Operationalizing transformative change for business in the context of Nature Positive

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Abstract

The Kunming-Montreal Global Biodiversity Framework (GBF) set a specific target for reducing the private sector's negative impacts on biodiversity and increasing positive impacts, as part of efforts to halt and reverse biodiversity loss. Meanwhile, 'Nature Positive' is emerging as an ambitious rallying call for mainstreaming the GBF. Merely tinkering with business-as-usual will not deliver these ambitions, and so calls for transformative change in business's relationship with biodiversity are increasing. However, there remains a lack of clarity on how to operationalize transformative change in the context of Nature Positive and the GBF, particularly how to develop meaningful actions and targets. This gap risks confusion, greenwashing, and failure to achieve global goals. This perspective draws on existing literature on social change to offer a practical framework for understanding and operationalizing transformative change for business and nature. We define and describe the role of transformative change within a Nature Positive ambition and summarize different types and scales of actions that companies could take, which we illustrate with case study examples. This framework could help with planning coordinated and mutually reinforcing actions towards transformative change, setting ambitious targets, and holding companies accountable to 'transformative' claims. However, all such plans and claims should be founded on abatement of new and on-going negative impacts first and foremost through implementing the mitigation hierarchy. We invite companies to test our framework for their own planning, decision-making and disclosures, to drive transformative change for a safe and just future.

1 Introduction

Nature is in unprecedented decline, primarily due to production and extraction of resources to meet the material demands of a growing and increasingly affluent society[1,2]. Nature encompasses the collective phenomena of the physical world, including living elements (i.e.,

biodiversity) and non-living elements (e.g., landscapes, water, soil), which are interdependent, and with which humanity is intrinsically linked via socio-ecological systems (Figure 1) [3]. As such, loss of nature not only threatens nature itself, but creates a systemic risk to companies, economies and society [4] (Figure 1).

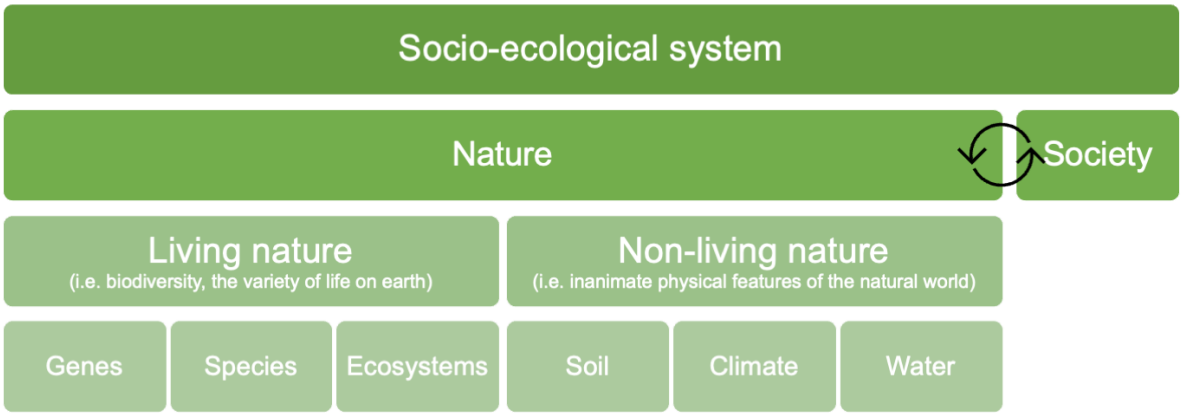

Figure 1 A simple schematic of the levels and elements of nature, and nature's relationship with society via socio-ecological systems. Though not clearly depicted here, living, and non-living nature are intrinsically linked, such that positive trends in biodiversity can be seen as an outcome of healthy non-living nature, while healthy non-living nature is also dependent on biodiversity (e.g., via supporting services)

The Kunming-Montreal Global Biodiversity Framework (GBF) sets out goals and targets for halting and reversing biodiversity loss within the coming decade, with the long-term vision of "living in harmony with nature" by 2050[5]. Meanwhile, 'Nature Positive' is emerging as an outcome-oriented rallying call for mainstreaming action towards the GBF[6]. Though the GBF does not explicitly mention the term Nature Positive, both are conceptually identical in terms of desired outcomes. I.e., the 2030 mission of the GBF is "to halt and reverse biodiversity loss to put nature on a path to recovery"[5], while the naturepositive.org site defines Nature Positive as "to halt and reverse nature loss … so that by 2030 nature is visibly and measurably on the path of recovery"[7].

It is now widely acknowledged that the private sector has a critical role to play in delivering the GBF and a Nature Positive future[5], and that this requires not just tweaks to business-as-usual but transformations in how societies manage their interfaces with nature and natural resources via markets, economies and institutions [1,8]. However, while mainstreaming of nature is welcome and needed, new terms and ambitions also risk confusion and greenwashing[7,9]. We aim to help circumvent these risks through defining and operationalizing key terms in the context of transformative change for business towards Nature Positive, with a focus on providing a practical framework to plan 'transformative actions' which are both ambitious and evidence based.

2 Context

2.1 The Global Biodiversity Framework

The Kunming-Montreal Global Biodiversity Framework (GBF) sets out an ambitious outcome-oriented plan for addressing the biodiversity crisis[5]. Unlike its predecessor (the Strategic Plan for Biodiversity 2011-2020), the GBF explicitly acknowledges the role of companies and globalized supply chains in biodiversity loss. For example, Target 15 states the need for companies and financial institutions to "*progressively reduce negative impacts on biodiversity,* [and] *increase positive impacts*."[5], while all other GBF targets are implicitly relevant to companies, requiring corporate action towards implementation[5].

This call to action for the private sector is important because production of commodities, embedded within globalized supply chains that are characterized by inequal exchange (i.e., with a net drain of natural resources from the global south, and a net export of biodiversity impacts from the global north), is the greatest driver of humanity's footprint on the planet[10–12]. The corollary is that changes in private sector practices can mitigate biodiversity loss and support sustainable development. For example, Ambatovy mine in Madagascar produces significant quantities of nickel and cobalt – both essential minerals for production of battery electric vehicles, as well as employing 8,000 Malagasy people and providing 27% of the country's tax revenues. The mine is also on track to achieve no net loss (NNL) of forest in Madagascar[13]. Beyond the site level, well implemented supply-chain initiatives – such as zero deforestation pledges and sourcing standards - have been shown to reduce deforestation within production landscapes[14], while private investment is also essential for scaling landscape restoration[15].

2.2 Nature Positive

In parallel, Nature Positive is emerging as an outcome-oriented rallying call for mainstreaming action towards GBF goals. While there is not yet a single agreed definition for Nature Positive, consensus is building around the naturepositive.org definition, which emphasizes the need for recovery in the overall state of nature in absolute terms relative to a current static baseline. This implies that Nature Positive is a global societal goal[7,16].

Emerging principles for Nature Positive commitments (Figure 2) relate to:

1. Aspirational levels of ambition, with commitments to positive outcomes for nature in absolute terms (e.g., an increase in abundance and diversity of species and ecosystems in the future, relative to a current static baseline).

2. Extended accountability in terms of the spatial, temporal, and systemic scope of commitments (i.e., including upstream value chain, sector-wide efforts, and proportional positive contributions towards diffuse and historic impacts on top of no net loss (NNL) for direct operations).
3. Comprehensive and well-evidenced strategies, targets, and action plans to underpin commitments. These should be aligned with best practice guidance; logically 'add up' to deliver positive outcomes for nature; mainstream nature throughout all forms of decision-making; and support a cycle of implementation, monitoring and evaluation, regular disclosure, and adaptive management.
4. Integration of cross-cutting societal challenges, including climate change and social justice (i.e., across all elements of socio-ecological systems, including considerations of social and intergenerational justice, living and non-living nature, climate).

