Science Based Targets for Land

Version 1

Draft for PUBLIC consultation

Acknowledgements

SBTN Land is grateful to the following donors who support its work: the Gordon and Betty Moore Foundation, Norway's International Climate and Forest Initiative (NICFI) and Robert Bosch Stiftung GmbH. SBTN Land would also like to thank the individuals and institutions that have generously contributed time and energy to the development of the SBTN Land targets.

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Suggested Citation:

Science Based Targets for Land Version 1. Science Based Targets Network (SBTN) 2023.

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1. The scope of the guidance documents in this restricted consultation are confined to SBTN Step 3 (Measure, Set, and Disclose) of the five-step SBTN Framework. Steps 4 (Act) and 5 (Track) will be addressed in later versions of SBTN's guidance.
2. This is guidance to direct *voluntary* corporate actions in line with company commitments to science based targets for nature and is not a regulatory framework.
3. Companies are not able to start using SBTN's guidance until Q2 2023, at which point SBTN will release science-based targets for nature v1 to an initial target validation group of ~10 pre-selected companies. SBTN will not recognize claims, public statements, or any targets coming from the use of this guidance until further notice.
4. The guidance document is written in technical language; the primary audience of this document should have the technical knowledge necessary to engage with this content. A more corporate-friendly version of this guidance will be published as part of the SBTs for nature v1 release in 2023.
5. Due to the technical nature of this content, feedback is requested from stakeholders with the following expertise: sustainability, environmental risk management, environmental and social science, ecology and conservation.

About this guidance

The Science Based Targets Network (SBTN) was established to develop methods for cities and companies to set integrated targets across all Earth systems - water, land, biodiversity, and ocean—building on the progress of the Science Based Targets initiative (SBTi) which enables companies to set science-based climate mitigation targets.

This guidance document represents the first contribution of the individuals and representative organizations focused on **land systems** within SBTN (hereafter referred to as "SBTN Land").[1] The document forms part of SBTN's "Science Based Targets for Nature version 1" – the first set of comprehensive nature targets that will raise the bar on corporate ambition on nature in line with the scientific evidence on what nature needs and will allow companies to prepare for adoption of more comprehensive and integrated targets to be published by the SBTN in due course.

This document covers:

- Why the world needs Land targets
- Target approach and alignment with existing initiatives
- The process for setting Land targets
- Guidance on each Land target

[1] SBTN Land Hub is led by World Wildlife Fund (WWF-US) and Conservation International (CI) and includes representatives from The Nature Conservancy (TNC), World Resources Institute (WRI), the Food and Land Use Coalition (FOLU), and Systemiq.

Introduction

The world is in the midst of a climate and nature emergency. Global mean temperatures are on track for an increase of more than 2.5˚C – far above the defined "safer upper limit" of 1.5˚C.[2,3] And at the same time, our society is witnessing what scientists describe as "the sixth mass extinction since the beginning of life on Earth"[4] with around half of the Earth's nature having been destroyed since the industrial revolution and most in less than half a century, along with the elimination of 2/3 of global animal populations, including mammals, birds, fish, amphibians and reptiles.[5]

The nature and climate crises are deeply intertwined in terms of:

- **Common drivers**: Human use now directly affects more than 70% of the global, ice-free land surface[6] and land use change and direct exploitation of land are the main drivers of human-induced loss of nature in all global regions and are precursors to each of the remaining drivers, including climate change, invasive alien species and pollution.[7]
- **Interactions (both positive and negative):** Biodiverse soils sequester more carbon and healthy ecosystems support climate adaptation. At the same time, climate change itself is a primary driver of biodiversity loss with rising temperatures and sea levels resulting in species redistributions and extinctions.
- **Solutions:** Changing the way working lands are used, while protecting and restoring nature, can deliver multiple wins for climate mitigation, adaptation, biodiversity and people. There is also congruence in important areas for biodiversity and nature's contributions to people and for climate mitigation (both in avoiding emissions and sequestering and storing of carbon)[8].

How and where land is used sits at the heart of this discussion.

The importance of land and its use is supported by its inclusion as a key topic in nearly every major international global convention, assessment or report, including those on biodiversity, desertification, climate, freshwater, and oceans.

Specifically, SBTN Land is working over this period to quantify spatially explicit thresholds that define what nature needs to thrive and quantify the ecological limits of human modification and use of terrestrial land systems that will form the basis of the second version of Land SBT methods. Version 1 of the Land SBTs comprise three targets as shown in Table 1. Companies should apply target setting methodologies according to the SBTN guidance on

