

BRIEFING PAPER:

DELIVERING MORE BY INSETTING THROUGH NATURE-BASED SOLUTIONS

**LOOKING BEYOND CARBON, TO SUPPORT SUPPLY CHAIN RESILIENCE, MITIGATE IMPACTS
AND ENSURE BENEFITS FOR NATURE AND PEOPLE**

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STATEMENT OF PURPOSE

This briefing paper explores the concept of 'insetting' strategies in land-based natural raw material supply chains, and how insetting with nature-based solutions (NbS insetting) can increase integrity, deliver benefits beyond carbon, and address risks and opportunities related to climate, nature and people. Building on existing guidelines, we explore characteristics of high-integrity insetting and highlight the need for collective action on developing a rigorous, standardised, accountable insetting framework.

The paper was developed by Nature-based Insights – a social venture spin-out of the Nature based Solutions Initiative, University of Oxford – and WWF, as part of the Nature-based Solutions Accelerator and under the Climate Solutions Partnership, a philanthropic programme between HSBC, the World Resources Institute and WWF-UK

EXECUTIVE SUMMARY

Within global supply chains, there is untapped potential for enhancing biodiversity, improving people's lives and achieving net zero goals. Insetting with nature-based solutions (NbS insetting) provides one approach to help realise this potential. We set out key recommendations for corporates, financial institutions, academic and non-governmental organisations. We invite organisations to explore NbS insetting and welcome feedback on this briefing paper to further develop and strengthen the concept.

NbS are defined by UNEA as actions to protect, conserve, restore, sustainably use and manage ecosystems, which address social, economic and environmental challenges, and simultaneously provide human well-being, ecosystem services and resilience and biodiversity benefits. **NbS offer strong potential to simultaneously tackle the nature loss and climate change crises, meet Sustainable Development Goals and support human wellbeing – also known as the triple challenge.** NbS have gained momentum in recent years and are formally recognised as a mechanism to address nature loss, climate change mitigation and adaptation in international treaties, including the [Global Biodiversity Framework](#) and the [UN Framework Convention on Climate Change](#).

The concept of insetting has also been gaining momentum within the business and financial sectors. Where offsetting typically refers to companies investing in projects elsewhere to compensate for their carbon or biodiversity footprint (projects occur outside the company's

own operations or supply chains), insetting should involve companies taking action to mitigate and address these impacts directly within the landscapes associated with their supply chains. This would be classed as scope 3 emissions or removals in carbon terms, i.e. those indirectly generated throughout companies' supply chains. However, insetting to-date has generally focused only on carbon, and the integrity of the approach remains uncertain. **Broadening out from a carbon-focused approach to include impacts on nature and human wellbeing has the potential to yield multiple benefits. An approach we refer to as NbS insetting in this paper.**

High-integrity NbS insetting can enable companies to contribute to global goals and build ecological, social, and economic resilience within their own supply chains and associated landscapes, mitigating their material business risks. A high-integrity approach should follow the mitigation hierarchy, be measurable, ecologically sound, support human wellbeing, and align with science-based trajectories to net zero. Various definitions, standards, frameworks and guidelines aim to ensure the integrity of NbS, yet more work is needed to apply these in the context of insetting.

When implemented with integrity, organisations that apply NbS insetting within the landscapes associated with their supply chains will find it easier to meet disclosure requirements and align with corporate frameworks relating to net zero and nature

positive commitments. Frameworks include science-based targets for nature (SBTN); the Forest, Land and Agriculture Science-Based Target-Setting Guidance; reporting standards such as the International Sustainability Standard Board (ISSB), the Global Reporting Initiative (GRI) the Carbon Disclosure Project (CDP); voluntary or mandatory disclosure frameworks such as those of the Taskforce on Climate-Related Financial Disclosures (TCFD), the Taskforce on Nature-Related Financial Disclosures (TNFD) and various existing and upcoming mandatory environmental and social due diligence such as the European Corporate Sustainability Reporting Directive (CSRD); and other corporate reporting standards.

NbS insetting should not be an add-on, but a part of core business operations to yield maximum benefits. The approach should be integrated into operating and financing models and requires high-level buy-in and coordination between different departments, such as procurement, product design and risk management. While the potential benefits are significant, NbS insetting poses various challenges that require collective and ongoing action to address, including traceability and transparency, limited control over supply chain operations, financial constraints, and internal coordination.

Insetting should involve companies taking responsibility for their own supply chains, while recognising that NbS are best applied at a landscape level. Therefore effective NbS insetting requires collective action involving

multiple stakeholders, including communities and producers, and other companies who source from the same production landscape. It is crucial to highlight the critical importance of working with local communities and Indigenous People: all NbS should empower and support the capacity of communities to design, manage, and monitor NbS activities.

Organisations implementing NbS Insetting will need to consider the claims they can make on their landscape investments and outcomes. ISEAL provide guidelines on collective, proportional and attribution claims and basic steps to apportion outcomes.

Investment in NbS insetting could help to fill the financing gap for nature and climate. However, while corporates and their financiers have a vested interest in supporting supply chain resilience, the commercial proof of concept for NbS insetting is still emerging. NbS require upfront and long-term financing. To drive NbS insetting at scale, all actors in the financial system will need to play a role, including banks and other lenders.



SECTION A: THE EVOLUTION OF INSETTING

OFFSETTING AND INSETTING AS DISTINCT CONCEPTS

Climate change, biodiversity loss and the related social poverty and inequality pose profound risks to the global economy and society.¹ But these risks could be mitigated by recognising that our society relies on more careful, sustainable stewardship of ecosystems.

Natural capital, sustained by healthy ecosystems, is increasingly understood as the single most important input to the global economy.² A clearer understanding of dependencies on nature³, as well as emerging global frameworks and growing awareness from consumers⁴, are building momentum for businesses to set ambitious nature commitments alongside their climate strategies. Frameworks such as the Taskforce on Nature-Related Financial Disclosures (TNFD) are gaining traction, alongside the International Sustainability Standard Board (ISSB) and Science Based Targets Network (SBTN) initiatives. As a result, company sustainability strategies and operations are increasingly aiming to align with the mitigation hierarchy and the AR3T action framework (see key concept: Mitigation hierarchy).

Simultaneously, concerns surrounding the integrity of the voluntary carbon market (VCM)⁵ and policies aimed at combating greenwashing, such as the UK's Environment Act, are leading businesses to question their use of offsetting strategies. Indeed, in response

Key concept: Mitigation hierarchy

The mitigation hierarchy, which aims to avoid, minimise, restore, compensate/offset for the environmental impacts of land use planning has been introduced, regulated by law and applied through various environmental policies in many countries and in corporate frameworks since the 70s⁵. For instance, the mitigation hierarchy is integrated into the International Finance Corporation's performance standard for due diligence financing. Similarly, [SBTN's AR3T](#) is a corporate action framework built on the mitigation hierarchy.

More recently, Maron et al. (2024) highlight the importance of incorporating the mitigation hierarchy into the concept of nature positive. These authors argue that "building on a foundation of full implementation of the mitigation hierarchy is essential for actions that benefit nature to be considered as genuine contributions to nature positive."⁶

to scientific and media scrutiny of the credibility of the VCM, the Voluntary Carbon Markets Integrity Initiative and the Integrity Council for Voluntary Carbon Markets have issued new guidance, but whether the new guidance will sufficiently address risks and uncertainties is yet to be tested.⁶

To adapt to the shifting regulatory landscape, maintain a social licence to operate and mitigate risks from supply chain disruptions, companies will need to prioritise actions that support sustainable development and reduce their impacts along their supply chains ^{7,8,9,10}

As a result, there is a growing interest in insetting.

Before exploring inseting further, it is important to understand why it is distinct to offsetting. Offsetting typically refers to funding projects that are outside a company's footprint to 'compensate' for residual impacts such as greenhouse gas emissions (e.g. carbon offsets) or environmental degradation (e.g. biodiversity offsets). Therefore, offsetting does not inherently require organisations to address their supply chain impacts on sourcing landscapes, and it is normally unconnected to a company's own operations – it could relate to entirely different sectors and be located far from the impact.

The mitigation hierarchy highlights that offsetting should not be used as a substitute for emissions avoidance or reduction at the source, but as a final step for addressing residual emissions. Historically, carbon offsetting has sometimes been used in lieu of decarbonisation efforts.¹¹ The emergence of biodiversity offsetting presents an additional challenge: biodiversity is place-based meaning any two units of biodiversity in two different places are not interchangeable, unlike units of carbon.¹² This means that biodiversity offsets cannot replace biodiversity that has been lost, although they can, if implemented effectively, result in a positive outcome for biodiversity conservation.

Inseting has the potential to address some of these concerns, as investments in supply chains and associated landscapes explicitly addresses organisations' impacts in line with the mitigation hierarchy by accounting for the location- and community-specific biodiversity and social values in that location. As such, NbS inseting has the potential to directly benefit businesses by increasing the ecological and social resilience of the

landscapes they depend on.

Key concept: What is the landscape associated with my supply chain?