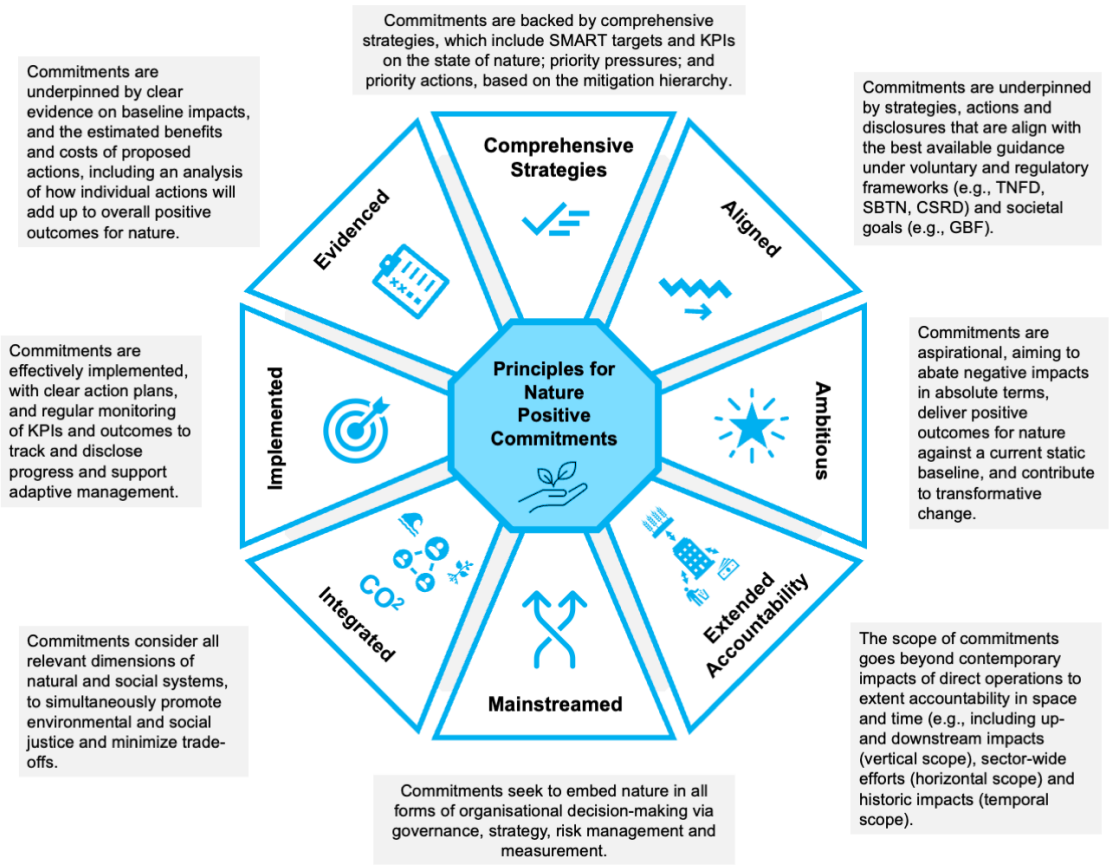

Figure 2 A summary of core principles for nature positive contributions, building on Milner-Gulland (2022) and zu Ermgassen et al. (2022) (KPIs = Key Performance Indicators)

With its conceptual simplicity, aspirational appeal, and the growing acknowledgment that tackling biodiversity loss makes business sense, Nature Positive is already being widely used as

a company-level ambition and branding tool (e.g., with 'Nature Positive' insurance, events, cities, corporate commitments, and summits)[6]. However, the emerging definitions and principles outlined above suggest that an individual company or product cannot claim to be Nature Positive itself [17], but rather can contribute towards a global Nature Positive goal. That is because nature recovery on a global scale requires actions and outcomes both within and beyond the contemporary attributable footprint of an individual company's value chain[1,8].

As such, arbitrary commitments and ad hoc actions by a handful of innovator and early-adaptor companies, while a crucial starting point, will not deliver the GBF and a Nature Positive future. Rather, change must include and go beyond the private actions of individual companies, to be upscaled across entire sectors and transform the economic, social, and political systems within which companies (and society at large) are embedded (i.e., transformative change)[1,18]. We therefore propose that company-level claims regarding Nature Positive be framed in terms of *contributions* towards a Nature Positive global goal, and include the following three elements:

1. Abatement of new and on-going negative impacts on nature from operations and value chain in absolute terms against a current static baseline (halt declines: no net loss from 2020). This can be achieved through implementing a mitigation hierarchy of actions (i.e., avoid, reduce, restore, compensate), to achieve No Net Loss (NNL) or Net Gain (NG)[9].
2. Proportional positive contributions to nature recovery, which at least counterbalance any new and on-going unabateable impacts and begin to address historic, indirect & diffuse impacts[19] (promote recovery: net positive by 2030). This can be achieved through a conservation hierarchy of positive conservation actions[19], which need not be directly linked to impacts and can be implemented beyond a company's value chain.
3. Contributions to systems change by working together with other companies and stakeholders across land/seascapes, value chains, and sectors; to guard against leakage and tackle structural issues (full recovery by 2050).

A Nature Positive future will not be possible without targets, actions, and outcomes at all three levels.

2.3 Transformative change

Transformative change can be defined as a process to effect major and fundamental changes in how society operates, across technological, economic and social factors, including paradigms, goals and values [2,18]; and the act or instance of transformation, in terms of outcomes. It involves not just changes in private actions, but profound shifts in values and institutions via the

emergence of new behavioural norms and new social structures[2,18] (Figure 3, Figure 4). As such, transformative change transcends multiple levels of society, involving:

i) Changes to the behaviors, goals, values, and motivations of private entities (including individuals and companies);

ii) Changes in social networks and structures (i.e., systems of coordination), including markets, regulations, institutions, and norms;

iii) Interactions between the two (i.e., changes to private behaviors influence the way social structures are established and operate, while structural changes create decision-making contexts for the private behaviors of individual entities [18]) to transform the system as a whole.

Importantly, transformations emerge from synergistic interactions between private actions and social and structural change[18]. In the context of business and nature, private actions can be considered as those which take place at the level of an individual company (i.e., adapting from Natio et al (2022), "behaviors that *companies* privately conduct to reduce their own impacts"), and contributions towards transformative change require that individual companies not only implement ambitious private actions to address their attributable footprint, but also participate in social signaling and collective action to drive social and structural change. When such changes occur synergistically, it may be possible to reach tipping points for changing the system as a whole, and thus deliver transformative change and nature recovery on a societal scale [20,21] (Figure 3, 4).

The need for transformative change to halt and reverse biodiversity loss is backed by scientific consensus[1], senior business executives[22,23], and increasingly embedded within frameworks and guidance for managing the private sector's impacts on nature[23,24].

