sensitive of these elements in their approach to biodiversity policies and, more generally, to sustainability policies. They should address nature-positive development from a pluralistic perspective, as a way of including actors who have historically been oppressed and marginalised by biodiversity policy — such as indigenous peoples and local communities, women and youths. In this way, governments can also create new forms of society, and another type of economy and culture, premised on the respect for the multiplicity of values (Pascual et al., 2021). As suggested by Pascual et al. (2021, p. 570), this endeavour will cut through all elements of society, with a clear role for government when it comes to facilitating it. According to Pascual et al., biodiversity policies need to 'recognise biodiversity–society interactions across sectors; address the political structures that condition dichotomous thinking between conservation and development'. The issue of plurality of values is directly connected to another structural element, namely that of power. The policies that need to be implemented should not only recognise the multiplicity of values and the needs that people have in relation to nature, but will also

need to address historical and current power imbalances. Addressing power structures is not simple and there is no single way of doing so. There are several ways of acting on power and various actors could do so, with national government being only one of the actors that could effectively contribute to nature-positive developments (Büscher and Fletcher, 2020) — but it is outside the scope of this report to describe this in more detail. This report suggests that government is only one of the actors to address power, and that it could do so by creating inclusive platforms where multiple actors, as well as their needs and visions can be expressed, and by redistributing material resources across actors so as to empower them. As also discussed in Büscher and Fletcher (2020), conservation interventions and policies have historically targeted local actors as they are the ones living with and directly depending on biodiversity. The authors suggest that transformative change should also address actors who are not residing in the areas on which they are having an impact, as suggested in all configurations. National governments are in the position to take this on. One way to do so which emerged from the configurations is for governments to eliminate the barriers and address the institutions, cultural norms and other mechanisms that allow unsustainable practices while preventing people from acting on and improving their own environment (Feola et al., 2021). Furthermore, governments need to support local actors to seize power and effectively participate in decision-making processes. This issue was addressed in all three configuration and resonates with calls for a more participatory type of democracy. As an example, within the context of rural landscapes, government is suggested to organise the process of land-use planning, secure land tenure and define environmental regulations. This means that government can actively work on power imbalances between actors by establishing norms and other regulatory mechanisms that support the types of claims on rural landscapes that would otherwise lack legitimation. Issues of power also emerged from the supply chain configuration, because proactive, front-runner businesses may not have the possibilities for achieving their own ambitious objectives on nature-positive development. Again, government has a role when it comes to empowering certain actors who might otherwise struggle to emerge as innovators and solvers of gridlocks.

Enabling whole-of-society approaches in navigating towards nature-positive futures

This approach is less about the structural and systemic components of change, but instead about focusing on human agency and people acting collectively to create their own future (Scoones et al., 2020). Engaging with these inclusive forms of governance will inevitably involve contestation and conflict 'over whose nature should be conserved or restored' (Bulkeley et al., 2022, p. 299). At the same time, it addresses the need for shifting power structures in decision-making arenas and the engagement of less powerful actors in these processes, as also explained above. Capacity building is required if we are to foster nature-positive interventions that would achieve biodiversity goals while realising various co-benefits, such as climate mitigation, well-being and human health benefits while also addressing trade-offs. Government, therefore, has a role in creating and supporting opportunities for stakeholders to express dissimilarity and contestation, including groups who were previously finding it difficult to be heard. In these deliberative spaces, local communities and stakeholders need to be involved in generating co-benefits, ensuring that these benefits will be shared equitably (e.g. access to urban green spaces), as well as tackling

the trade-offs (Bulkeley et al., 2020). In addition, national action agendas could also play a role here to design deliberative and inclusive processes principle of transformative change. Moving forward requires capacity building to embrace contestation and negotiation, shifting power dynamics and discourses in order to enable whole-of-society approaches to engage in the generation of nature-positive futures (Bulkeley et al., 2022).

7.2 The contribution of the post-2020 Global Biodiversity Framework to whole-of-society approaches

To achieve the 2050 Vision of the CBD of people living in harmony with nature, a common mission for the post-2020 Global Biodiversity Framework to become nature-positive by 2030 and have a large-scale restoration of nature afterwards is clearly ambitious. This section draws some conclusions on how the post-2020 Global Biodiversity Framework can further support transformative governance for nature on national levels, stemming from whole-of-society initiatives.