[2] https://www.unep.org/emissions-gap-report-2020
[3] https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf
[4] Ceballos, G., Ehrlich, P. and Dirzo, R. 2017. 'Population losses and the sixth mass extinction' *Proceedings of the National Academy of Sciences* Jul 2017, 114 (30) E6089-E6096; DOI:10.1073/pnas.1704949114))
[5] https://www.wwf.fr/sites/default/files/doc-2020-09/20200910_Rapport_Living-Planet-Report-2020_ENGLISH_WWF-min.pdf
[6] IPCC, 2019: Summary for Policymakers. In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [P.R. Shukla, J. Skea, E. Calvo Buendia, V. Masson-Delmotte, H.- O. Pörtner, D. C. Roberts, P. Zhai, R. Slade, S. Connors, R. van Diemen, M. Ferrat, E. Haughey, S. Luz, S. Neogi, M. Pathak, J. Petzold, J. Portugal Pereira, P. Vyas, E. Huntley, K. Kissick, M. Belkacemi, J. Malley, (eds.)]. https://doi.org/10.1017/9781009157988.001
[7] Jaureguiberry, P., Titeux, N., Wiemers, M., Bowler, D. E., Coscieme, L., Golden, A. S., ... & Purvis, A. (2022). The direct drivers of recent global anthropogenic biodiversity loss. Science Advances, 8(45), eabm9982.
[8] Vijay, V., Fisher, J. R., & Armsworth, P. R. (2022). Co-benefits for terrestrial biodiversity and ecosystem services available from contrasting land protection policies in the contiguous United States. Conservation Letters, 15(5), e12907.

materiality from Steps 1 and 2 and according to the size and sector of each company (for more information see section iii below on "Requirements for setting SBTs for land").

i. Introducing Land Targets

The aim of SBTN is to develop a methodology for science-based targets (SBTs) that will enable the corporate sector to **align their own commitments to nature with the necessary speed and scale of action** as determined by science. SBTN's science-based targets for nature V1 – which cover land and freshwater systems – are an important step towards this aim.

This document focuses on the v1 methodology for land targets, hereafter referred to as SBTs for land, Land SBTs, or more simply, "Land targets".

Version 1 of the Land SBTs comprise three distinct targets which are shown in table 1 below. Companies should adopt these targets depending on the materiality of pressures generated by the company's activities, as well as the sector, size and land footprint of the company (for more information see section iii below on "Requirements for setting SBTs for land").

The set of targets are designed to work together to incentivize the high level actions needed to achieve nature goals in land systems – namely halting conversion of natural ecosystems (target 1), freeing up agricultural land for natural ecosystem restoration (target 2) and improving the ecological integrity of landscapes, including working lands, to enhance ecosystem structure, composition and function (target 3).

Critically, the landscape engagement target (target 3) works to ensure that companies appropriately balance the need to use land more efficiently while avoiding unsustainable forms of agricultural intensification (e.g., overuse of fertilizers and chemical inputs, irrigation practices that deplete freshwater resources) and building resilience. It also provides a vehicle to guide the implementation of the other two land SBTs through landscape level engagement.

Table 1 - Science-based Targets (SBTs) for Land

Science Based Targets for Land*	
Target 1	**No Conversion of Natural Ecosystems**
Target 2	**Land Footprint Reduction**
Target 3	**Landscape Engagement**

*SBTN Land has complemented the three Land Targets with a requirement for Forest, Land and Agriculture (FLAG) companies to set a sister target on land GHG emissions following the SBTi FLAG methodology requirements (note: for companies required to set climate targets as per FLAG's guidance).

The three SBTN Land targets have been developed according to their capacity to address the criteria:

1. Maximum coverage of pressures most relevant to the impacts most companies have on land.
2. Underpinned by quantifiable and measurable metrics which can be feasibly impacted by company activities to make progress against the target.
3. Aligned with and built on active and relevant corporate sustainability standards and initiatives.
4. Incentivize action across SBTN's AR³T mitigation hierarchy: Avoidance and Reduction of impacts as well as Regeneration and Restoration of nature, all underpinned by systems Transformation.

The three targets are informed by the information and data that is currently available and allow companies to set targets today that will allow for **quantifiable contributions at the company and landscape level**. They are designed to increase the clarity, ambition, and/or scope of existing initiatives that, despite intent, have not led to the transformational changes required to address climate change and nature loss.

In terms of how they complement climate SBTs, they are designed to address impacts which climate targets cannot, by incentivizing activities related to wider, non-GHG impacts on land, for example the reduction and treatment of pollution and effluents, reduced pesticide use, erosion control and other actions which promote biodiversity and ecosystem integrity.

They also expand focus beyond forests to include other natural ecosystems (e.g., grasslands, wetlands, shrublands) especially as they relate to the working lands (e.g., cropland, rangeland, pasture, managed forest) that facilitate the production of goods used by companies. Moreover, while firmly rooted in directing companies to assess, avoid, or mitigate their impacts on nature, Land SBTs will go further by incentivizing companies to deliver on regenerative, restorative, and transformative actions in land systems beyond the scope of their direct value chains— including actions which underpin broader issues of sustainable development and that are in line with a nature positive future.

SBTN will revise the v1 SBT Land targets during 2023 and 2024 as land system science and methods for accounting for impacts and dependencies on nature progress. The ambition is for v2 SBT Land targets to reflect what nature needs at a local level (based on place-based, regionally defined and locally-relevant thresholds) and to cover a broader range of material land indicators (such as biodiversity loss, terrestrial eutrophication and soil erosion).