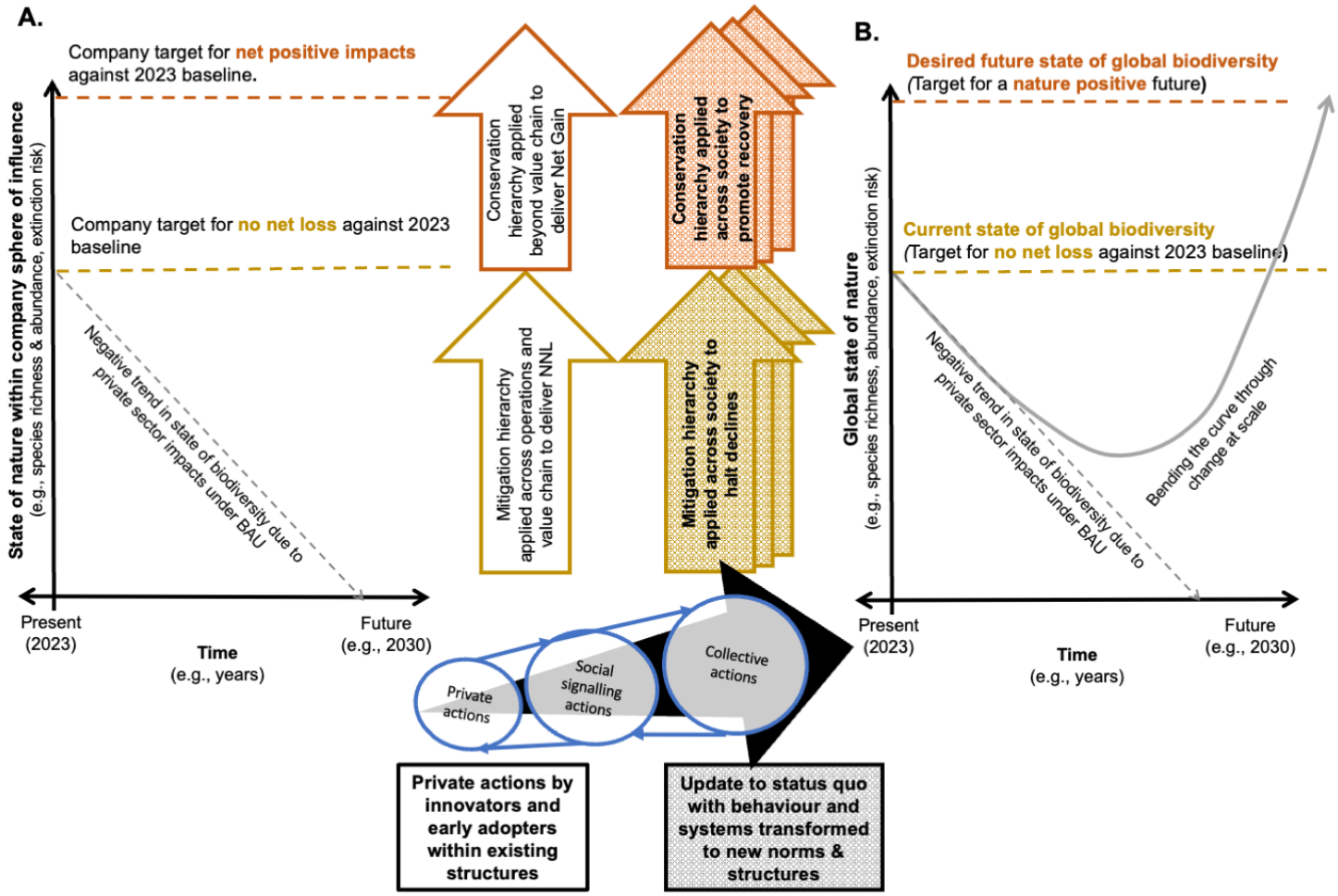

Figure 3 Conceptualising the role of transformative change within a Nature Positive societal goal (building on Milner-Gulland et al. 2020 and Naito et al. 2022), where A depicts the private actions of a single firm at the scale of their own sphere of influence and B depicts change at the societal scale. In the absence of any conservation action, nature will decline due to ongoing business impacts. The mitigation hierarchy addresses contemporary, attributable impacts toward a goal of no net loss (NNL) within a company's value chain, while the conservation hierarchy recovers nature to a desirable future state through addressing past, indirect, and diffuse impacts beyond the value chain. At present, this approach may be implemented by a small number of innovators and early adopters within existing structures (A), however the contribution of private actions towards positive outcomes for nature on the societal scale are marginal (albeit necessary) in the absence of social signalling and collaborative action to drive social and structural change. 'Bending the curve' at the societal level will only occur when nature positive becomes a new norm throughout the private sector, is scaled across land/seascapes and sectors, and supported by new social structures.

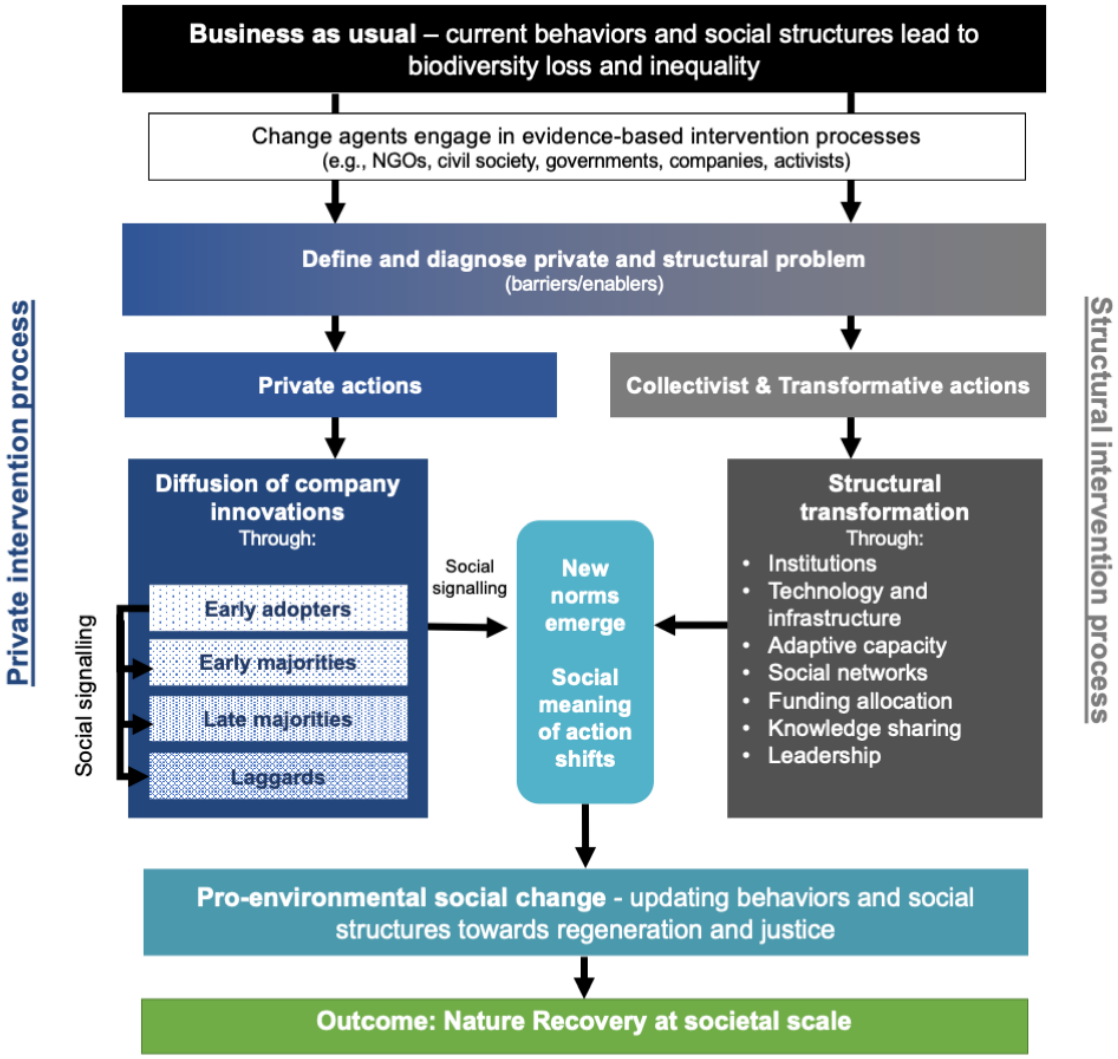

Figure 4 A conceptual diagram of parallel and synergistic processes for transformative change towards Nature Positive, adapted from Naito et al. (2022)

3 The challenge: operationalising transformative change for business and nature

The GBF, Nature Positive and transformative change are inextricably linked. Based on the definitions outlined above, it follows that a Nature Positive future (and the GBF) cannot be achieved without transformative change, and that any Nature Positive ambition should, by definition, promote transformative change. Indeed, it is widely accepted that projected catastrophic biodiversity losses can only be averted through transformative action[1,8].