Inseting takes place within supply chains and the landscapes associated with those supply chains. However, there is a lack of standardised guidance on what counts as being 'associated' with supply chain operations. Jurisdiction-scale approaches support consistency and ease of governance²³, but they may not account for the sources and flows of ecosystem services that support raw material production. The large-scale interconnectedness of nature means that delineating landscapes on purely ecological terms could lead to intractably large areas for companies to invest in. It may also beg the question 'when does inseting become offsetting?'

Landscape delineation will be a case-by-case process, and should be based on identifying tangible and measurable links between an organisation's impacts and dependencies and the landscape. However, further guidance and principles are needed on how organisations should approach this in a practical way. Guidance will also need to reflect practical considerations for project implementation so that local communities remain central to the governance process.

MOVING BEYOND A CARBON FOCUS

Though there is no formal definition, **the inseting concept has initially focused on carbon, with existing inseting approaches that emphasise land-based carbon reductions and removals** (Annex 1).^{13,14,15} While there is evidence of a broader application of inseting to nature and social impacts, these are often framed as 'co-benefits' instead of central components of an intervention.¹⁶ **Its scope can, and should, be broader and more holistic.**

Currently, there are a number of different definitions or interpretations of what insetting is and there are a few key differences between these (Annex 1). While in all cases robust methodologies are needed to measure carbon benefits, one difference relates to whether carbon reductions must be verified. Measuring and verifying carbon removals introduces rigour. Yet evidence continues to cast doubt on the integrity of many carbon credits used for offsetting, and most offsetting that occurs today is still not net zero aligned.^{17,18} Another difference is how they define the limits of the landscapes associated with a company's supply chains (see key concept: What is the landscape associated with my supply chain?). These differences, along with the lack of an agreed definition and a focus on carbon, open up the potential for insetting to lack integrity.

Alongside increased understanding of how our supply chains depend on nature, **a growing body of evidence shows the critical role of well-managed and complex agricultural landscapes in fostering ecological resilience and enhancing social and economic vitality.**¹⁹ This shows how

there is an untapped potential for insetting that goes beyond a carbon focus. Companies can use an insetting approach to advance actions with positive impacts for nature and people, whilst adhering to the mitigation hierarchy (Figure 2, Key concept: Mitigation Hierarchy). This may involve the use of credits as a tool for third-party verified impacts, as part of a rigorous Monitoring, Reporting and Verification (MRV) approach.

There is a need for collective action to develop a rigorous, evidence-based definition and governance of insetting. Given the lack of an agreed definition and the narrow focus of insetting to date, we propose looking to the nature-based solutions (NbS) framework when considering how insetting can be scaled in a high-integrity way. NbS are increasingly recognised as an effective way to deliver benefits for people and nature at the landscape scale.^{20,21,22} Insetting with NbS, or NbS insetting, would **involve organisations working closely with local communities to take actions to address the nature, social, and climate impacts, risks and opportunities within their supply chains and associated landscapes.**



SECTION B: NATURE-BASED SOLUTIONS FOR HIGH-INTEGRITY INSETTING

WHY NATURE-BASED SOLUTIONS?

As organisations are increasingly setting ambitious targets for climate and nature, NbS have gained momentum over the past few years, including recognition in the [Global Biodiversity Framework](#) and the [UN Framework Convention on Climate Change](#). NbS is an umbrella term for working with nature to deliver measurable benefits for nature, climate and people, helping to tackle the triple challenge (see key concepts: Nature-based solutions and the triple challenge).

NbS projects strive to balance trade-offs and promote synergies between multiple goals to generate measurable benefits for biodiversity, communities, climate and the economy.^{24,25,26}

There is a growing evidence base on the effectiveness of NbS for addressing societal goals, as well as meeting climate change mitigation targets.^{27,28,29,30,31,32} There is also increasing evidence that actions to protect, restore and better manage ecosystems, such as restoration of native vegetation along coasts, build ecological and social resilience and support adaptation to climate change.³³

Key concept: Nature-based Solutions

Nature-based solutions are defined by the United Nations Environment Assembly as:

*Actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems, which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services and resilience and biodiversity benefits.*³⁴

Key concept: The triple challenge

The triple challenge is about simultaneously averting dangerous climate change, reversing biodiversity loss, and supporting the wellbeing of a growing population. Action to address each of these issues is inherently dependent on action to address the others. The goals align to global agreements such as the UNFCCC Paris Agreement on Climate Change, the UN Sustainable Development Goals (SDGs), and the UN Convention on Biological Diversity. Taking a triple challenge approach recognises that failing to address climate change and biodiversity loss will jeopardise our future wellbeing and prosperity, including our food security.³⁵

Integrity in NbS is supported through an internationally accepted definition, guiding principles (nbsguidelines.info) and the ongoing development of a global standard.³⁶ WWF has published a [blueprint](#) on implementing high-impact and high-quality NbS for climate change mitigation. It is crucial to highlight the critical importance of working with local communities and Indigenous People: all NbS should empower and support the capacity of communities to design, manage, and monitor NbS activities.

It is important to note that NbS can be confused, or used interchangeably, with related terms such as Natural Climate Solutions. Climate change mitigation is one societal challenge to which NbS offer a response. Others include human health challenges, food security or, indeed, resilience to climate change impacts. Therefore, adherence to best practice guidelines on NbS is additionally important to ensure that biodiversity and human wellbeing impacts remain central.

SCALING NBS THROUGH SUPPLY CHAINS AND ASSOCIATED LANDSCAPES

Implementing NbS at scale is an important facet of meeting the triple challenge.³⁷ There are many factors to be considered including the required policy and technical shifts, effective governance and community participation and ownership.

One factor is financing. NbS require time and investment for good design and longevity, and traditional sources of finance, such as government

Key concept: Integrated landscape approach

While there is no universally agreed definition, an integrated landscape approach can be described as a strategy that engages multiple stakeholders in attempts to manage societal and environmental objectives at the landscape scale. This requires design, planning and ongoing governance to enable trade-offs and potential synergies to be identified for more sustainable and equitable land management. It recognises that activities within landscapes cannot operate in silos, and instead seeks to manage how different parts of a system interact and influence each other.

Adapted from [CIFOR](#) and [IISD](#).

funding and philanthropy, are currently insufficient. Alternative financing from private and blended sources are required at scale to meet the global goals outlined in previous sections.³⁸ While not all NbS are suitable for private financing, many projects that could be are not designed from the outset to benefit from private financing, for example through developing a business model with clear sources of revenue.³⁹

One potential way to address the challenges of scaling NbS is by integrating NbS into corporate operations and sourcing practices. This in turn links them to supply chains and associated landscapes, and to the practice of insetting.

For example, a company relying on raw materials could work with farmers to finance agroforestry practices to improve soil health, reduce carbon emissions and increase biodiversity, while also supporting resilience of supply and of the

farmers' livelihoods. An illustrative NbS inseting intervention is shown for a coffee supply chain in Figure 1. The voluntary and compliance frameworks outlined in Section A are further incentivising this integration. For example the TNFD Locate Evaluate Assess Prepare (LEAP) approach sets out how organisations should identify, assess, manage and disclose nature-related issues, which requires them look at their sourcing and supply chain activities.

Supply chains face direct exposure to the detrimental consequences of nature degradation. These include measurable financial losses due to disruptions in pollination, water availability, soil health and climatic stability,^{40,41} aggravated by disruptions arising from the erosion of 'nature's contributions to people' within communities close to the supply chain.⁴² The material risks are significant and comprehensive but high-quality NbS can mitigate these risks by enhancing delivery of ecosystem services, improving social cohesion and human wellbeing, and building social and ecological resilience.⁴³

Further, wider sustainable supply chain management can deliver cost savings to businesses by improving operational efficiency, securing raw material supply, avoiding regulatory penalties and encouraging innovation.^{44,45,46} Hence NbS inseting should not neglect complementary sustainable farming practices that are not formally designated as NbS, such as avoiding or reducing pesticide and fertiliser use (i.e., precision agriculture).