SBTN is committed to developing a more complete set of biodiversity target-setting methods, including species and pressures on biodiversity not currently included in the step 3 methods for land and freshwater. Whereas the targets and methodologies proposed in this document explicitly consider biodiversity in steps 1 and 2 and demonstrate appreciable alignment with goals outlined in the CBD (as noted in section iii below), the SBTN recognizes that there may be gaps in what is relevant for species-level biodiversity (e.g., threats from overexploitation or invasive species) or from a nature's contributions to people perspective.

Following the final revision and approval of the v1 SBT Land targets, the SBTN Biodiversity Hub will perform a formal gap analysis to understand and document limitations in the biodiversity coverage of v1 SBTs. It is anticipated that the gap analysis will be completed with a report delivered shortly after final approval of the V1 land methods. In addition to forming the first steps toward developing biodiversity-specific target setting methods, the report will also include additional guidance on how companies can get started now in optimizing biodiversity outcomes when implementing the existing land and freshwater targets.

Critically, there will be consistency between v1 and v2 targets. Most importantly, the V1 land targets are designed to incentivize corporate actions that will be aligned with delivery of V2 land targets and the data companies will collect and analyze for the V1 target methodologies will be directly relevant for V2.

ii. Alignment of Land Targets with existing corporate commitments

Land SBTs will rely on the familiarity of companies with climate targets as defined by the Science Based Targets initiative (SBTi) and build upon existing corporate accountability commitments for deforestation and conversion of land. These existing commitments are the result of decades of work to understand climate change and deforestation, its sources, and who bears responsibility. This work has led to significant innovation both in science and in the capacity of the private sector to respond to its responsibility for past and ongoing emissions and impacts.

Land SBTs link to and build upon existing and emerging initiatives and frameworks and are not intended to lead to parallel or asynchronous processes that confuse or undermine existing quality work on corporate sustainability.

Box 1 - Alignment of SBTN Land Targets with existing initiatives

The following initiatives, developed as guidance and standards for companies, are designed to be used in parallel with SBTN Land Targets:

The Science Based Targets initiative (SBTi) has developed a methodology for Forest, Land and Agriculture (FLAG) companies to set 1.5°C aligned climate targets for land-based emissions and removals.

The Accountability Framework initiative (AFi) supports the process of defining targets, accounting, and disclosure related to deforestation and ecosystem conversion in commodity supply chains. The Accountability Framework provides a reference for best practice on no-deforestation and no-conversion policies that is used by SBTi and the GHG Protocol, and SBTN. . Valid SBTi FLAG targets require companies to set no-deforestation commitments in alignment with the Accountability Framework. by specifying details for commitments to eliminate land use change, which the SBTi FLAG methodology requires.

The Draft GHG Protocol Land Sector and Removals Guidance instructs users on how to carry out emissions inventories needed to set valid SBTi FLAG targets and to monitor progress toward meeting them.

These three initiatives have also worked in collaboration to align on definitions, targets, and many aspects of accounting at different scales of analysis and for different types of land use change.

To achieve this, SBTN Land targets reflect an integrated approach to target setting, accounting, and reporting.

The first version of Land SBTs is built upon and written in collaboration with the experts and institutions that developed key existing data and environmental initiatives that cover land-related impacts, namely:

- The Greenhouse Gas Protocol (GHGP) Land Sector and Removals Guidance[9]
- Science Based Targets initiative's Forest, Land and Agriculture (FLAG) Guidance[10]
- The Accountability Framework Initiative (AFi)[11]

Additionally, the guidance on Landscape Engagement (section 3) has been developed with important contributions from CDP, ISEAL, Proforest, and Rainforest Alliance.

The development of Land SBTs in connection with the above listed initiatives helps ensure alignment, strengthens the target approaches, and reduces the burden for companies, who are already working or will work with these initiatives. Many companies will already be familiar with these initiatives and will have collected requisite data and information that they can repurpose to set SBTN Land Targets and calculate baselines. There will, however, be some data and conditions that are more specific to SBTN Land.

[9] https://ghgprotocol.org/land-sector-and-removals-guidance
[10] https://sciencebasedtargets.org/sectors/forest-land-and-agriculture
[11] https://accountability-framework.org/

iii. Alignment of Land Targets with International Agreements

a. Global Biodiversity Framework – Convention on Biological Diversity (CBD)

With the finalization of the CBD's global biodiversity framework (GBF) in December 2022, SBTN Land can also finalize its alignment with global goals on biodiversity. At each stage of the process leading up to Montreal-Kunming, the SBTN Land Hub worked to best align the development of its corporate target setting methodology with sequential drafts leading up to final negotiation.

Below, an outline of the first version of corporate targets for land is provided with an explanation on how they specifically relate to the Goals and Targets outlined in the Final Montreal-Kunming Global Biodiversity Framework (GBF)[12].

These v1 targets do not attempt, nor do they achieve, a comprehensive target setting approach for land and biodiversity. For now, they allow companies to set quantifiable targets to avoid and reduce company impacts on several major pressures to land systems and terrestrial biodiversity. They also require companies with material impacts on land to engage in landscape initiatives and to create the enabling conditions that will permit the regeneration of working lands, the restoration of degraded ecosystems, and a transformation of landscapes, including the factors that have driven their degradation. These targets are a meaningful step for companies towards a comprehensive science-based target-setting approach to nature.