However, driving transformative change is, by definition, complex; requiring coordinated suites of actions and multi-scale synergies (Figure 3, 4) [8,18]. This in turn implies an extended scope of accountability beyond the direct control of any one company, which makes it one of the most critical and yet most challenging aspects of the Nature Positive agenda. Indeed, a recent review of corporate biodiversity commitments found that most are falling short of transformative improvements that are consistent with emerging definitions of Nature Positive contributions[16]. For companies, this creates a risk of greenwashing, where misuse of 'Nature Positive' and 'transformative change' creates vague and unsubstantiated claims or distracts from more tangible issues[25]. For society, this risks failure to achieve global goals for nature.

3.1 Transformative change needs extended accountability

The need for extended accountability – e.g., via cross-sectoral and collaborative approaches - can be illustrated by considering the three scales of company action for Nature Positive contributions outlined in Section 2.2 (see Box 1 for a hypothetical examples). First and foremost, the mitigation hierarchy should be adhered to, to halt further declines in nature as attributed to a company's operations and value chain[9,19,24]. This means abating new and on-going impacts as far as possible, then restoring, and offsetting any unabateable impacts. However, under business-as-usual technologies and structures, abating impacts on nature often conflicts with organisations' mission critical activities[26], especially growth ambitions and fiduciary duties. Moreover, adoption and implementation of the mitigation hierarchy remains limited in corporate and national policies and regulations, with barriers regarding data, technologies, and systems to accurately assess company footprints and progress against commitments. Addressing these structural and systems-level barriers is necessary for implementation of the mitigation hierarchy to become a widely adopted business norm. Secondly, to enable nature recovery, historic, indirect, and diffuse impacts of companies' operations and value chains also need to be addressed through proportional positive contributions (Figure 3). However, successful nature

recovery initiatives require land/seascape-scale efforts, collaboration amongst private and public sector actors, and institutions for investing in and delivering high integrity additional biodiversity outcomes[15,27]. Finally, to ensure nature recovery occurs at a global scale, and acknowledging complex telecouplings between distant places, sectors and other societal goals, there is a need to guard against displacement of impacts within and across land/seascapes and sectors (i.e. leakage) and other perverse consequences for nature and people[28].

For example, a large food and beverage company may commit to reducing their land occupancy footprint (e.g., as per the Science-Based Targets (SBTs) for Land Target 2 [29], but this will be unlikely to lead to nature recovery without other complementary collective actions together with suppliers and stakeholders in production landscapes (Box 1). Similarly, a large automotive company may commit to increasing the percentage of recycled materials (e.g., steel, aluminum) in their products, and while this may reduce the company footprint, it may not reduce the global mining footprint and may represent an opportunity cost for another company wishing to source recycled content, due to limits in total supply of recycled metals[30].

Box 1. The need for action at multiple scales for Nature Positive contributions in the food and beverage sector: a hypothetical example

As part of a Nature Positive ambition, a large food and beverage company may decide to reduce their attributable land occupancy footprint by substituting some of their animal-based ingredients (e.g., dairy, meat) for lower-impact plant-based alternatives (e.g., soy) and lab cultured meats. However, while this may reduce the attributable land occupancy footprint of the company, it is unlikely the land will be taken out of production or restored back to nature without other social and structural changes. For example, there would need to be an overall increase in supply of and demand for plant-based and lab-cultured alternatives, which displaces the market for animal-based ingredients, alongside investment in collaborative restoration initiatives, to deliver additional biodiversity outcomes at the societal scale. This would require shifts in norms and social meanings for consumers and companies, whereby plant-based and lab-cultured alternatives become increasingly socially accepted and profitable, eventually creating a 'new norm' and somewhat de-coupling protein-rich diets from biodiversity loss.

Inevitably, not all biodiversity impacts could be eliminated, because energy and raw materials are still required to produce alternatives. This highlights the need to define and set societal limits on acceptable levels of biodiversity impact, and prioritizing abatement first, while also

developing mechanisms for high integrity compensation (both of which are structural issues); and facilitate cross-sectoral synergies (e.g., in this instance, where a food sector transformation also depends on transitioning to clean energy) to reach tipping points for societal outcomes.

Social safeguards would also need to be considered for producers and consumers impacted by these market shifts, since efforts to regenerate nature should also seek better outcomes for people, and ensure the worse-off do not bear the costs [31]. For instance, phasing out intensively farmed meat may result in higher prices – at least in the short term – for animal protein. This could have negative impacts on low-income families who rely on cheap livestock-based foods for protein[32]. As such, social and economic interventions by state and non-state actors may be needed to ensure just transitions. For example, governments could redirect perverse agricultural subsidies towards supporting low-income healthy diet shifts.

3.2 Extended accountability is risky

As illustrated, transformative change towards Nature Positive is a multi-level and multi-actor endeavor. Private actions need to be implemented synergistically with actions to tackle broader social and structural constraints. However, this type of system-scale planning and action is complex and risky for individual companies (and remains notably absent from corporate nature commitments[16]). Firstly, there is a risk of greenwashing - where vague and unsubstantiated Nature Positive or transformative claims do not lead to clear positive outcomes, or delay or distract from more tangible actions to mitigate company footprints[25]. Yet secondly, without system-level commitments, there is a risk of leakage - where a single company's direct and tangible positive actions do not lead to overall improvements in the state of nature on a societal level, because of a lack of change at jurisdictional, value chain, market or systems scales (Box 1)[14,33]. These risks also create trade-offs between integrity and ambition, where being too strict on integrity, due to fears of greenwashing, may stifle innovation and ambition, which are needed to enable transformative solutions. However, allowing ambitious yet speculative transformative claims open the door to greenwashing.

Given these risks and trade-offs, there is a need for a structured framework and criteria – to guide individual companies on expectations regarding what types of actions and targets can be defensibly considered transformative and aligned with a Nature Positive ambition, and coordinate collective action to deliver transformative change.

Within this context, we build on our operational definition of Nature Positive contributions at the level of an individual company (Section 2.2) and established literature on behavioural and social change to offer a practical framework for operationalizing transformative change towards Nature Positive. Within this framework we summarize the different types and scales of coordinated actions that companies could take to drive transformative change and offer recommendations on how actions could be structured and prioritized to promote integrity and innovation, while guarding against leakage and greenwashing. This can help companies plan actions, set ambitious targets, and monitor progress, as well as hold them accountable to transformative (and thus, by definition, Nature Positive) claims to deliver global goals for nature.

4 The solution: operationalizing transformative change towards Nature Positive

4.1 Situating transformative change within an outcome-based goal for nature

A first step for developing transformative actions is to define an overarching outcome-based goal. While measurable positive outcomes for nature are already clearly embedded within Nature Positive, the level of ambition for a company (or collective) can be explicitly operationalized through a commitment statement or measurable target regarding the desired future state of nature. An example of a company-level target for the state of nature could be "*The richness and relative abundance of priority species and the extent of natural ecosystem within our sphere of influence have increased by X% by 20XX relative to a 20XX baseline*", which would then need to be disaggregated into contextualized place-based targets as relevant for different sites and biomes. Transformative actions then sit within a logical theory of change (e.g., using a state-pressure-response framework (Figure 5)), with a strategic and evidence-based approach for meeting interim targets (i.e., abating pressures) and delivering positive outcomes (i.e., absolute improvements in the state of nature).

Within this theory of change, it may be useful to first consider the scale of company-level pressure abatement and nature recovery needed to achieve the target, then identify any barriers or enablers related to suppliers, supply sheds, industry partners or wider structural issues (i.e.., issues which cannot be addressed by private actions alone). For example, a company may need to source a certain volume of recycled content or achieve a certain percentage recyclability to achieve their pressure abatement targets, however barriers such as insufficient supply or technology may hinder progress. Similar, a company may wish to support ecological restoration

in a particular landscape, however there are other stakeholders within the landscape with whom cooperation and collaborative action is required.

Key concepts from the social change literature can then be applied to identify and plan coordinated and mutually reinforcing actions - including individual and collective actions, and across different scales – to enable transformative change.