The mission of the CBD post-2020 Global Biodiversity Framework will be operationalised according to 4 goals regarding ecosystems, species and genetic diversity; nature's contributions to people, including ecosystem services; equitable benefit-sharing and means of implementation, and 21 specific targets to achieve these goals. On the ambitions for biodiversity governance, in the coming years, our scenario analysis clearly suggests that, to achieve transformative change, ambitious targets on protected areas and other area-based conservation efforts and nature's contributions to people must be coupled with targets on indirect drivers of change related to broader sustainability challenges, such as climate change mitigation and modes of production and consumption (IPBES, 2019; Bulkeley, Kok and Van Dijk, 2020; IUCN, 2022).

Climate and biodiversity efforts are often still treated as separate scientific and policy domains, but it will be necessary to better align biodiversity and climate goals, capture synergies and deal with trade-offs, as evidence is mounting that climate change is a driver of biodiversity loss and biodiversity conservation is necessary to keep global temperature increase at below 2 °C (Pöortner et al., 2021; Deprez et al., 2021; Trisos et al., 2020). The connection between SDGs, putting nature on the path to recovery and achieving the net zero climate target was highlighted, for instance, at the UN Summit on Biodiversity (September 2020), the IUCN World Conservation Congress, and the Climate COP in Glasgow (2021).

Furthermore, to honour the commitments on nature-positive development, governments can no longer afford to ignore currently unsustainable food production and consumption (UN Food Summit, 2021) and the multiple ways in which people depend on nature for their livelihoods. As mentioned in the chapters above, nature-positive development can only be achieved if it also works for people (Pascual et al., 2021). For instance, 70% of the world's poor directly or indirectly depend on wild species (Fedele et al., 2021; IPBES, 2022). Achieving nature-positive development calls for specific targets for 2030 regarding urban

green, spatial planning and business and finance, as these are relevant in the three configurations and can provide direction and support to whole-of-society initiatives on the three related levels .

Realising the nature-positive pathways in practice, in all three configurations, will clearly benefit from coordinated policy approaches at higher levels of decision-making. Non-state actors, regional governments and cities local already have a long tradition of working on climate and are now developing more integrated actions on biodiversity and climate, as well as other sustainability issues that are relevant and important to them. In turn, biodiversity action can benefit from non-state and local action on sustainability that includes achieving the nature-positive objective.

Once goals and targets have been agreed on, the more important question is that of how the CBD post-2020 framework in its actual implementation will contribute to delivering the transformative changes needed to achieve a nature-positive future. This requires attention to the further development of implementation mechanisms that have transformative potential within CBD and other international institutions that are relevant for biodiversity, including an important role for the financial sector including its supervisors. In national biodiversity policy, a shift is required, from mechanisms designed primarily for conservation and that increasingly address the direct drivers of biodiversity loss through mainstreaming the inclusion of biodiversity in relevant sector policies, to tackling the indirect drivers (Bulkeley, Kok, Van Dijk, 2020).

As domestic implementation of the CBD takes place through National Biodiversity Strategy and Action Plans (NBSAP) and related national and sub-national planning that is mostly confined to traditional conservation strategies, national nature-positive strategies need to be aligned with national and sub-national goals and policies on climate, food security, sustainable production and consumption and other SDGs. Such whole-of-government approaches for biodiversity, through NBSAPs or other national planning processes, will be necessary to tackle the indirect drivers of loss of biodiversity and ecosystem services and to include the multiple values of nature and achieve justice. The question remains if this can be achieved through NBSAPs, but, in any case, more attention must be paid to the inclusion of nature-positive developments in other planning processes. Prioritisation and mainstreaming biodiversity in policy agendas on sub-national, national and international levels is, therefore, key to expanding the action arenas and involving new actors to achieve transformative change for nature, which may be achieved through national action agendas. Specific attention must be paid to whole-of-society approaches and to enabling an active role for non-state and local actors, which could be a common thread in these whole-of-government efforts.

Although the importance of whole-of-society approaches to biodiversity is increasingly recognised within the CBD, they still need further development as an integral part of CBD's institutional mechanisms. The CBD Action Agenda for Nature and People does provide opportunities for galvanising their contribution, as it brings together new commitments by societal actors and shows how nature-positive development pathways are being realised.

High-level champions can support these initiatives. The Action Agenda can leverage resources and capacities from multiple societal actors, implement nature-positive strategies and demonstrate innovative solutions, pushing national governments towards greater ambitions (Pattberg et al. 2019; Kok et al. 2019). If the CBD Action Agenda will not be strengthened any further, for example through attention paid to aligning commitments with the GBF and proper monitoring and review mechanisms, there is a risk of greenwashing. The Action Agenda for Nature and People and the Global Action Agenda for Climate could also be brought together around the 'Race to Zero and Nature Positive', given the intractable linkages between both topics and given the fact that several actions by non-state actors result in a better outcome for both biodiversity and climate. The same is true for international processes around food and agriculture.