No Conversion of Natural Ecosystems: Land Use Change (LUC) is one of the primary drivers of recent and historical biodiversity loss. This target limits further loss of biodiversity because of conversion of natural ecosystems attributed to company activities or sourcing. Target 1, 2, 3, 10, 11, 15, 16, 19, 20, 21 of the GBF.

Land Footprint Reduction: The Land Footprint Reduction target liberates agricultural land from production, relieving pressures from the leading driver of biodiversity loss. Target 2, 3, 10, 15, 19, 20, 21 of the GBF.

Landscape Engagement: The Landscape Engagement target encompasses a variety of potential actions that companies can implement for achieving holistic environmental and social outcomes within collaborative landscape initiatives. Specifically, companies must substantially increase ecological integrity within priority landscapes for production and sourcing of high impact commodities (measured using the Ecological Integrity Index). In addition to the biophysical impacts of this target on GBF objectives, this target promotes company engagement in the transformational processes necessary to realize landscape objectives. The implementation of this target also asks companies to explore ecosystem restoration in agricultural areas taken out of production through the Land Footprint Reduction target. Target 2, 3, 10, 11, 15, 16, 19, 20, 21, 22, 23 of the GBF.

A key feature of the Montreal-Kunming Global Biodiversity Framework (and all CBD decisions) is that it is agreed on, implemented with, and reported by national governments. Companies have only an indirect influence in this process and are ultimately not responsible for delivering on its outcomes. This is especially reflected in the coverage of SBTs for Land and the monitoring framework of the GBF. Many of the indicators used apply only to national level reporting and are not relevant for companies. Despite the mismatch between monitoring and corporate target setting, there are many direct overlaps and many instances where corporate nature targets on land will likely make significant contributions to the goals and targets of the GBF. However, these may be monitored at the landscape scale, rather than

[12] https://www.cbd.int/article/cop15-final-text-kunming-montreal-gbf-221222

for national reporting to the Convention on Biological Diversity. That said, considering the targets and goals, governments would be incapable of delivering on the suite of Goals and Targets without strong and dedicated participation by the private sector – such that in many places in the targets this is explicitly acknowledged.

Of specific relevance for corporate land targets are Goal A and B, and Targets 1, 2, 3, 10, and 15. For a full analysis, see Annex 9, which includes an annotated version of the Montreal-Kunming Global Biodiversity Framework, as it relates to the target-setting methodology presented in Version 1 of SBTN's Land methods. Throughout target development the SBTN Land Hub has worked to align with draft versions of this framework and now squarely align with many of its goals and targets. Companies setting targets for land through the V1 methodology can be confident that progress on these targets will contribute to and align with the Global Biodiversity Framework. This alignment will only increase from this point as more specific methods are developed for subsequent versions of SBTN Land targets.

Table 2 - Demonstration of which Convention on Biological Diversity Montreal-Kunming Goals and Targets are relevant and aligned with SBTN Land's version 1 science-based targets.

		Science -based Targets for Land (V1)			GBF Monitoring Framework Alignment		
Montreal-Kunming Global Biodiversity Framework		No Conversion	Land Footprint	Landscape Engagement	Headline indicators	Component indicators	Complementary indicators
GOAL A	Biodiversity existence	✓	✓	✓	●	●	●
GOAL B	Biodiversity use		✓	✓			●
GOAL C	Biodiversity benefit sharing						
GOAL D	Framework implementation				●		
Target 1	No conversion	✓			●	●	●
Target 2	Restoration	✓	✓	✓	●	●	●
Target 3	30% protected by 2030	✓	✓	✓	●	●	●
Target 4	Save species						
Target 5	Intl. trade in species						
Target 6	Invasives						
Target 7	Pollution						
Target 8	Climate and adaptation	✓	✓	✓		●	●
Target 9	Species management						●
Target 10	Working lands	✓	✓	✓	●	●	●
Target 11	Nature's contributions to people	✓	✓	✓	●		
Target 12	Urban nature						
Target 13	Fair & equitable benefit sharing						
Target 14	Transformation and integration						●
Target 15	Corporate disclosure	✓	✓	✓	●	●	●
Target 16	Overconsumption & waste	✓	✓	✓			●
Target 17	Biosafety						
Target 18	Harmful subsidies				●		
Target 19	Financial flows	✓	✓	✓	●		●
Target 20	Capacity and innovation	✓	✓	✓			
Target 21	Transparency and data	✓	✓	✓			
Target 22	Socially responsive/inclusive			✓			
Target 23	Gender equality			✓			

b. UN Convention to Combat Desertification

The United Nations Convention to Combat Desertification in those countries experiencing serious drought and/or desertification, particularly in Africa (UNCCD), is focused on combatting desertification and mitigating the effects of drought in countries experiencing serious drought, land degradation, and/or desertification (DLDD). To facilitate the achievement of this objective, the UNCCD 2018–2030 Strategic Framework[13] was adopted by the 197 Parties to the Convention at the 13th Conference of the Parties to the UNCCD (COP 13) in Ordos, China in 2017.