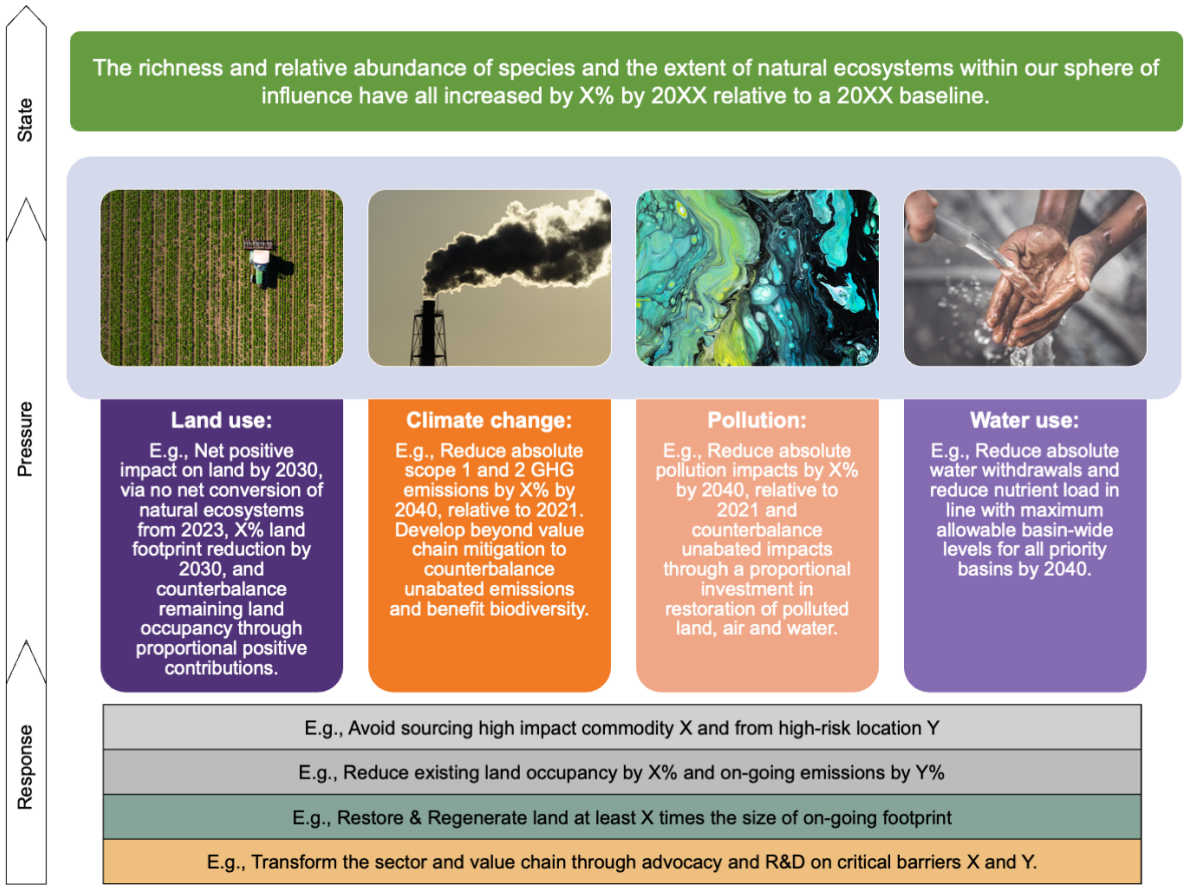

Figure 5 A simple theory of change with nested targets using a state-pressure-response framework, where the state target is based on positive outcomes for biodiversity, pressure targets are based on impact drivers (IPBES 2019), and responses can be organised according to a mitigation hierarchy of actions.

4.2 A framework for planning transformative actions

Naito et al. (2022) summarize individual-oriented and structurally-oriented insights on social change to offer an integrated framework for how private, social, and collective actions can synergistically interact to drive transformative social change[18] (Figure 4). Drawing on and adapting this framework, with a specific focus on a Nature Positive societal goal and companies as the main unit of analysis, we describe three classes and three scales of mutually reinforcing actions for promoting transformative change towards a Nature Positive future (we note that companies themselves comprise groups of individuals with their own goals and motivations, however the individual-oriented approaches summarized in Naito et al. (2022) can be equally

applied to groups of individuals[18,34], particularly those with common values, incentives and goals, where it can be assumed that all individuals within a company have consented to work towards the common goal(s) of the company[35]). We then summarize these classes and scales of action into an operational framework for guiding suites of transformative action by companies, and suggest how SMART targets (i.e., specific, measurable, assignable, realistic, time-bound)[36] could be set and monitored to promote ambition, integrity and accountability.

4.3 Classes of action to promote transformative change

The range of possible company actions that are relevant to transformative change can be divided into three categories: private actions, social-signaling actions, and collective actions[18] (Table 1).

4.3.1 Private action

Private actions are those which a company conducts to reduce their own impacts on nature, including developing corporate biodiversity strategies which abate and counterbalance pressures, and ensuring NNL for contemporary attributable impacts [19]. It also includes efforts to integrate social safeguards, such as committing to NNL or net gain (NG) for local people when mitigating biodiversity impacts[31]; and mainstreaming nature throughout key business functions and governance systems, such as bonuses for senior executives that are linked to biodiversity outcomes[37]. These actions can incidentally contribute to shifts in patterns of supply and demand (particularly for companies with large market shares, or finance companies using shareholder activism[38]), however if implemented alone they do not necessarily address structural problems or change the system[18].

4.3.2 Social signaling action

Social signaling actions are those which a company conducts to publicly signal their opinions and position on biodiversity. These actions can result in diffusion of innovation and network effects via opinion leaders and social tipping points, where other companies are engaged to follow suite [39–41]. Examples include: publicly sharing biodiversity goals and strategies, disclosing impacts and progress towards delivering goals (e.g. Task-force on Nature-related Financial Disclosures (TNFD)), public-facing corporate pledges (e.g., naturepositive.org, the finance for biodiversity pledge), and publicly displaying certifications as part of brand image[42]. These actions can contribute to spreading norms and practices aligned with societal goals for nature, and may encourage investment from and cooperation with like-minded companies[43]. Social-signaling actions have the potential to change norms, which can inspire others within a companies' spheres of influence or wider social network[18].

4.3.3 Collective action

Collective actions are those in which companies collectively engage with the intention of addressing structural barriers and opportunities, such as developing infrastructure and technologies (and promoting access thereof), or changing institutions, sectors, laws, and policies. For example, The Fashion Pact aims to accelerate sector-wide and value chain-wide adoption of sustainable practices via the largest collective virtual purchasing power agreement in the fashion industry[44], while Tetra Pak are investing in trials to remove aluminum layers from their packaging, which would dramatically improve recyclability for the sector[45]. Similarly, the World Business Council for Sustainable Development (WBCSD) recommends that companies advocate for policies to level the playing field on business action for nature[23]. These actions can influence the private actions of many other companies, creating rippling effects which drive systems change.

Table 1 Summary of the three classes of action that businesses can undertake for transformative change towards a nature positive future (based on Naito et al. 2022)

Class	Explanation	Examples
Private	Actions that a company privately conducts to reduce their own impacts on nature. Can incidentally contribute to shifts in patterns of supply and demand, though do not necessarily create intentional ripples that address structural problems.	Developing and implementing corporate biodiversity strategies which strictly adhere to the mitigation hierarchy to deliver NNL or NG for contemporary attributable value chain impacts. Transforming key business functions towards nature positive.
Social signaling	Actions that a company conducts to publicly signal their opinions and position on biodiversity loss. These actions can contribute to spreading social norms and practices aligned with societal goals for nature. Social-signaling actions have the potential for changing norms, which can inspire other actions and companies within a companies' spheres of influence.	Publicly sharing biodiversity goals and strategies and disclosing impacts (positive and negative) and progress towards delivering goal; signing up to public-facing corporate pledges (e.g., Finance for Biodiversity Pledge, Business for Nature's "Make it Mandatory" campaign)
Collective	Actions that companies engage in collectively, with the intention of changing laws, policies, institutions, sectors, infrastructure, and technology. These actions can drive broader system change	Industry-wide pacts and purchasing power agreement (e.g., Fashion Pact); R&D to address major constraints in current practices (e.g., Tetra Pak packing R&D); collectively advocating

	and indirectly influence individual behaviors of many other companies in up- and down-stream value chains through systems changes (e.g., new policies, institutions, infrastructures, and practices).	for new policies and regulations (e.g. BfN and WMBC joint policy recommendations); collectively boycotting certain high-impact commodities, practices, or suppliers; industry-wide collaborations to develop new biodiversity-friendly technologies and infrastructures