As part of the structural change agenda addressed in the previous section, we need to ensure that responsibility for reducing consumption is not only placed on individuals. It should be recognised explicitly that all levels of government and business also need to reduce their consumption and waste production and that they must play a fundamental role in structurally changing current consumption and production patterns. Action plans and reporting mechanisms should explicitly require that evidence is presented of such behavioural changes taking place and having a tangible effect (Bulkeley, Kok, Van Dijk, 2020). Including the financial sector (i.e. national and commercial banks, insurance sector and pension funds) is crucial for the success of nature-positive development and for stimulating and financially supporting innovations and systemic disruptions. Explicit recognition of the role of the financial sector will be critical, if we are to develop nature-inclusive portfolios for loans and investments. This would reduce the risk of biodiversity loss related to the financial sector and start to develop approaches for financing net-positive biodiversity and low-carbon development trajectories while also utilising the experience of the financial sector as gained in addressing climate change (Text box 7.1; Van Tilburg et al., 2022).

Alongside integrative and inclusive governance processes, experimentation that fosters innovative, diverse and alternative approaches is required and is given a mandate through the GBF. This could be supported through capacity-building approaches that emphasise demonstration projects, living laboratories and partnerships across various sectors.
The CBD agendas on mainstreaming, finance and capacity building that support national implementation, must be explicitly focused on the nature-positive objective. This can build on whole-of-society efforts already taking place. As highlighted in the previous section, this requires countries to develop whole-of-government approaches for mainstreaming, enabling and regulating the necessary changes to achieve nature-positive development.
It will also require new types of capacity. One question is that of whether increasing capacity for environmental ministries is actually what is needed the most, or if we need capacity and resources to be allocated to economic ministries, local government, private sector actors and the like, so as to truly enable a whole-of-government approach? New priorities for capacity building may be identified by analysing implementation successes and failures, enhanced by increased transparency on progress through peer review (Bulkeley, Kok and Van Dijk, 2020).

Text box 7.1 Lessons from the financial approach to achieving climate change targets

Obligations on corporate accountability in the CBD Global Biodiversity Framework could do for biodiversity what the Paris Agreement has been doing for the involvement of business and finance in climate change (Van Tilburg et al., 2022). The Paris agreement on climate change, and the willingness of companies to commit to climate targets has stimulated the uptake of climate change issues in business and finance. The pricing of CO_2 emissions and transparent reporting about risk assessment and management are instruments that have increased awareness and the pressure to act on risks posed by climate change and the effects of energy transition policies.

Financial market supervisors (i.e. central banks) have analysed climate change effects through stress tests, and they expect financial institutions to do the same for their own portfolios (ECB, 2020). To increase the inclusion of climate change risks in financial decisions and risk management, the Taskforce on Climate Related Financial Disclosure (TCFD, 2017) has formulated several recommendations, focused on transparent disclosure of the risks and opportunities related to the transition to a low-carbon economy. The recommendations refer to several areas of disclosure, such as using better metrics and data, guidance on reporting and disclosure on both general and sector-specific levels, the need for structured strategies to manage risk, and transparency about corporate governance structure with respect to managing climate change risks.

The ECB nevertheless found that 90% of the largest banks still do not meet the supervisory expectations on climate (ECB, 2021). Insufficient data and methodological gaps hinder the full implementation of the ECB expectations, in the short term. As a result, little corrective action has been taken, so far, by financial institutions. The TCFD recommendations on disclosure and accountability are still valid, but additional policy efforts are also needed, such as mandatory implementation and reporting by a large group of companies — not only for companies listed on the stock market but also for privately owned companies (De Waard et al., 2020).

Biodiversity loss and climate change are intimately linked, from both risk and mitigation points of view. The lessons learned regarding climate change are therefore important for biodiversity governance, as there is synergy possible by tackling biodiversity and climate issues together, and the need for managing the trade-offs between them. Therefore, they should be addressed together, both by financial policymakers, risk managers and market supervision authorities (Van Tilburg et al., 2022).

The CBD peer-review mechanisms that are being developed could be extended beyond government level and need to include various societal front runners, so that we can learn from their experiences towards achieving nature-positive development, especially on difficult issues for which many other countries face similar challenges. Beyond learning approaches as part of a new accountability mechanism for biodiversity, the contribution by non-state actors can also be included in the stocktake and review mechanisms that monitor progress towards realisation of targets. This is especially important to ensure visibility and credibility of non-state contributions to nature and people (Widerberg et al., 2021).

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