The Strategic Framework identifies five Strategic Objectives (SOs), focused around ecosystems, degradation and sustainable land management (SO1), affected populations (SO2), drought (SO3), global environmental benefits (SO4), and finance (SO5). The Strategic Framework is strongly linked to Sustainable Development Goal (SDG) 15 and target 15.3 to "by 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world". In addition, the Convention has a focus on "improving the living conditions of affected populations" (where "affected populations" are those affected by land degradation) and on "enhancing ecosystem services".

The UNCCD's Strategic Framework, focused on arresting land degradation by 2030, is closely aligned with SBTs for Land. The SBTs for land complement corporate climate targets by incentivizing activities related to wider, non-GHG impacts on land, such as actions which promote biodiversity and ecosystem integrity – objectives consistent with the UNCCD Strategic Framework.

UNCCD's strategic objectives guide the actions of all UNCCD stakeholders and partners (including national governments) to achieve a land degradation-neutral world consistent with the 2030 Agenda for Sustainable Development, including ecosystem services. Hence, corporate sourcing areas (or jurisdictions) and related traceability efforts would benefit from a national government's UNCCD ratification and LDN strategies. Further detail on alignment between the SBTs for Land and UNCCD strategic objectives is given in Table 3.

Table 3 - UN Convention to Combat Desertification and its alignment with SBTN Land Targets

UNCCD Strategic Objective and Expected Impact	Target 1: No Conversion of Natural Ecosystems	Target 2: Land Footprint Reduction	Target 3: Landscape Engagement
SO1: To improve the condition of affected ecosystems, combat desertification/land degradation, promote sustainable land management and contribute to land degradation neutrality			
EI 1.1 Land productivity and related ecosystems services are maintained or enhanced.	✓	✓	✓
EI 1.2 The vulnerability of affected ecosystems is reduced, and the resilience of ecosystems is increased.		✓	
EI 1.3 National voluntary land degradation neutrality targets are set and adopted by countries wishing to do so, related measures are identified and implemented, and necessary monitoring systems are established.	N/A		
EI 1.4 Measures for sustainable land management and the combating of desertification/land degradation are shared, promoted, and implemented.	✓	✓	✓
SO 2: To improve the living conditions of affected populations			
EI 2.1 Food security and adequate access to water for people in affected areas is improved.	✓	✓	✓
EI 2.2 The livelihoods of people in affected areas are improved and diversified.	✓		✓
EI 2.3 Local people, especially women and youth, are empowered and participate in decision-making processes in combating DLDD.	✓		✓
EI 2.4 Migration forced by desertification and land degradation is substantially reduced			

[13] https://www.unccd.int/sites/default/files/inline-files/ICCD_COP%2813%29_L.18-1716078E_0.pdf

SO 3: To mitigate, adapt to, and manage the effects of drought in order to enhance resilience of vulnerable populations and ecosystems			
EI 3.1 Ecosystems' vulnerability to drought is reduced, including through sustainable land and water management practices.	✓		
EI 3.2 Communities' resilience to drought is increased.			
SO 4: To generate global environmental benefits through effective implementation of the UNCCD			
EI 4.1 Sustainable land management and the combating of desertification/land degradation contribute to the conservation and sustainable use of biodiversity and addressing climate change.	✓		
EI 4.2 Synergies with other multilateral environmental agreements and processes are enhanced.	✓		
SO 5: To mobilize substantial and additional financial and non-financial resources to support the implementation of the Convention by building effective partnerships at global and national level			
EI 5.1 Adequate and timely public and private financial resources are further mobilized and made available to affected country Parties, including through domestic resource mobilization.	✓		
EI 5.2 International support is provided for implementing effective and targeted capacity-building and "on-the-ground interventions" in affected country Parties to support the implementation of the Convention, including through North–South, South–South and triangular cooperation.	✓		
EI 5.3 Extensive efforts are implemented to promote technology transfer, especially on favorable terms and including on concessional and preferential terms, as mutually agreed, and to mobilize other non-financial resources	✓		

iv. Requirements of companies for setting Land targets

Setting Land SBTs is part of Step 3 of the five-step process for setting SBTs for nature. Before using the land methods, **companies *must* first complete Step 1 (Assess) and Step 2 (Interpret & Prioritize)**.[14] These earlier steps of the SBTN target setting process will enable companies to **determine which pressures they most likely need to address with targets**, and which parts and locations of their business are the highest priority to get started with first.

There is a dedicated section of this guidance for each of the three targets outlining which companies need to set which of the targets.

For Target 1: No Conversion of Natural Ecosystems, please see Section 1.

For Target 2: Land Footprint Reduction, please see Section 2.

For Target 3: Landscape Engagement, please see Section 3.

At a high level, companies will be required to adopt each of the three land SBTs depending on:

1. The **materiality of specific pressures generated** because of the company's activities, such as terrestrial ecosystem use/change.
    a. Materiality of these pressures should be determined by companies before applying the Step 3 methods, by using the Step 1 guidance from SBTN.
    b. If land-associated pressures, shown in Table 4 below, are identified as material during these assessment steps, a company will be required to set at least one land target.
2. The International Standard Industrial Classification of All Economic Activities (ISIC) designated sector(s) of the company. See Table 5 below.
3. The **size of the company** for Target 2.
4. The **impact of the company in terms of emissions and/or the land footprint**.