4.4 Scales of action to promote transformative change

As well as types of actions, it is helpful to think about scales of action, which go beyond, build upon, and complement company-level private actions (Table 2). This is because action for nature must scale up within sectors and scale out across geographies and value chains to guard against leakage and market splitting (e.g., wherein only the most progressive actors adopt nature commitments, with committed companies sourcing from suppliers with good performance, and uncommitted companies continuing to purchase commodities which drive biodiversity loss)[33]. The scales of action – in increasing order of geographic reach - can be broadly grouped into company scale, land/seascape scale, and sectoral and value chain scales. At all scales, complementary actions from other actors - such as governments, consumers, investors, and civil society – are required. Actions of others are typically beyond the direct control of an individual company, however companies can use individual or collective influence and purchasing power, and, by engaging in multiple classes of complementary actions across these scales (Table 1), network effects and tipping points may be achieved.

4.4.1 Company level transformation

Company level transformation refers to actions which abate pressures on nature in absolute terms and decouple a company's value chain from negative impacts on nature. This includes direct changes to production and procurement processes, as well as changes in norms and decision-making within which production processes are embedded. Examples of changes in production and procurement include: transitioning to full circularity, to maximize the reuse of resources and eliminate biodiversity impacts associated with raw material extraction[46]; decarbonizing energy supply through a transition to renewable energy sources; or implementing SBTs to abate pressures in line with societal limits. Examples of changes in norms and decision-making include rewarding biodiversity outcomes within the company (e.g., executive

bonuses linked to environmental outcomes [47]) or within the value chain (e.g., to create performance-based market incentives for good practice/outcomes [33]).

4.4.2 Land/seascape transformation

Land/seascape transformation recognizes that companies are frequently one actor among many within a land- or seascape, within which there are competing demands for space to support biodiversity, climate and wellbeing goals [48]. Moreover, impacts created by a single actor in one place can have diffuse impacts the wider land/seascapes and other stakeholders within them. For example, there are trade-offs between land use for food (which is necessary to support the wellbeing of a growing population) and sparing land for nature. When seeking to reconcile the two at the landscape scale, there are further trade-offs between intensification and extensification of agriculture, where some species are more likely to thrive in situations where there is a smaller area of intensive agriculture and more natural habitat, while others thrive in more extensive areas of wildlife friendly agriculture [49,50]. As such, there is a need for context-specific multi-scale approaches that can meet multiple goals [51,52]. For example, a study in farmland-dominated landscapes in lowland England suggested that a combination of high-yield farming, natural habitat, and low-yield farming could result in better biodiversity outcomes for birds than either land sharing or land sparing alone [53], and would also support food production and economic outcomes for farmers and landowners.

These trade-offs can create risks for companies if their negative actions are exacerbated, or positive actions undermined or diluted, by the actions of others, which can be particularly risky in contexts of weak governance or where impacts are diffuse or difficult to attribute[14]. Moreover, the magnitude of influence of an individual company over land/seascape scale decisions may be small. These challenges underline the need for collaborative approaches to reconcile competing demands for space and resources, whilst also delivering biodiversity outcomes at scales that are meaningful for nature recovery[14,33,54] and supporting social justice.

Actions to support land/seascape transformation include engaging in integrated land/seascape initiatives, which strengthen governance through multi-stakeholder platforms [55,56]. This aligns with jurisdictional approaches to biodiversity, which promote positive outcomes at a jurisdictional level, through formalized collaboration and coordination between government, civil society and/or the private sector[57] (Table 2). For example, companies could support cumulative and strategic environmental assessments and systematic planning; collect and share data; fund participatory monitoring; and provide capacity and resources to de facto landowners and managers, especially local communities, to engage with and address the

drivers of biodiversity loss. Existing examples include incorporating First Nation values and cumulative project impacts into regional development planning in British Columbia [58]; supporting sustainable development, nomadic livelihoods, and conservation in Mongolia [59]; and identifying strategic and least cost 'solar energy zones' for deployment of solar energy development in southwestern USA [60]. Importantly, integrated, and cumulative landscape-scale planning can help to secure procedural and distributional justice for indigenous people and local communities (IPLCs) who may be impacted by business activities, by thinking beyond the project scale and drawing together potentially affected stakeholders.

The importance of land/seascape-scale engagement in abating business pressures on biodiversity and creating transformative change is explicitly acknowledged by the Science-Based Targets Network (SBTN) in version 1 of SBTs for land, including a specific target on landscape engagement (Target 3) which "promotes company engagement in the transformational processes necessary to realize landscape objectives." [29]. This target includes efforts to increase the ecological integrity of priority landscapes and restore ecosystems in agricultural areas taken out of production to meet land footprint reduction targets.

4.4.3 Sector and value chain transformation

Sector and value chain transformation recognizes that, while a company-level action to reduce impacts may seem logical at the scale of a company footprint, the overall effect depends on the actions of others in the sector and value chain (Box 1)[14,33]. For example, a food and beverage company may commit to becoming 'palm oil free' to avoid associated deforestation and biodiversity risks. However, if doing so does not reduce the overall amount of palm oil in production, nor reduce deforestation and biodiversity loss associated with palm oil production, there will be no positive outcome for society [61]. To address this, businesses can engage at sectoral scales through industry roundtables (e.g., the Roundtable on Sustainable Palm Oil), or with specific nodes in their value chain, for example to change the behaviour of producers and suppliers to implement zero deforestation standards, and thus increase the overall total quantity of certified commodities and meaningfully decrease deforestation in target landscapes [14,61–63].

Sector and value chain transformation also recognizes that there may be technological, infrastructural, economic, and political barriers to adoption of processes or practices that are beneficial for nature. One example is limitations in current supply of recycled metals, where efforts by one company to increase their use of recycled content may limit the ability of other companies to do the same, with a need for improvements in the functioning of secondary

material markets via efficient recycling policy mixes to increase overall supply [30]. Businesses could engage with others in the sector, and petition governments, to agree standards, establish demand and price premiums, and either directly invest in - and/or encourage governments to invest in - research and development (R&D).

Finally, sector and value chain transformations should acknowledge that different sectors are often inter-linked (e.g., mining and agriculture require energy) with complex telecouplings between distant places and sectors [28], such that private company actions and even entire sectoral or landscape transformations can result in displacement effects and unintended consequences for other sectors. Examples of these types of knock-on effects include EU energy policy driving land use change in the Brazilian Amazon due to increased demand for biofuels, and demand for electric transport driving increased mining impacts due to the need for precious metals for batteries [64,65]. As such, the scope of a sectoral or land/seascape transformation may depend upon or be limited by the transformation of another sector. Possible solutions are for businesses to reduce their value chain impacts in absolute rather than relative terms (i.e., to reduce total impacts against a static baseline, rather than per unit of production or relative to a counterfactual of future growth), and to commit to decoupling growth from resource use (e.g., via circular economy strategies, with reuse, repair, and recycling in mind) or ultimately degrowth. Businesses could also petition governments – for example regarding green energy supply - in jurisdictions where they operate.

Table 2 : Three scales of transformative action that businesses can undertake towards a nature positive future

Scale	Explanation	Example business actions	Example of complementary actions by others
Company	Actions that abate pressures in absolute terms and decouple corporate activities from negative impacts on nature. Includes direct changes to production processes and changes in norms and governance within which production processes are embedded.	Commit to full circularity, to decouple from raw material extraction, and full decarbonisation. Adopt governance structure which rewards nature recovery alongside profit.	Other companies increase supply of goods and services that make business model transformations possible. Individual companies could facilitate through market incentives or investment in R&D.