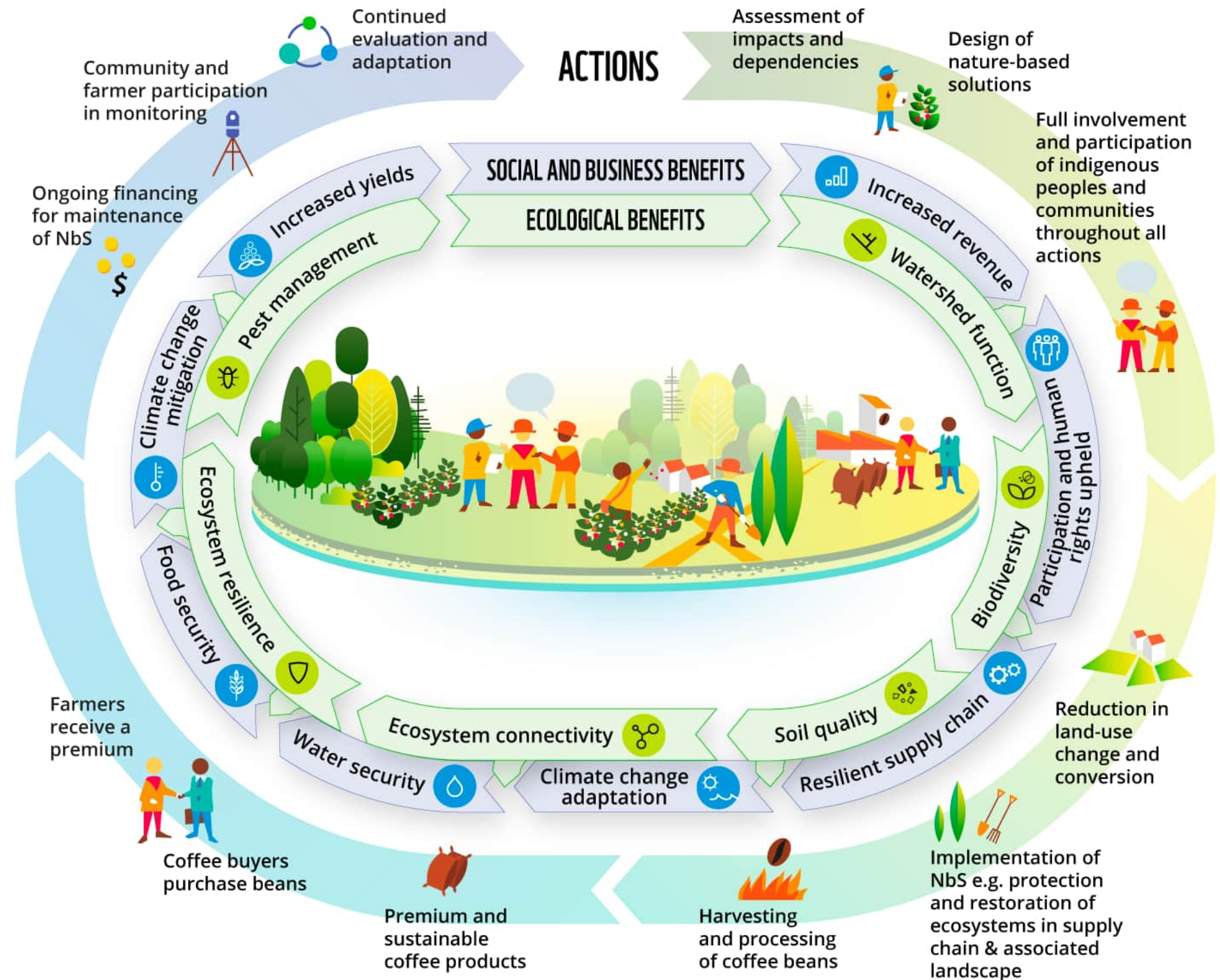


Figure 1. Figure showing NbS inseting and associated benefits for an illustrative coffee supply chain.

SECTION C: ACHIEVING HIGH-INTEGRITY NBS INSETTING

A high-integrity approach to NbS insetting should follow the mitigation hierarchy, be measurable, ecologically sound, support human wellbeing, and align with science-based trajectories to net zero. It would generate measurable benefits to biodiversity, climate, and to the wellbeing of local communities associated with a company's supply chain.

A high-integrity approach presents a significant opportunity for organisations to align risk strategies better with corporate frameworks for climate and nature.

The NbS framing has the potential to strengthen the integrity of insetting projects and associated outcomes and claims. Various guidelines exist to support the high integrity implementation of NbS projects, yet more work is needed to apply these in the context of insetting. Specifically, NbS should go beyond a direct operational footprint to respond to the context of the wider landscape.

In this section, we examine the opportunities and the challenges presented by NbS insetting. We also present a real-world case study of what a high-integrity approach looks like in a commodity supply chain in Thailand (Box 1).

We acknowledge that some actors may use the term insetting for approaches that lack integrity. Strict language when referring to what constitutes

a high-integrity approach, and clear guidance that excludes the use of offsetting, will help create transparency, maintain a holistic approach, and avoid criticism of greenwashing being levelled at those using an NbS insetting approach.

Designing an NbS insetting programme requires understanding the state of nature, associated risks and opportunities within a supply chain and associated landscape. It also requires setting specified targets against a baseline.

Within any complex system, challenges and potential trade-offs can increase the uncertainty of intervention outcomes.⁴⁷ Comprehensive monitoring, adequate resourcing and effective management approaches are needed to alleviate the risk of adverse and/or short-lived outcomes.

OPPORTUNITIES FOR IMPLEMENTING HIGH-INTEGRITY NBS INSETTING

While insetting can help achieve carbon removals within supply chains by aligning to a credible net-zero approach that follows the mitigation hierarchy,⁴⁸ NbS insetting should allow organisations to go beyond a carbon focus to address the triple challenge more effectively. The NbS framing focuses on the social and ecological

impacts of the supply chain, rather than seeing these only as co-benefits.

Additionally, NbS are most effective when designed to respond to a larger scale context, such as at landscape-level.⁴⁹ Therefore, NbS inseting will require collective action involving multiple stakeholders, including communities and producers, and other companies who source from the same landscape. This means taking an integrated approach to the impacts, risks and opportunities within the landscape associated with a supply chain, including how to manage potential trade-offs with food production and other land-uses, and respecting local knowledge and rights.

NbS inseting is strongly aligned with international corporate sustainability frameworks and can support monitoring of impacts and progress towards targets disclosed under TNFD, CSRD, and ISSB. It may also help organisations with efforts towards certification, for example relating to soil quality or deforestation- and conversion-free products.

For financial institutions, projects and clients adopting NbS inseting supports a holistic, high-integrity approach to identifying and assessing supply chain risks and impacts under TNFD. These risks include physical risks such as drought

or floods, and social risks such as human rights infringements and lack of community support.

NbS inseting is particularly valuable to ensure biodiversity impacts can be managed and minimised and, where necessary, addressed within the same location through nature restoration, protection and sustainable management. NbS inseting should incorporate the AR3T framework and mitigation hierarchy (Figure 2).



Figure 2. How NbS inseting aligns with the mitigation hierarchy for nature and the AR3T framework (note that an equivalent approach can be applied to social and climate impacts)

RISKS AND CHALLENGES FOR IMPLEMENTING HIGH-INTEGRITY NBS INSETTING

Companies and financial institutions wanting to implement NbS insetting need assurance that the solutions will be high-integrity, as does civil society, consumers, and other stakeholders. For this to be possible, various challenges and risks need to be addressed.

Table 1 outlines some of these key risks and challenges in the forest, land and agriculture sector. Many of these represent broader integrity concerns that are not unique to NbS insetting, but are examined here within the framework of NbS insetting. The last column in Table 1 makes some recommendations for management responses to mitigate risk and realise the opportunities NbS insetting presents. **These recommendations could form the beginnings of criteria for high-integrity NbS insetting.**



TABLE 1. NBS INSETTING: RISKS, CHALLENGES AND MANAGEMENT RESPONSES

RISKS AND CHALLENGES	DETAIL	GUIDANCE FOR MANAGEMENT RESPONSE
<p>Setting appropriate boundaries of the landscape associated with a supply chain (i.e. delineating the landscape)</p>	<p>It is important to set the boundaries of, or delineate, a landscape in a way that takes a company's impacts and dependencies into account.</p> <p>This is particularly important in the context of biodiversity and human wellbeing, which are spatially specific.</p> <p>Interventions limited to within the operational boundary of the supply chain can mean that important ecosystem service flows and interdependencies are not incorporated, and social and political systems are not accounted for. This reduces the quality of NbS and potential benefits from insetting. For example, any intervention to improve water quality and supply in a plantation could be ineffective without considering the activities and risks within the wider watershed.</p>	<p>As part of an assessment of impacts and dependencies, apply a systems-based approach to identify ecosystem interdependencies and flows of ecosystem services in the wider sourcing landscape, and adjust the geographic scope of NbS interventions accordingly.</p> <p>Landscape delineation and integrated landscape approaches are increasingly recognised as necessary for addressing the triple challenge instead of siloed sectoral initiatives (see key concept: What is the landscape associated with my supply chain?).</p> <p>In some instances, it may be difficult to justify where insetting ends and offsetting begins. This issue is closely tied to (i) how we define the landscape associated with a supply chain, and (ii) whether both impacts and dependencies are used to define this area of interest.</p> <p>Including dependencies has the potential to create confusion around what claims a business can make with regards to insetting, as a company is not mitigating or remediating the impacts from its own production system to address dependencies (e.g. improving water quality in a farm by implementing NbS activities upstream).</p> <p>There is a need for further guidance, which also related to requirements for claims (see row below).</p> <p>When it comes to addressing climate impacts, the Greenhouse Gas Protocol process to elaborate Land Sector and Removals Guidance is currently considering how it will clarify the boundaries of scope 3 in this context and will provide further guidance in due course.</p>
<p>Lack of supply chain traceability</p>	<p>Insetting requires knowledge of supply chain locations and operations (e.g., agricultural production practices, working conditions, etc.). A lack of traceability makes measuring and disclosing context-specific impacts challenging and weakens the business case for increasing supply chain resilience.</p>	<p>Companies should invest in traceability in a phased approach and in parallel with NbS. This means beginning with the most high-risk, high-materiality supply chains. They can also integrate supply chain transparency and the requirement to share location data into supplier codes of conduct. Traceability challenges and how they are managed should be clearly communicated and publicly documented.</p> <p>Although focused on carbon, the GHG Protocol recognises traceability challenges in its provision that "where primary data is not yet available, companies may be able to consider broader sourcing regions as part of their value chain."</p> <p>Policies like the EU Regulation on deforestation-free supply chains are accelerating progress on traceability to farm or plantation for forest-risk commodities.</p>