Depending on the above criteria, the targets will be:

a. Required (if not done, the company will not be able to validate and communicate its SBTs)
b. Recommended
c. Not required, or
d. Not applicable.

[14] https://sciencebasedtargetsnetwork.org/resources/public-consultation-resources/

571 To have their SBTs for Land validated, companies will need to meet the requirements put
572 forward in this method.

573 *Table 4 - Pressure categories covered by SBTs for nature, from SBTN Step 1. Pressures in bold (or marked with*
574 *a *) are those covered in the SBTs for land methods. Companies that have material contributions to these, as*
575 *identified in Step 1, will be required to*

IPBES Pressure Category	SBTN Pressure Category
Ecosystem Use and use change	**Terrestrial ecosystem use and use change** Freshwater ecosystem use and use change Marine ecosystem use and use change
Resource exploitation	Water use Other resource use (minerals, fish, other animals, etc.)
Climate Change	GHG emissions
Pollution	Non-GHG air pollutants Water pollutants **Soil pollutants**

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Box 2 - What are the overlaps and differences between SBTi FLAG methods and SBTN Land methods?

Companies engaging in Climate Targets

The SBTi Forest, Land and Agriculture (SBTi FLAG) target setting methodology is based on land-related greenhouse gas emissions and removals. The focus is therefore on climate change and the actions companies take to address these emissions will maximize emissions reductions and removals. It also includes a requirement for companies to set a no-deforestation target and a recommendation for companies to set a no-conversion target.

Companies engaging in Nature Targets

The suite of SBTN land targets have a wider focus on what **nature** needs, for example, the landscape engagement SBTN land target is built upon multiple indicators of impact on land (e.g., removal of net primary productivity, pollution) and the no conversion of natural ecosystems target more explicitly addresses non-forest natural ecosystems.

While there is a significant overlap in terms of the actions on land that companies would take to deliver against their SBTs for land-related GHGs and removals (i.e. climate) and nature, the integration of climate and nature at the goal-setting level incentivizes more holistic approaches over singular "silver bullet" approaches that maximize the outcome of one climate or nature indicator. For example, a climate-only lens might lead to fast-growing, monoculture, non-native tree planting for rapid carbon sequestration where land is relatively cheap (i.e. the biodiversity-rich tropical belt). This may have disastrous impacts on water availability, biodiversity loss and resilience in a region which would likely undermine climate outcomes due to increased wildfires, pests, and disease.

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Table 5 below outlines the applicability of each of the Land SBTs based on sector classification as a quick guide to understand which land targets a company may be required to set, which are recommended, and sectors for which targets are not required or not applicable. Each target section also displays these requirements as a flow chart and provides more details around the scope of each of these targets across direct operations, direct sourcing, and indirect sourcing.

Companies that meet the materiality thresholds for land and that align with the sectors listed below will be required to set and validate these targets to make claims about SBTs for Nature.

Table 5 - Sector requirements for Land SBTs: Based on this table, sectors are required to set a target, required based on additional methodological criteria (e.g., if they must set an SBTi FLAG target), Required with a specified methodological exception (e.g.,

Sector (ISIC)	No Conversion	Land Footprint Reduction	Landscape Engagement
Manufacture of food products	Required	Required	Required
Manufacture of beverages	Required	Required	Required
Manufacture of tobacco products	Required	Required	Required
Manufacture of textiles	Required	Required	Required
Manufacture of wearing apparel	Required	Required	Required
Manufacture of leather and related products	Required	Required	Required
Biofuel*	Required	Required	Required
Agriculture	Required by FLAG	Required	Required
Wholesale trade...	Required by FLAG	Required	Required
Retail trade...	Required by FLAG	Required	Required
Accommodation and food service	Required by FLAG	Required	Required
Fishing and aquaculture	Required	Required	Not applicable
Real estate activities	Required	Not required	Required
Forestry and logging	Required	Not required	Required
Sports activities and amusement and recreation activities	Required	Not required	Required
Support activities for crop production	Required by FLAG	Required by FLAG	Required
Manufacture of chemicals and chemical products	Required by FLAG	Required by FLAG	Required
Manufacture of basic pharmaceutical products ...	Required by FLAG	Required by FLAG	Required
Manufacture of furniture	Required by FLAG	Required by FLAG	Required
Manufacture of rubber and plastics products	Required by FLAG	Required by FLAG	Required
Manufacture of machinery and equipment...	Required by FLAG	Required by FLAG	Required
Manufacture of computer, electronic and optical products	Required IFC PS 6	Not applicable	Required
Manufacture of refined petroleum products	Required	Not applicable	Required
Manufacture of wood and of products of wood ...	Required	Not applicable	Required
manufacture of paper products	Required	Not applicable	Required
Other Consumer Goods manufacturer*	Required	Not applicable	Required
Manufacture of basic metals	Required IFC PS 6	Not applicable	Required
Manufacture of coke and refined petroleum products	Required IFC PS 6	Not applicable	Required
Manufacture of other non-metallic mineral products	Required IFC PS 6	Not applicable	Required
Manufacturing, other	Required IFC PS 6	Not applicable	Required
Manufacture of fabricated metal products, non-machinery	Required IFC PS 6	Not applicable	Required
Mining of coal and lignite	Required IFC PS 6	Not applicable	Required
Extraction of crude petroleum and natural gas	Required IFC PS 6	Not applicable	Required
Mining of metal ores	Required IFC PS 6	Not applicable	Required
Other mining and quarrying	Required IFC PS 6	Not applicable	Required
Electricity, gas, steam and air conditioning supply	Required IFC PS 6	Not applicable	Required
Construction	Required IFC PS 6	Not applicable	Required
Civil engineering	Required IFC PS 6	Not applicable	Required
All other sectors*	Not required	Not applicable	Recommended