Land/seascape	Actions taken to ensure that private company actions for nature at a given site contribute to societal goals at a jurisdictional level, rather than spatially or temporally displacing impacts.	Support integrated land/seascape initiatives or participate in jurisdictional approaches.	Local government coordinates landscape-scale planning with participatory monitoring from civil society groups. Individual companies could facilitate participation of others through offering funding.
Sector and value chain	Actions taken to ensure that private company actions contribute to sector-wide, value chain-wide and societal change rather than displace impacts to other actors, land/seascapes, or sectors; and actions to address sector-level barriers and reach 'critical mass' tipping points.	Commit to degrowth. Engage with industry roundtables to increase sector-wide adoption of mitigation practices. Investing in or test new technologies. Analyse potential feedbacks and knock-on effects of actions and engaging with other sectors to avoid them. Encourage business schools to include training on nature for future business leaders.	Governments repurpose subsidies to support technology and infrastructure innovations. Other companies petition or lobby governments to facilitate action. Other industries and value chains, especially energy, also commit to Nature Positive/a green transition. Adjacent sectors – such as finance and education – embed norms towards nature recovery.

4.5 Combining complementary actions at multiple scales

Combining these different types of actions across scales provides a useful conceptual framework for planning a suite of transformative actions towards a Nature Positive future (Figure 6, Table 3), where the specific actions that any one company could initiate and support will vary depending on the type of company, available levers for change, and priority goals that are most relevant[1,2] (Table 3).

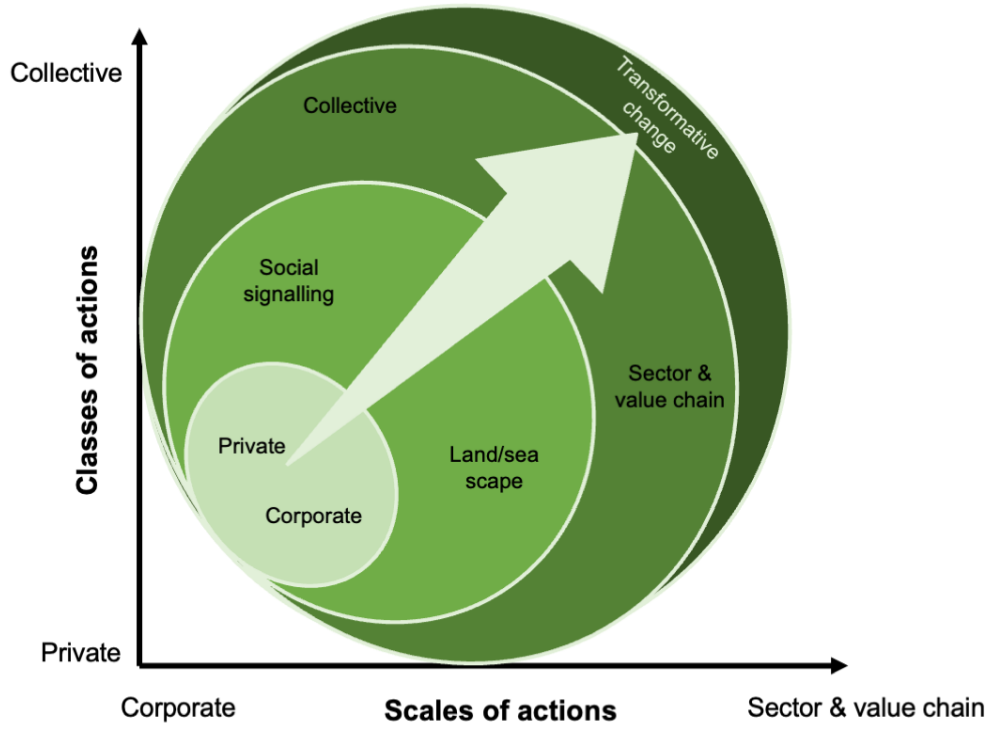

Figure 6 A conceptual diagram of expanding classes and scales of actions, which businesses can implement along with other actors, to create change at a societal scale.

Table 3 : A conceptual framework for companies to identify and combine actions towards a nature positive future, with case study examples for a food retailer and a mining company

		Private	**Social signalling**	**Collective**
Food retailer	**Company**	Make company-level commitment to abate pressures and proportionally contribute to nature recovery; adopt science-based targets for zero conversion of natural ecosystems and footprint reduction.	Publicly disclose and track progress towards company commitment.	Require all suppliers to develop science-based targets, adopt best practice standards and social safeguards, and make their own nature positive commitments.

	Landscape	Engage with systematic and participatory landscape planning (e.g., as part of subnational jurisdictional approach) and develop landscape engagement targets with meaningful biodiversity outcomes at landscape scales.	Publicly disclose and track progress towards landscape-scale targets.	Advocate for mandatory science-based target setting at the landscape scale within jurisdictions of operation and ensure smallholder landowners are appropriately incentivised/compensated for any opportunity costs.
	Sector and value chain	Engage in roundtables with other food companies to secure sector-level adoption of science-based targets; ensure that unsustainable sourcing doesn't shift to other sectors and landscapes.	Publicly disclose and track progress towards sectoral/value chain commitments.	Advocate for mandatory science-based target setting and robust disclosures for the sector; join industry roundtables and promote cross-societal initiatives towards a just transition; promote open joint R&D in sustainable intensification.
Mining company	**Company**	Make company-level commitment to proportionally contribute to nature recovery; ensure biodiversity net gain for all mining operations by implementing best practice standards.	Publicly disclose and track progress towards net gain commitments.	Transition towards establishing mining operations in countries/jurisdictions with large share of renewable energy mix., and with clearly enforced/complied with environmental legislative frameworks.

Land/seascape	Facilitate or contribute to a landscape-scale plan as part of impact mitigation and offsetting, so there are overall positive outcomes for the landscape; extend proportional responsibility to indirect impacts of mine site development as well as direct impacts.	Collect, share, and publish biodiversity data at landscape scale together with other stakeholders, for transparent tracking/sharing of implementation of landscape plan.	Advocate for landscape-scale net gain policies as part of land use planning within jurisdictions of operation and move jurisdiction if meaningful progress is not made; conduct R&D into poorly understood impacts (e.g., ecotoxicity).
Sector and value chain	Invest in technologies that promote recyclability, recycling, and circularity across the value chain and sector.	Openly share data on mine impacts and encourage sector-wide transparency and benchmarking initiatives which could incentivize improvements across the sector due to reputational risk.	Advocate for laws on mandatory net gain with social safeguards for the whole mining sector.

4.6 Implementation considerations

Overall, this classification outlined the different kinds of actions that companies can take, as individual organizations and collectives, not only through changing company policies and practices but also through engaging in actions at broader scopes and scales for societal effects. It is important to emphasize that achieving transformative change requires implementing different mutually reinforcing classes and scales of action simultaneously, within a wider theory of change for delivering positive outcomes for nature.

4.6.1 Promoting integrity and innovation

To promote integrity and guard against greenwashing, we recommend the following safeguards.

First and foremost, companies should prioritize addressing issues that are most closely related to their impacts (e.g., informed by a materiality and/or value chain assessment[24,29]), and commit to private actions which can defensibly achieve NNL or NG for contemporary attributable impacts. While private actions alone cannot be considered transformative, they are a prerequisite to meaningful social signaling and collective action, which otherwise could be considered a distraction from addressing primary nature-related impacts [25].

Importantly, social signaling and collective actions cannot be used to counterbalance biodiversity impacts, since equivalence between losses and gains is not demonstrable [66]. However, collective actions may later materialize into measurable biodiversity outcomes that are attributable to a company via impact abatement or nature recovery benefits (e.g., by leading to new consumer norms with more demand for lower impact products; stricter nature-related regulations for suppliers and manufacturers; or positive outcomes within supply sheds, all of which could measurably reduce the impacts of the company's value chain).