RISKS AND CHALLENGES	DETAIL	GUIDANCE FOR MANAGEMENT RESPONSE
Lack of transparency on supply chain initiatives	There is little publicly available detail on existing supply chain initiatives that focus on inseting or sustainability more widely. Public case studies are high level and lack detail on metrics, impacts and costs. This means there is a lack of transparency and accountability around reported impacts, and less opportunity for learning between actors.	Detailed case studies, with clear methodologies and metrics for impact, should be developed and made publicly available. For example, see the Consumer Goods Forum KPI reporting page . Companies should publish funding models along with commitments for scale, and conduct and share independent evaluations.
Supply chain locations can shift in response to upstream production patterns	Sub-regional landscapes may enter or leave a supply chain in response to upstream production patterns. Social and ecological systems are context-specific and inseting must be within supply chains, so regular shifting affects impact and risk management. This means inseting could become an offsetting project over time.	Companies can commit to sourcing from and investing in specific landscapes, building long-term partnerships with suppliers and supply chain communities, to minimise shifting and maximise resilience benefits from NbS investments. They may also choose to focus on key supply chains based on materiality (either for the business or on where they are best placed to create a positive impact).
The chain of custody in the supply chain affects the approach required	In some cases, a company can have control over supply chain operations due to its local market share or through direct ownership. In others, it may be using a by-product of a different supply chain or occupy a small portion of a local market; this shared responsibility complicates the governance and funding of inseting projects.	A chain of custody system helps monitor and track responsibility for supply chain operations, and should be an outcome of efforts to increase traceability. In landscapes where multiple buyers purchase from limited suppliers (e.g., corporates purchasing palm oil from Sumatra), inseting requires collective action mechanisms, often coordinated by independent organisations such as project developers. Buyers should be identified and engaged in the governance of inseting projects to agree on roles and responsibilities.

RISKS AND CHALLENGES	DETAIL	GUIDANCE FOR MANAGEMENT RESPONSE
<p>Corporate claims around inseting outcomes in landscapes</p>	<p>Companies want to understand the claims they can make around inseting projects and communicate these to both financiers and consumers. The quality and nature of these claims is a key indicator of a company's commitment to transparency.</p>	<p>Claims can be classified as collective, proportional or attribution.^{50,51}</p> <p>Collective action claims are the most broadly applicable, and acknowledge the roles of other stakeholders in achieving an outcome (e.g. "together we achieved..."). These can be qualitative (e.g. reported human wellbeing) or quantitative (e.g. soil health and carbon sequestration capacity). It is important for these, and all claims, to be made based on achieving the outcome.</p> <p>Proportional claims are a subset of collective claims where an organisation claims responsibility for specific outcomes within a collective action project. These might be required to avoid double counting of outcomes where quantities are needed for company disclosures (e.g., carbon removals from ecosystem restoration counted within scope 3 emissions). Caution needs to be applied in making proportional claims to avoid overstating a company's impact within complex landscapes where other stakeholders and external factors are driving change. Apportioning claims requires a high level of coordination and transparency within the project, and the measurement of specific outcomes related to actions.</p> <p>Attribution claims require a high degree of causality and rigour, as a company is claiming to be the sole actor in achieving an inseting outcome. They need to use counterfactuals to account for external factors (e.g. comparing the project's outcomes to an equivalent setting where the company isn't involved). This category of claim may be needed for counting results towards scope 3 (or equivalent) targets. However, there is currently an incompatibility between project methodologies, involving counterfactuals, for measuring carbon reduction or removals and the methodologies for corporate inventories, meaning technical solutions will be needed to make attributional claims in the land sector more achievable.</p> <p>Associated reported outcomes towards targets should accurately reflect what activities and results took place within scope 3 (or equivalent) boundaries, and what was outside. Results counted towards scope 3 emission targets should be limited to that delivered within a company's scope 3 boundary, and not include additional results based on offsetting, as per WWF guidance.</p>
<p>Participation, social safeguarding and upholding of human rights</p>	<p>Top-down and low-quality NbS may risk infringements upon land ownership and customary rights, in particular in relation to Indigenous peoples and traditional rights-holders. Lack of participation from communities within landscapes and affected by proposed interventions increases the risk of negative and short-term outcomes.</p>	<p>All interventions should be designed with the participation and <u>free, prior and informed consent</u> of Indigenous peoples and communities in the landscape, building a social licence and trust through the inception and ongoing governance of an NbS project.</p> <p>Robust <u>due diligence</u> and safeguarding procedures should be embedded into inseting strategies. This includes accessible and safe mechanisms for raising grievances and whistleblowing.</p> <p>See the WWF Environment and Social Safeguarding Framework and the IUCN Global Standard Criterion 5 for further important considerations.</p>

RISKS AND CHALLENGES	DETAIL	GUIDANCE FOR MANAGEMENT RESPONSE
<p>Credibility in managing trade-offs and synergies between climate, biodiversity and human wellbeing</p>	<p>Complex landscapes will always present challenges in managing trade-offs between climate, biodiversity and human wellbeing.</p> <p>Decision-making on trade-offs can result in adverse outcomes if there is a lack of community participation, data and due diligence/oversight. This can be exacerbated if organisations are disconnected from their sourcing landscapes.</p>	<p>Close collaboration, alignment of principles, and transparent data sharing from suppliers and project developers can support due diligence and decision-making on trade-offs.⁵²</p> <p>Community participation and robust monitoring can help ensure that trade-offs are evidence-based and uphold human rights (see above). Synergies can also be identified through ongoing monitoring.</p> <p>Periodic third-party reviews against standards for human rights, carbon removals and biodiversity gains (including against the IUCN Global Standard for NbS) can provide additional verification, though such standards are still emerging.</p>
<p>Internal buy-in and coordination</p>	<p>The departments leading the design and implementation of inseting strategies (typically sustainability teams) are not in charge of procurement or product design. Other departments may not understand the benefits of NbS inseting.</p>	<p>Coordinating departments should have executive buy-in, to ensure top-down oversight of company activities. A true cost accounting approach is needed, including externalities and the cost of shifting supply chains. This can inform a cost-effectiveness analysis of inseting, compared to responses driven solely by procurement costs and/or avoiding risks.</p>
<p>Using evidence-based decision-making processes</p>	<p>Environmental and social data is often lacking for commodity production landscapes outside North America and Europe. Global models are often not granular enough to provide a clear picture of local social and ecological dynamics. This makes evidence-based decision-making difficult, or risks making decisions from uncertain data.</p>	<p>Companies should combine multiple sources of information, from company data to primary field data and national/global datasets, to build a holistic picture of the socioecological systems they operate within (see Box 1 for example). This needs to be combined with a robust gap analysis of where data is lacking, to inform the design of monitoring and evaluation strategies that support data collection, claims around inseting outcomes, and internal and external communication.</p> <p>Several tools are available to support companies in this process (e.g., WWF Risk Filter, STAR, IBAT, inVEST, ENCORE, Nbl Analytics Model (see case study), Trase). TNFD provides a list of tools and datasets that can support the implementation of the LEAP framework.</p>
<p>Cost-effectiveness and financing</p>	<p>Though there is emerging data, the commercial case for NbS inseting needs demonstrating across diverse contexts (complex supply chains require significant further exploration). Current financing of supply chains tends towards shorter-term funding, such as receivables or invoice financing. This does not allow for capital investment and ongoing costs.</p>	<p>Financing mechanisms need to be suitable for the longer timeframes and additional resource requirements involved, e.g. sufficient resourcing for robust monitoring and evaluation. Financing should be integrated into the business case and supported by cost-effectiveness analysis to demonstrate the value of sustained financing flows (for example to avoid one-off pilot funding). See Section C for further discussion.</p>

BOX 1 CASE STUDY: WHAT MIGHT A HIGH-INTEGRITY NBS INSETTING PROJECT LOOK LIKE?

Reckitt, a global consumer goods company headquartered in the UK, collaborated with Nature-based Insights – a social venture spin-out from the University of Oxford – to apply the TNFD’s LEAP approach (Locate, Evaluate, Assess and Prepare). The company wanted to analyse the nature-related impacts, risks and dependencies within the upstream latex production landscape of its Durex supply chain in Surat Thani, Thailand.

A longstanding partnership between Reckitt and the Earthworm Foundation has delivered raw material supply chain transparency. As a result, Reckitt can trace its Durex natural latex supplies back to the farm level. A multistakeholder programme, led by Earthworm, has led to the creation of the Surat Thani Sustainable Rubber Association (SRA), which Reckitt pays a premium to as members of the Fair Rubber Association. Through training, capacity building and supply chain transparency, Earthworm supports latex farmers in the SRA to have more sustainable livelihoods through better agricultural practices and diversified incomes. Other key stakeholders actively engaged in the Earthworm-led latex programme, include local government branches of the Rubber Authority of Thailand, Fair Rubber Association and the Department of National Parks.