*not yet an ISIC sector classification

a. Mandatory alignment of a No Conversion Target and Land Footprint Reduction Target with SBTi FLAG Climate Targets

Given that climate and nature goals can and must be achieved holistically, the Land Hub *requires* companies that are required to set SBTi FLAG climate targets to complement their SBTN Land targets with a target on land-based GHG emissions and removals following the SBTi FLAG methodology requirements (see SBTi FLAG)

Correspondingly, companies required by SBTi to set FLAG climate targets, are *required* by SBTN to set a No Conversion of Natural Ecosystems target and a Land Occupation Reduction Target (if they meet the company size requirement).

SBTi requirements for setting a FLAG target. Companies that meet these requirements must also set a No Conversion target under SBTN:

i. **Companies from the following SBTi-designated sectors**:
   a. **Forest and paper products** (forestry, timber, pulp and paper);
   b. **Food production** (agricultural production);
   c. **Food production** (animal source);
   d. **Food and beverage processing**;
   e. **Food and staples retailing**; and
   f. **Tobacco**.

Companies in **any other sector** with **FLAG-related emissions** that total **more than 20% of overall emissions across scopes**. The 20% threshold should be accounted for as gross emissions, not net (gross minus removals).

b. When No Conversion is Required, with exceptions

There are several sectors that must convert land; therefore a no conversion target is required of these companies in a way that they still adhere to the mitigation hierarchy.

A familiar industry standard regarding the conversion of natural ecosystems is the International Financial Corporation's (IFC) Performance Standard 6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources. which helps companies plan for and address their impacts on biodiversity at a project level.

While companies setting Science Based Targets for Nature may not be required to adhere to IFC's performance standards as their operations may not contractually tied to IFC financing, this standard still provides useful guidance for how companies that cannot avoid land conversion can minimize its impacts and it is internalized in this guidance with a notable exception on offsets.

It is likely that sectors that are included in the table above (mining, extractives, infrastructure) as *recommended* to set a *No Conversion* target are familiar with PS6. However, a key requirement under SBTN is that biodiversity offsets will not be accepted as compliant with a science-based target. Companies seeking to utilize IFC's PS6 to comply with a no conversion target should complete all relevant Environmental and social management system activities included in the guidance including assessments and declarations and submit to SBTN for validation. Where IFC PS6 guidance conflicts with SBTN guidance (e.g., Supply Chain) priority will be given to SBTN guidance.

v. Data that companies will ultimately use to set land targets

The headline data requirements are outlined below and summarized in table 7. More detailed guidance on how this data should be collected and used is provided in the specific sections for each of the three targets:

1. **No Conversion of Natural Ecosystems**
   a. Hectares of natural ecosystems converted on land owned, controlled, or managed by the company after a baseline year of 2020 or earlier.
   b. Hectares of natural ecosystems converted on production units or in sourcing areas known to be in the company's supply chain after the baseline year 2020.
2. **Land Footprint Reduction**
   a. Hectares of agricultural land in direct operations or upstream (in company supply chain).
   b. Volume of commodities produced or sourced, and yields (production per hectare) of those commodities.
3. **Landscape Engagement**
   a. Location and area of holdings pertaining to high impact commodities and locations prioritised in Step 2 (see Annex 1 and Annex 3)
   b. Land use and intensity data (e.g., Ecosystem Integrity Index) for each landscape.

Table 6 - Value chain definitions

Value chain	Definitions
Operational site	Operational locations within a company's value chain/spheres of control and influence (including direct operations). Sites can include operations from any phase of a product's life cycle, from extractive operations, production facilities, logistics facilities, wholesale and retail, and recycling/end of life.
Direct operations	All activities and sites (e.g., buildings, farms, mines, retail stores) over which the enterprise has operational or financial control. This includes majority-owned subsidiaries.
Direct sourcing	Sourcing from producers or first point of aggregation
First point of aggregation	*TBD based on results of public consultation*
Indirect sourcing	Sourcing from stages of the value chain that are downstream the first point of aggregation
Raw and processed commodities (non-embedded)	Commodities purchased in their raw or processed form (and not included as ingredients or components of complex products)
Embedded or highly-transformed commodities	Volumes of high impact commodities that are included into complex products. In this case, companies do not purchase a commodity in its raw or processed forms, but they purchase a product which contains them.