To guard against leakage, actions at land/seascape and value chain scales are the next highest priority once clear, tangible, and measurable private commitments have been fulfilled. To guide this process, companies could conduct supplier and land/seascape risk and opportunity assessments to decide whether to 'stick or twist' (i.e., stay and engage, or switch suppliers/sourcing locations) (Figure 7). This could be based on assessing the strategic importance of a supplier or location for the company (e.g., in terms of procured volumes or financial value of the commodity to the company) alongside the willingness to or feasibility of engaging in meaningful action (Figure 7). Those which fall into the high importance-high feasibility category could become key partners for driving transformative change, while those which fall into low importance and low feasibility could be phased out. Those which are high importance but low feasibility may require longer-term engagement strategies and incentive structures to move them along the nature positive journey (Figure 7).

Investments in R&D can also be implemented to promote transformative change, and these could be treated similarly to social signaling and collective actions to promote innovation whilst guarding against greenwashing. That is, actions to invest in R&D do not count towards impact mitigation until impact abatement or recovery benefits from new technology are realized in terms of outcomes. However, if R&D innovations are included in companies' long-term targets and projected pathways to Nature Positive contributions, a risk rating could be estimated based on the predicted likelihood of the technology or innovation being realized and used to discount any speculative biodiversity outcomes accordingly. This would be in line with existing good practice for biodiversity offset risk multipliers [67].

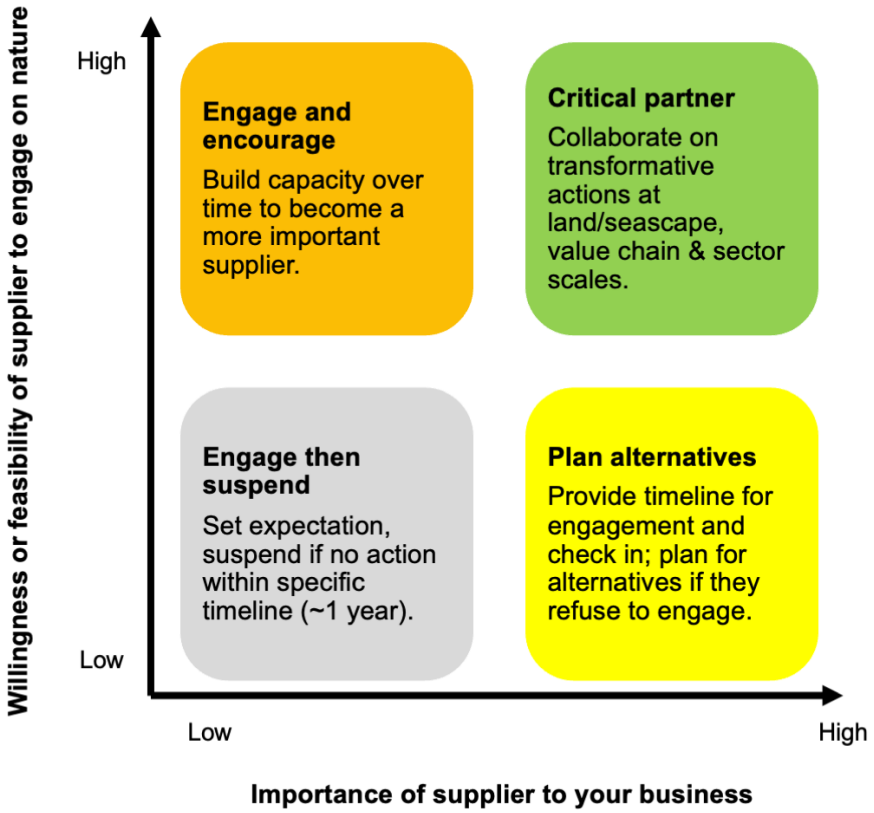

Figure 7 A simple decision matrix for supplier engagement strategies towards transformative change

4.6.2 Integrating social justice

Incorporating all aspects of socio-ecological systems is a key principle of nature positive (Figure 2). This means ensuring safe and socially just processes and outcomes, investing in people's capacities, working to address historic and structural injustices, and integrating a human-rights approach into business models and actions [37,68,69]. Practical examples include ensuring free, prior, and informed consent (FPIC) of IPLCs for any nature-related business actions that may influence them, and ensuring project-affected persons are no worse off and ideally better off because of business actions [31,70].

Forum for the future outlines a business transformation compass for working to adopt a just and regenerative mindset [37], which aligns with Nature Positive, and emphasises that social justice and nature recovery are intrinsically linked, since inequality and injustice exacerbate the degradation of nature and vice versa [12]. This means social justice is not considered an afterthought in the context of transformative change towards nature positive, but rather an integral part of a just transition. The compass highlights how shifting from a 'risk mitigation' to a 'just and regenerative' mindset can help companies to transform business functions and systems to deliver changes needed for biodiversity, climate, and people.

4.6.3 Setting targets for transformative actions

As illustrated, actions beyond companies' direct sphere of control should not be regarded as optional extras, but rather a core and necessary part of a Nature Positive commitment. Nevertheless, since some types of actions for transformative change relate to development of new and untested approaches (and can therefore be intangible and difficult to measure) or require collaborative action (are therefore not entirely under the control of the company implementing them), companies may be reluctant to set specific transformation targets. Similarly, stakeholders may be concerned about the potential for vague and misleading claims or over-optimistic reliance on unproven approaches, with parallel concerns from companies about perceptions of greenwashing [25]. One solution, as outlined above, is to ensure targets for contemporary attributable impacts are set alongside transformation targets. Then, drawing on existing disclosure frameworks and guidance, the following guidelines could help companies set credible transformation targets:

1) Develop an outcome-based commitment, which is operationalized through a measurable target for the state of nature and underpinned by a logical theory of change. The theory of change should demonstrate how actions will halt declines, promote recovery, and drive transformative change; and incorporate any risks and assumptions.
2) Include an evidence-based and ideally quantitative assessment of risk, particularly for any new or untested technologies, with precautionary risk-multipliers and/or discounting factors applied to estimate future outcomes which rely on new or unrealized approaches.
3) Develop SMART targets, which focus as far as feasible on anticipated changes in the state of nature or key pressures. For example: "abate absolute pollution footprint associated with commodity/component Y by X% as a result of open and collaborative R&D". Where outcomes are not measurable in the short-term, companies could set targets around meaningful process indicators which logically lead to outcomes (as per 1) (e.g., invest X% of CAPEX on nature positive technologies) or apply risk multipliers and discounting (as per 2).
4) Contextualize targets to indicate the scale of the contribution relative to company impacts and the landscape, sectoral or global need; with targets set within an order of magnitude of the societal challenge (e.g., % financial contribution towards cost of 30% landscape-scale protection and restoration target, relative to total revenue or profit derived from business activities within the area and relative to other landscape actor's contributions).

5) Disclose and publicize progress on transformative actions alongside progress against actions to mitigate direct attributable impacts.

5 Outlook

We have proposed a framework to support companies to develop transformative actions for contributing towards a Nature Positive future, which is grounded in robust social science theory and empirical evidence. We have also offered suggestions on how the framework could be implemented to promote integrity and innovation, whilst guarding against leakage and greenwashing. While driving transformative change may be considered too vague or ambitious for a single company to meaningfully contribute towards, we have shown that actions towards transformative change are definable, operationalizable, feasible, measurable, and not only optional extras but a core and necessary part a Nature Positive commitment. Moreover, the leading role of business in other societal goals that require collective action and extended accountability – such as ending modern slavery or ensuring a living wage – show that progressive companies can and do implement social signaling and transformative actions to drive social change [71,72].

We call on forward-thinking companies to pilot our framework for designing and prioritizing actions towards transformative change, in alignment with setting SBTs for nature, response metrics for TNFD and other legal and voluntary disclosures. Actions and target-setting require practical application and testing, to understand the extent to which individual company actions scale up and can be attributed to transformative change and societal outcomes. We hope this will drive further uptake and implementation of transformative action, which can facilitate the transition towards a safe, just, and Nature Positive future for all.

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