The desktop analysis led by Nature-based Insights helped Reckitt estimate the biodiversity footprint of its latex supply chain, including quantifying

the extent and integrity of key ecosystems, understanding carbon dynamics in the landscape, and identifying opportunities to protect, restore and increase connectivity of ecosystems. A **mixture of datasets** including best practice global tools (e.g., PREDICTS, IUCN databases, InVEST, GLOBIO 4, WRI Aqueduct tools), company data and primary field data were used to build a **multidimensional baseline understanding** of the landscape. This information is being used to help identify potential opportunities for forest protection, agroforestry and biodiversity restoration activities **following the mitigation hierarchy**, with a focus on activities that aim to build socioecological resilience through income stability, reduced vulnerability to climate change and pest impacts, and improved water quality.

This rigorous desk-based analysis informed a stakeholder consultation workshop to enable the development of a monitoring and evaluation approach for NbS on latex farms. A **monitoring and evaluation system** adapted to the local context addresses key knowledge gaps and assess socioeconomic, carbon and biodiversity outcomes of project actions. Within this project, **multiple stakeholders have been identified and engaged** to coordinate actions that increase yield and quality of latex, and increase incomes for the members of the Sustainable Rubber Association. With an important, traceable and relatively stable supply chain, supported by robust and transparent **social and ecological analyses**, Reckitt is able to identify

areas where it is best placed to create benefits for farmers that will ensure the supply of natural latex to the Durex brand is sustainable.

NbS in the latex production landscape offer opportunities to mitigate the impact of rubber production, which is traditionally monoculture, while supporting healthy ecosystem assets and ensuring the delivery of ecosystem services. With a stronger understanding of nature-related risks within raw material supply chains, Reckitt is strengthening the quality of its risk assessments and implementing solutions to future-proof the supply chain.

Through this work, Reckitt has piloted a process for analysing landscape-scale impacts, dependencies and risks in Natural Raw Material supply chains. The aim is to consistently apply this methodology in multiple supply chains, while tailoring it to local contexts. This has so far successfully been used to support stakeholder consultations and workshops with local NGOs, farmers’ cooperatives, research institutes and governmental organisations. Reckitt has committed to trialling this process in five natural raw material supply chains by 2025 to establish biodiversity baselines for its sourcing landscapes, assess the potential for implementing NbS, and monitor NbS activities implemented by local supply chain partners.

Reckitt is a partner of WWF UK, and early adopter of TNFD. Nbi developed Reckitt’s analytical framework and provides technical input to TNFD pilots.

SECTION D: FINANCING NBS INSETTING

While the potential benefits of NbS insetting are multiple, in order to scale, **NbS insetting also needs to be a financially and operationally sound business decision and not just a 'cost of doing business'.**⁵³

There is a significant financing gap for nature.⁵⁴ Investment volumes need to more than double by 2025 and triple by 2030 to keep global average temperature change below 1.5°C, halt and reverse biodiversity loss and achieve land degradation neutrality. Private sources of finance currently make up only 17% of total investment. Investment into NbS is increasing however, while recognising that not all NbS are appropriate for private financing, the commercial proof of concept for NbS is still emerging.^{55,56}

At the same time, the financing and wider resourcing requirements for NbS are often larger and more complex than for more common supply chain interventions, such as good agricultural practices.⁵⁷ For example, the design and implementation phases for NbS in supply chains can be substantial with upfront capital needed, followed by longer periods before returns on investment are achieved. Additionally, the costs of establishing a baseline and monitoring system are likely to be higher to unlock the additional resilience and environmental and societal benefits offered by NbS.⁵⁸

There are examples of private and blended financing mechanisms that can enable these outcomes,^{59,60} but these need further exploration

and application in different supply chain contexts and/or for NbS specifically. The mechanism needed will differ depending on factors such as the commodity in question, scale, jurisdictional context and investor risk tolerance. Novel financing approaches also need to explore fair risk-sharing agreements and enable community participation.⁶¹

Corporates and their financiers have a vested interest in supply chain resilience.⁶² Corporates in particular may be able to support NbS insetting projects at an earlier stage than other forms of private finance. Anecdotal feedback during the development of this briefing suggests that corporate investments can enable NbS project inception and proof of concept, paving the way for projects to build a business case and seek opportunities for private investment to enable scale. However, while corporate social responsibility and sustainability budgets that fall outside an organisation's core financial model may have catalytic value, these are likely to be insufficient for achieving impact at scale across supply chains. The costs and returns of NbS insetting need to be integrated into standard operating, which requires buy-in and coordination from multiple departments and business functions.

To drive the change required for NbS insetting at scale, all actors in the financial system will need to play a role, including banks and other lenders. **Long-term offtake agreements** (Box 2) are one area with potential for scaling NbS insetting, especially when combined with upfront financing to cover initial costs. Financial institutions, including

banks, would have a vital role in supporting clients to offer such agreements to their upstream suppliers, and many have internal commitments to support clients to transition to nature and climate positive policies. Additionally, sustainability-linked lending products can incentivise NbS insetting. These include preferential loans for companies that meet predefined criteria and impact targets. The Climate Solutions Partnership, a collaboration between HSBC, World Resources Institute and WWF, has outlined how financial products could support the transition to regenerative palm oil production, which can involve NbS in and around certified oil palm plantations (Box 3).

Importantly, private financing alone cannot respond adequately to all NbS financing needs, so a blended finance approach is likely needed.⁶³ Public finance, including from climate finance facilities, and concessional finance (provided on more favourable terms) from large corporate buyers or development banks, will play an important role in scaling NbS. These types of finance can de-risk private investments and provide more patient capital so that proof of concept and returns on investment can be demonstrated (Box 4).

NbS insetting has the potential to be strongly aligned to climate, nature and sustainable development targets and commitments set by corporate supply chain actors, including manufacturers and retailers, and the lenders that finance them. **This presents a key opportunity for integrating the financing of NbS insetting into core business planning**, highlighted in the opportunities in Section C and through the case studies outlined. Larger organisations could partner with small and medium enterprises in their

supply chains, which may not have the capacity to meet the recommendations of disclosure frameworks, such as TNFD, alone.⁶⁴

To enable this integration, NbS insetting projects need to be designed so that their measurement and reporting align with other reporting applications. The NbS Accelerator has produced complementary guidance on aligning NbS project metrics to investor reporting requirements.

BOX 2

LONGER-TERM AGRICULTURAL AGREEMENTS AND PREMIUM PRICING FOR COCOA

In Côte d'Ivoire, **cocoa farmer cooperatives** have engaged with a market-based approach to support the **transition to agroforestry** and secure a market for their cocoa. With support from the LDN Technical Assistance Facility and the IDH ISLA Programme, the cooperatives secured an agroforestry premium through their cocoa offtake contracts with a trader and a downstream chocolatier. The premium is now embedded in the procurement practices of the cooperatives' private sector partners. As part of the project design, farmers also benefit from and are incentivised by **formalised land titles**.

The premium pricing for the cocoa factors in the cost of agroforestry roll out, training and awareness raising, and maintenance, helping secure the **sustainable operation** of the farms. **European regulatory requirements** and disclosure commitments are among the key motivating factors for the chocolatier to invest in this supply chain.

See the IDH website for more details.⁶⁵

BOX 3

SUSTAINABILITY-LINKED FINANCING FOR REGENERATIVE PALM OIL

WWF has recently published a concept note on regenerative palm oil, which includes a framework for sustainable financing. To be eligible for finance, palm oil operators (including plantations and smallholder cooperatives) would need to **demonstrate sustainable practices**. As part of this, operators would need to be members of the Roundtable on Sustainable Palm Oil (RSPO) and meet certification requirements for facilities and materials.

Secured financing could be spent on **regenerative agricultural practices** at a landscape/ area level, **including NbS such as forest restoration**. Any financed project would need to demonstrate performance in categories including crop yield, biodiversity enhancement and climate resilience. **Traceability** to the palm oil mill or plantation would be essential for verifying performance and managing risk. In this way, the financing is linked to sustainability criteria, known as 'sustainability-linked loans'.

See [regenerative palm oil framework](#) for more detail.⁶⁶

BOX 4

PUBLIC FINANCING TO CATALYSE PRIVATE INVESTMENT IN RESPONSIBLE SHRIMP AND RICE FARMING

The Dutch Fund for Climate and Development (DFCD), in collaboration with WWF-Viet Nam, is supporting entrepreneurs to pilot an NbS approach on rotational shrimp and rice farming in the Mekong Delta. Funded by the Dutch entrepreneurial development bank FMO, the pilot projects receive a grant that allows them to test and strengthen their approach before seeking commercial investment at a larger scale. The project is developed together with supply chain actors, and meets criteria required for DFCD investment, including having positive, measurable conservation and development outcomes, and generating commercial revenue. The aim is for this approach to be scaled across the Mekong by crowding in private investment from aquaculture companies and buyers, which has been de-risked by the earlier stage public financing.

See the WWF-Viet Nam [website](#) for more detail.

The case for NbS inseting as an approach for effective risk management is likely to grow as disclosure frameworks become more mainstream, supply chain resilience is threatened by climate change and nature loss, and pressure for high-integrity sourcing from consumers, financiers and regulators increases.⁶⁷ Partnerships between producers, suppliers, corporates and financial institutions, which propose effective financing mechanisms and demonstrate high-integrity, will provide vital blueprints for others and support the scaling of NbS inseting.



SECTION E: LOOKING AHEAD

NbS hold great potential to help address the climate and biodiversity crises and improve human wellbeing. Within global supply chains, there is untapped potential for enhancing biodiversity, supporting sustainable development and achieving net-zero goals. NbS insetting, as a working concept, is one approach that can help companies and financial institutions act on their impacts and dependencies. **Moving away from a purely carbon-focused approach by insetting with NbS has the potential to yield multiple benefits, while helping organisations to mitigate their supply chain risks, increase ecological and social resilience, and achieve their targets.**

Significant work remains to deepen understanding of insetting and its application in supply chains. This includes the need for a formalised, mutually

agreed definition, supported by principles grounded in environmental and social integrity and guided by priorities defined by the mitigation hierarchy. **To achieve this, we call for collective action to explore, acknowledge and address the risks and challenges, and realise the many opportunities associated with NbS insetting.**

Despite the challenges, **we can take positive action now to respond to the urgency of the triple challenge.** Collaboration to test and develop solutions in supply chains and associated landscapes can generate evidence and blueprints, in turn helping others to improve practice. **All stakeholders have a role to play in responding to our calls to action, and realising the potential of high-integrity NbS insetting.**

CALLS TO ACTION

CORPORATES

- Understand the part that NbS insetting can play related to your business activities for a broader focus on biodiversity and human wellbeing, in line with the NbS guidelines (<https://nbsguidelines.info/>) and IUCN global standard on NbS, and following the mitigation hierarchy and AR3T framework.
- Seek high-level management buy-in for insetting, to foster coordination between multiple organisational divisions (procurement, operations, risk).
- Consider the funding approach, including potential for philanthropic funding to help support initial proof of concept and catalyse access to other forms of finance.
- Embrace a data-driven approach to NbS insetting by drawing upon diverse datasets and sources, including company data, primary data including traditional knowledge, global datasets and models.
- Tools and guidance for measuring biodiversity already exist, and new tools are being launched. Start collecting data and deepening your understanding of supply chain risks and options for mitigation.
- Collaborate within landscapes, with relevant partner NGOs and institutions and your sector, including through the participation of Indigenous Peoples and other community members in developing insetting strategies, which may include long-term offtake agreements and other mechanisms for financing. Proactively address issues of attribution and shared impact.
- Align ambitions to reduce workload by recognising the overlap between insetting and TNFD disclosures, SBTN reporting, SDGs and other CSR metrics. Communicate your progress so that others may learn from it.

FINANCIAL INSTITUTIONS AND INVESTORS

- Understand that NbS play a vitally important role in helping to mitigate climate change this century, but their contribution is relatively small compared to what must be achieved by the rapid phase-out of fossil fuel use. Unless we drastically reduce greenhouse gas (GHG) emissions, global heating will adversely affect the carbon balance of many ecosystems, turning them from net sinks to net sources of GHGs (<https://nbsguidelines.info/>).
- In line with TNFD and TCFD recommendations, conduct portfolio reviews using robust due diligence frameworks to identify where clients have significant dependencies and impacts on nature, with consequent risk and opportunities (or require clients/investees to provide this information).
- Use the [IUCN Global Standard](#) to familiarise teams and clients with NbS as a concept, recognising their holistic approach to people, nature and climate. Use the standard to ensure there is strong internal understanding and consistency, especially in client-facing teams, and to understand the quality of your potential investments and identify gaps. Note that the IUCN global standard is still in development phase, and should be used as a basis to improve and adapt to local contexts.
- Engage with the buyers and retailers in your portfolio or client base to understand their needs regarding supply chain sustainability, and their capacity to support NbS insetting such as through long-term offtake agreements with their suppliers (e.g. through a client survey on interest in applying concepts in this paper.)
- Consider how/if your current finance products are incentivising positive impact for people, nature and climate.
- Use a test-and-learn approach to pilot new or amended financial products to support NbS insetting, in close partnership with clients, especially those

identified as having significant dependencies and impacts on nature.

- Work in partnership with other providers of development or impact finance, such as development banks, to identify funding and risk mitigation solutions for NbS insetting investments.

ACADEMIA, NGOS AND SPECIALIST TECHNICAL ORGANISATIONS

- Support the development of a high-integrity insetting definition and guidance. In particular, there is an urgent need for guidance on delineating the landscape for insetting projects.
- Help generate evidence on NbS insetting by providing technical expertise on data collection and monitoring methods, and sharing lessons transparently. Critically, this requires interdisciplinary work and the integration of knowledge from Indigenous People and local communities.
- Drive collaboration and support the formation of rights-based partnerships within landscapes, including with Indigenous peoples, landowners and traditional rights-holders.
- Share insights on appropriate metrics, tools and other enablers of high-integrity NbS insetting.
- Support effective coordination within landscapes, enabling solutions for attribution and shared impact.

WWF and Nature-based Insights welcome feedback on this briefing paper, to help strengthen the concept and identify gaps. We also invite you to share case studies and other examples of NbS approaches within supply chains that we and others can learn from.



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ANNEX 1. EXISTING INSETTING DEFINITIONS

SOURCE	INSETTING DEFINITION
Draft position from GHG Protocol guidance for Agriculture, Forestry, and Other Land Use (WBCSD, 2022)	Carbon reductions or removals that are certified to a voluntary carbon standard, that arise from financial contributions only within an organisation's supply chain (i.e., not adjacent; broad sourcing regions can be counted in the absence of primary data; counted within scope 3 inventory). Does not cover compensation for unabated emissions.
International Carbon Reduction and Offset Alliance (ICROA)	A carbon reduction project, verified by an offset standard, which occurs within a company's supply chain or supply chain communities. A company must invest financially in the development and maintenance of the insetting project (developed by itself, suppliers or third parties). The investment must involve a supply-chain activity (i.e., raw material production, processing or transportation) and the supply chain community. Lastly, the activities covered must generate additional, unique, measurable and verifiable emissions reductions.
International Platform for Insetting (IPI) and the Insetting Program Standard	Interventions along a company's value chain that are designed to generate greenhouse gas emissions reductions and carbon storage, and at the same time create positive impacts for communities, landscapes and ecosystems. These activities can be within or around the supply chain. Recognises the role of certification for quality assurance. ⁶⁸ "Insetting is currently an umbrella term used to describe both on farm emissions reduction and removal activities that can be traced to a particular buyer, as well as broader landscape approaches that contribute to strengthening supply chains and improving the resilience and integrity of ecosystems across production landscapes." ⁶⁹
Race to Zero	Reducing greenhouse gas emissions (including through avoided emissions), or increasing greenhouse gas removals through an actor's scope 1, 2, or 3 emissions, in order to compensate for greenhouse gas emissions, such that an actor's net contribution to global emissions is reduced. Insetting claims are only valid under a rigorous set of conditions, including that the reductions/removals are additional, not overestimated, and exclusively claimed. Further, insetting can only be used to claim net-zero status to the extent it is 'like for like' with any residual emissions.
Science Based Targets initiative corporate net zero standard	Used to describe projects wholly contained within a company's scope 3 supply chain boundary, a project partially within its scope 3 supply chain boundary (spanning its supply chain and other companies' supply chains) or a project adjacent to a supply chain boundary. Insetting measures are directly accounted for in a company's efforts to abate all of its supply chain emissions as it pursues its net-zero target. Does not require certification. Recognises that there are multiple definitions of 'insetting' in use and no standardisation of the term.
Ecometrica	First published use of 'insetting'. A partnership/investment in an emission-reducing activity within the sphere of influence or interest of a company (outside WBCSD scopes 1 and 2), whereby the greenhouse gas reductions are acknowledged to be created through partnership and where mutual benefit is derived (i.e., company efficiencies). Does not require certification.
Acorn	Insetting drives decarbonisation throughout the supply chain, and allows companies to partner with other players in the chain to collectively reduce net emissions. Requires certification.

REFERENCES

- 1 World Economic Forum. 2023. Global Risks Report 2023. www.weforum.org/publications/global-risks-report-2023
- 2 Dasgupta, P. 2021. Final Report - The Economics of Biodiversity: The Dasgupta Review. HM Treasury, UK. www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review
- 3 Kurth, T, Wübbels, G, Portafaix, A, Meyer zum Felde, A and Zielcke, S. 2021. The Biodiversity Crisis Is a Business Crisis. Boston Consulting Group. <https://web-assets.bcg.com/fb/5e/74af5531468e9c1d4dd5c9fc0bd7/bcg-the-biodiversity-crisis-is-a-business-crisis-mar-2021-rr.pdf>
- 4 McKinsey and NielsenIQ. 2023. Consumers care about sustainability – and back it up with their wallets. www.mckinsey.com/industries/consumer-packaged-goods/our-insights/consumers-care-about-sustainability-and-back-it-up-with-their-wallets
- 5 Jones, J.P, 2023. 'Worthless' Forest Carbon Offsets Risk Exacerbating Climate Change <https://www.bangor.ac.uk/news/2023-08-25-worthless-forest-carbon-offsets-risk-exacerbating-climate-change>
- 5 Stevenson, M and Weber, C. 2020. First Things First: Avoid, Reduce ... and only after that – Compensate. WWF International. https://wwf.panda.org/wwf_news/?362819/First-Things-First-Avoid-Reduce--and-only-after-thatCompensate
- 6 Maron, M., Quétier, F., Sarmiento, M. et al. 'Nature positive' must incorporate, not undermine, the mitigation hierarchy. *Nat Ecol Evol* 8, 14–17 (2024). <https://doi.org/10.1038/s41559-023-02199-2>
- 6 Edie, 2023. New joint commitment launched to boost carbon market integrity <https://www.edie.net/new-joint-commitment-launched-to-boost-carbon-market-integrity/>
- 7 Katsaliaki, K, Galetsi, P and Kumar, S. 2021. Supply chain disruptions and resilience: a major review and future research agenda. *Annals of Operations Research* 319(1). doi.org/10.1007/s10479-020-03912-1
- 8 KPMG. 2022. Big shifts, small steps: Survey of Sustainability Reporting 2022. kpmg.com/xx/en/home/insights/2022/09/survey-of-sustainability-reporting-2022/biodiversity.html
- 9 Business for Nature. 2021. Business action on climate and nature [online]. www.businessfornature.org/act
- 10 Kurth, T, Wübbels, G, Portafaix, A, Meyer zum Felde, A and Zielcke, S. 2021. The Biodiversity Crisis Is a Business Crisis. Boston Consulting Group. <https://web-assets.bcg.com/fb/5e/74af5531468e9c1d4dd5c9fc0bd7/bcg-the-biodiversity-crisis-is-a-business-crisis-mar-2021-rr.pdf>
- 11 Axelsson, K., Wagner, A., Johnstone, I., Allen, M., Caldecott, B., Eyre, N., Fankhauser, S., Hale, T., Hepburn, C., Hickey, C., Khosla, R., Lezak, S., Mitchell-Larson, E., Malhi, Y., Seddon, N., Smith, A. and Smith, S.M. 2024. Oxford Principles for Net Zero Aligned Carbon Offsetting (revised 2024). Oxford: Smith School of Enterprise and the Environment, University of Oxford.
- 12 Streck, C. 2023. Shades of REDD+: Harmonized biodiversity claims as a solution for fragmented biodiversity markets. *Ecosystem Marketplace*, 22 November. www.ecosystemmarketplace.com/articles/shades-of-reddharmonized-biodiversity-claims-as-a-solution-for-fragmented-biodiversity-markets
- 13 International Platform for Insetting (IPI) and Abatable. 2023. Addressing Scope 3 – how insetting can be scaled to tackle supply chain emissions. www.insettingplatform.com/addressing-scope-3
- 14 WBCSD. 2022. Insetting and scope 3 climate action: applying and accounting for natural climate solutions (NCS) in land sector value chains. World Business Council for Sustainable Development. <https://www.wbcd.org/contentwbc/download/14797/210459/1>
- 15 Griscom, B.W., Adams, J., Ellis, P.W., Fargione, J. et al., (2017), Natural Climate Solutions, *PNAS*, Earth, Atmospheric and Planetary Sciences, <https://doi.org/10.1073/pnas.1710465114>
- 16 www.insettingplatform.com/insetting-explained/#nature-based-solutions
- 17 Hacking, J, Williams, B, Tind Nielsen, S, and Braña Varela, J. 2021. Beyond Carbon Credits: A Blueprint for High-Quality Interventions that Work for People, Nature and Climate. WWF. www.worldwildlife.org/publications/beyond-carbon-credits-a-blueprint-for-high-quality-interventions-that-work-for-people-nature-and-climate
- 18 George, S. 2023. Was 2022 the beginning of the end for 'junk' carbon credits? *Edie*, 6 January. www.edie.net/was-2022-the-beginning-of-the-end-for-junk-carbon-credits
- 19 Estrada-Carmona, N, Sánchez, A, Remans, R and Jones, S. 2022. Complex agricultural landscapes host more biodiversity than simple ones: A global meta-analysis. *PNAS* 119(38): e2203385119. doi.org/10.1073/pnas.2203385119
- 20 Girardin, C, Jenkins, S, Seddon, N, Allen, M, Lewis, S, Wheeler, C, Griscom, B and Malhi, Y. 2021. Nature-based solutions can help cool the planet — if we act now. *Nature* 593: 191-194. doi.org/10.1038/d41586-021-01241-2
- 21 Chausson, A, Turner, B, Seddon, D, Chabaneix, N, Girardin, C, Kapos, V, Key, I, Roe, D, Smith, A, Woroniecki, S and Seddon, N. 2020. Mapping the effectiveness of nature-based solutions for climate change adaptation. *Global Change Biology* 26(11): 6025-6629. doi.org/10.1111/gcb.15310
- 22 Seddon, N, Chausson, A, Berry, P, Girardin, C, Smith, A and Turner, B. 2020. Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Philosophical Transactions of the Royal Society B* 375(1794). doi.org/10.1098/rstb.2019.0120
- 23 ISEAL. 2022. Making Credible Jurisdictional Claims Good Practice Guide v1.1 (2022) <https://www.isealalliance.org/get-involved/resources/making-credible-jurisdictional-claims-good-practice-guide-v11-2022>

- 24 UNEA. 2022. UN Environment Assembly 5 (UNEA 5.2) Resolutions. United Nations Environment Assembly. www.unep.org/resources/resolutions-treaties-and-decisions/UN-Environment-Assembly-5-2
- 25 Seddon, N, Smith, A, Smith, P, Key, I, Chausson, A, Girardin, C, House, J, Srivastava, S and Turner, B. 2021. Getting the message right on nature-based solutions to climate change. *Global change biology* 27(8): 1518-1546 <https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15513>
- 26 Seddon, N. 2022. Harnessing the potential of nature-based solutions for mitigating and adapting to climate change. *Science* 376(6600) 1410-1416 <https://www.science.org/doi/10.1126/science.abn9668>
- 27 Chausson A, Turner B, Seddon D, et al. 2020. Mapping the effectiveness of Nature-based Solutions for climate change adaptation. *Global Change Biology* 26 6134-6155. <https://doi.org/10.1111/gcb.15310>
- 28 Seddon, N, Daniels, E, Davis, R, Chausson, A, Harris, R, Hou-Jones, X, Huq, S, Kapos, V, Mace, G.M., Raza Rizvi, A, Reid, H, Roe, D, Turner, B, Wicander, S. 2020 Global recognition of the importance of nature-based solutions to the impacts of climate change. *Global Sustainability* 3(15) 8 <https://doi.org/10.1017/sus.2020.8>
- 29 Girardin, C, Jenkins, S, Seddon, N, Allen, M, Lewis, S.L, Wheeler, C.E, Griscom, B.W, Malhi, Y. 2021. Nature-based solutions can help cool the planet — if we act now. *Nature* 593, 191-194 <https://www.nature.com/articles/d41586-021-01241-2>
- 30 Hacking, J, Williams, B, Tind Nielsen, S, and Braña Varela, J. 2021. Beyond Carbon Credits: A Blueprint for High-Quality Interventions that Work for People, Nature and Climate. WWF. www.worldwildlife.org/publications/beyond-carbon-credits-a-blueprint-for-high-quality-interventions-that-work-for-people-nature-and-climate
- 31 Baldwin-Cantello, W, Tickner, D, Wright, M, Clark, M, Cornelius, S, Ellis, K, Francis, A, Ghazoul, J, Gordon, J, Matthews, N, Milner-Gulland, EJ, Smith, P, Walmsley, S and Young, L. 2023. The Triple Challenge: synergies, trade-offs and integrated responses for climate, biodiversity, and human well-being goals. *Climate Policy* 23(6): 782-799. doi.org/10.1080/14693062.2023.2175637
- 32 Mahmoud, I, Morello, E, Rizzi, D and Wilk, B. 2022. Localizing Sustainable Development Goals (SDGs) through co-creation of nature-based solutions (NBS). In: Brears, R. (ed) *The Palgrave Encyclopedia of Urban and Regional Futures*. Palgrave Macmillan. doi.org/10.1007/978-3-030-87745-3_354
- 33 Nature-Based Solutions Initiative (n.d.) NbS Case Study Platform [online] casestudies.naturebasedsolutionsinitiative.org
- 34 UNEA. 2022. UN Environment Assembly 5 (UNEA 5.2) Resolutions. United Nations Environment Assembly. www.unep.org/resources/resolutions-treaties-and-decisions/UN-Environment-Assembly-5-2
- 35 Baldwin-Cantello, W, Tickner, D, Wright, M, Clark, M, Cornelius, S, Ellis, K, Francis, A, Ghazoul, J, Gordon, J, Matthews, N, Milner-Gulland, EJ, Smith, P, Walmsley, S and Young, L. 2023. The Triple Challenge: synergies, trade-offs and integrated responses for climate, biodiversity, and human well-being goals. *Climate Policy* 23(6): 782-799. doi.org/10.1080/14693062.2023.2175637
- 36 IUCN. 2020. IUCN Global Standard for Nature-based Solutions : a user-friendly framework for the verification, design and scaling up of NbS : first edition. International Union for Conservation of Nature. doi.org/10.2305/IUCN.CH.2020.08.en
- 37 Baldwin-Cantello, W, Tickner, D, Wright, M, Clark, M, Cornelius, S, Ellis, K, Francis, A, Ghazoul, J, Gordon, J, Matthews, N, Milner-Gulland, EJ, Smith, P, Walmsley, S and Young, L. 2023. The Triple Challenge: synergies, trade-offs and integrated responses for climate, biodiversity, and human well-being goals. *Climate Policy* 23(6): 782-799. doi.org/10.1080/14693062.2023.2175637
- 38 UNEP. 2023. State of Finance for Nature 2023. <https://www.unep.org/resources/state-finance-nature-2023>
- 39 Terranomics. 2022. Nature Based Solutions – a review of current financing barriers and how to overcome these. WWF. <https://www.wwf.org.uk/sites/default/files/2022-06/WWF-NBS-Public-Report-Final-270622.pdf>
- 40 CISL and AON. 2022. Nature-related financial risk: use case. Mapping exposure to nature-related risks across financial indices. University of Cambridge Institute for Sustainability Leadership. www.cisl.cam.ac.uk/files/cisl_aon_mapping_exposure_to_nature-related_risks_across_financial_indices_apr22.pdf
- 41 Robeco and CISL. 2022. How soil degradation amplifies the financial vulnerability of listed companies in the agricultural value chain. University of Cambridge Institute for Sustainability Leadership. www.cisl.cam.ac.uk/files/robeco-cisl_nature-related_financial_risk_use_case_-_land_degradation_vfinal2.pdf
- 42 Brauman, K. et al. 2022. Global trends in nature’s contributions to people. *PNAS* 117(51): 32799-32805. doi.org/10.1073/pnas.2010473117
- 43 Woroniecki, S, Spiegelberg, F, Chausson, A, Turner, B, Key, I, Irfanullah, H and Seddon, N. 2023. Contributions of nature-based solutions to reducing people’s vulnerabilities to climate change across the rural Global South. *Climate and Development* 15(7): 590-607. doi.org/10.1080/17565529.2022.2129954
- 44 Cousins, P, Lawson, B, Petersen, K and Fugate, B. 2019. Investigating green supply chain management practices and performance: The moderating roles of supply chain ecocentricity and traceability. *International Journal of Operations & Production Management* 39(5): 767-786. doi.org/10.1108/IJOPM-11-2018-0676
- 45 Dechezleprêtre, A and Sato, M. 2014. The impacts of environmental regulations on competitiveness. Grantham Research Institute on Climate Change and the Environment, Global Green Growth Institute. www.lse.ac.uk/granthaminstitute/wp-content/uploads/2014/11/Impacts_of_Environmental_Regulations1.pdf
- 46 Axelsson, K., Wagner, A., Johnstone, I., Allen, M., Caldecott, B., Eyre, N., Fankhauser, S., Hale, T., Hepburn, C., Hickey, C., Khosla, R., Lezak, S., Mitchell-Larson, E., Malhi, Y., Seddon, N., Smith, A. and Smith, S.M. 2024. *Oxford Principles for Net Zero Aligned Carbon Offsetting (revised 2024)*. Oxford: Smith School of Enterprise and the Environment, University of Oxford.
- 47 Rounsevell, M et al. 2021. Identifying uncertainties in scenarios and models of socio-ecological systems in support of decision-making. *One Earth* 4(7): 967-985. doi.org/10.1016/j.oneear.2021.06.003

48 Axelsson, K., Wagner, A., Johnstone, I., Allen, M., Caldecott, B., Eyre, N., Fankhauser, S., Hale, T., Hepburn, C., Hickey, C., Khosla, R., Lezak, S., Mitchell-Larson, E., Malhi, Y., Seddon, N., Smith, A. and Smith, S.M. 2024. Oxford Principles for Net Zero Aligned Carbon Offsetting (revised 2024). Oxford: Smith School of Enterprise and the Environment, University of Oxford.

49 WWF, 2022. How to Design High-Quality NbS Field Projects: A Guide for Practitioners <https://wedocs.unep.org/handle/20.500.11822/42356;jsessionid=77F571D-02B8242A9EAF9972755CEE485>

50 ISEAL. 2016. Impacts and Outcomes Claims and Communications Guidance. www.isealliance.org/get-involved/resources/impacts-and-outcomes-claims-and-communications-guidance

51 ISEAL. 2023. Effective company claims about contributions to landscape performance outcomes. iseal.org/sites/default/files/resource/2023-08/Effective-company-claims-about-contributions-to-landscape-outcomes_ISEAL_08-2023.pdf

52 Villena, V and Gioia, D. 2018. On the riskiness of lower-tier suppliers: Managing sustainability in supply networks. *Journal of Operations Management* 64: 65-87. doi.org/10.1016/j.jom.2018.09.004

53 Smith, T, Beagley, L, Bull, J, Milner-Gulland, EJ, Smith, M, Vorhies, F and Addison, P. 2019. Biodiversity means business: Reframing global biodiversity goals for the private sector. *Conservation Letters* 13(1): e12690. doi.org/10.1111/conl.12690; UNEP, 2022.

54 UNEP. 2022. State of Finance for Nature. United Nations Environment Programme. www.unep.org/resources/state-finance-nature-2022

55 Finance Earth. 2021. A market review of nature-based solutions: An emerging asset class. finance.earth/wp-content/uploads/2021/05/Finance-Earth-GPC-Market-Review-of-NbS-Report-May-2021.pdf

56 UNEP. 2023. State of Finance for Nature 2023. <https://www.unep.org/resources/state-finance-nature-2023>

57 IDH and WWF. 2022. Attracting private investments for sustainable landscapes: A guide. www.idhsustainabletrade.com/uploaded/2022/02/WNF_IDH_Toolkit_final_0322_

[amend_291122_.pdf](#)

58 Chausson, A, Welden, E, Melanidis, M, Gray, E, Hirons, M and Seddon, N. 2023. Going beyond market-based mechanisms to finance nature-based solutions and foster sustainable futures. *PLOS Climate* 2(4): e0000169. doi.org/10.1371/journal.pclm.0000169

59 Tobin-de la Puente, J and Mitchell, A (eds.) 2021. *The Little Book of Investing in Nature*. Global Canopy, Oxford. globalcanopy.org/wp-content/uploads/2021/01/LBIN_2020_EN.pdf

60 GIZ. 2023. Catalysing finance and insurance for nature-based solutions. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. www.greenfinanceplatform.org/case-studies/catalysing-finance-and-insurance-nature-based-solutions

61 Seddon, N, Chausson, A, Berry, P, Girardin, C, Smith, A and Turner, B. 2020. Understanding the value and limits of nature-based solutions to climate change and other global challenges. *Philosophical Transactions of the Royal Society B* 375(1794). doi.org/10.1098/rstb.2019.0120

62 CISL and AON. 2022. Nature-related financial risk: use case. Mapping exposure to nature-related risks across financial indices. University of Cambridge Institute for Sustainability Leadership. www.cisl.cam.ac.uk/files/cisl_aon_mapping_exposure_to_nature-related_risks_across_financial_indices_apr22.pdf

63 Earth Security. 2021. The blended finance playbook for nature-based solutions. www.earthsecurity.org/reports/the-blended-finance-playbook-for-nature-based-solutions; Chausson et al., 2023.

64 Cox, T. 2023. Capitals Coalition: Partner with SMEs to improve nature action. Carbon Pulse, 18 October. carbon-pulse.com/230219

65 IDH. 2023. Towards climate-resilient agriculture and agroforestry transition in wider Tai Forest area, Côte d'Ivoire. www.idhsustainabletrade.com/news/towards-climate-resilient-agriculture-and-agroforestry-transition-in-wider-tai-forest-area-cote-divoire

66 WWF/Climate Solutions Partnership. 2023. Regenerative palm oil framework: An opportunity for sustainable finance. wwfint.awsassets.panda.org/downloads/wwf_-concept-note-for-regenerative-palm-oil-framework.pdf

67 Gareil, A, Romec, A, Sautner, Z and Wagner, A. 2023. Do investors care about biodiversity? Swiss Finance Institute Research Paper No. 23-24, European Corporate Governance Institute – Finance Working Paper No. 905/2023. dx.doi.org/10.2139/ssrn.4398110

68 International Platform for Insetting (IPI) and Abatable. 2023. Addressing Scope 3 – how insetting can be scaled to tackle supply chain emissions. www.insettingplatform.com/addressing-scope-3

69 Blanc, P. 2023. For insetting to play its part in tackling Scope 3 emissions, the market needs a unified direction. Abatable, 22 November. www.abatable.com/blog/insetting-scope-3-emissions