Required

Recommended

Targets: 1) No Conversion of Natural Ecosystem (NCNE); 2) Land Footprint Reduction (LFR); 3) Landscape Engagement (LE)

Table 7 - v1 SBT for land, specific data requirements

Stage of the value chain	Targets	Where	Unit of measurement	Spatial data	Notes
Producers and site owners/operators	1	Required Location of all sites where high impact commodities are produced. Areas converted after cut-off date.	Hectares	Required Production units	
	2	Required Volumes of agricultural commodities produced by production location. Data on operational sites where commodities are produced.	Metric tonnes Hectares	Recommended for operational sites	
	3	Required Location of all operational sites (at ecosystem level) prioritized in step 2.	Hectares	**Required** Production units	Required only for companies willing to set the EII at the level of operational site
Direct sourcing	1, 3	Required Sourcing area and volumes of high impact commodities purchased and volumes of high impact commodities	Hectares Metric tonnes or equivalent from each production unit or sourcing area	Recommended for 1	
	1	Recommended Production unit	Hectares	Recommended for 1	
	1	Areas converted after cut-off date (TBD)	Hectares	N/A	
	3	Recommended Operational site	Hectares	N/A	
	2	Required Volumes of agricultural commodities purchased Yield of each product purchased	Metric tonnes Metric tonnes per hectare per year	Not required Not required	Volumes of product should be differentiated to the extent possible by sourcing location; yield data should be matched to the extent possible with the sourcing locations

Stage of the value chain	Targets	Where	Unit of measurement	Spatial data	Notes
Indirect sourcing (non-embedded)	1, 3	Required Sourcing area of high impact commodities purchased	Hectares	Recommended for 1	For Target 1 Sourcing area of high impact commodities purchased is required for Group 1 ecosystems
	1, 3	Required Volumes of high impact commodities embedded into complex products purchased	Metric tonnes (or equivalent)	Recommended **for 1**	For Target 3 Volumes of commodities only if contribution of the company in a landscape initiative associated to the level of volumes they buy.
	1, 3	Recommended Production unit or sourcing areas of high impact commodities purchased	Hectares	Recommended	
	2	Required Volumes of agricultural commodities purchased Yield of each product purchased	Metric tonnes Metric tonnes per hectare per year	Not required Not required	Volumes of product should be differentiated to the extent possible by sourcing location; yield data should be matched to the extent possible with the sourcing locations
Indirect sourcing (embedded or highly-transformed)	1, 3	Required Volumes of high impact commodities embedded into complex products purchased	Metric tonnes (or equivalent)	N/A	For Target 3 Volumes of commodities only if contribution of the company in a landscape initiative associated to the level of volumes they buy.
	1, 3	Recommended Production unit or sourcing area of high impact commodities purchased	Hectares	Recommended	
	2	Required Volumes of agricultural commodities purchased Yield of each product purchased	Metric tonnes Metric tonnes per hectare per year	Not required Not required	Volumes of product should be differentiated to the extent possible by sourcing location; yield data should be matched to the extent possible with the sourcing locations

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vi. Step 3 Land Target requirements determined by Step 1 Materiality Assessment

In SBTN guidance for Step 1: Assess[15], companies gather information on the material pressures generated by their activities and on the corresponding state of nature in the locations where they operate.

In this process, companies first screen their portfolio of economic activities for materiality of different pressures, and then estimate their contributions toward these through an assessment of pressures and impacts associated with each category of activity. Based on the materiality of land-associated pressures, companies may be required to set SBTs for land.

Using the guidance in Step 1 Technical Supplement, conduct your materiality assessment for your Direct Operations against all required pressure categories.

To assess Land Target requirements, you will need the results from two of the pressure categories:

1. **Terrestrial ecosystem use and use change** and
2. **Soil pollutants**.

Additionally, companies in some specific sectors will use their greenhouse gas inventory (e.g., using Greenhouse Gas Protocol guidelines) to assess whether they meet the threshold for setting a No Conversion target.

No Conversion of Natural Ecosystems

The target "No Conversion of Natural Ecosystems" is **consistent with the zero deforestation commitments set within the soft commodity supply chains** of companies to date and consistent with the guidance in the Accountability Framework Initiative guidance.

For specific sectors (see table 8) the target is required with an exception to **align with IFC performance standard 6 without offsets**, including no conversion of Key Biodiversity Areas and High Conservation Value areas. Additional details are discussed below.

There are two thresholds that companies should assess to understand what their requirements are for a No Conversion target.

First, companies for which Terrestrial Use is material according to Step 1's materiality screening are **required to set a No Conversion target** (For more information see table 8 below).

Second, companies in specific sectors should use their greenhouse gas emissions inventory to assess whether 20% or more of their emissions come from land sector activities (e.g., Agriculture, Forestry and Other Land Use emissions) requiring them to set a Land Conversion target.

[15] [add link when ready]

Table 8 - Sector requirements for Land Conversion if scoring 8 or above on Terrestrial Use in SMT tool for Direct Operations

ISIC Description	No Conversion of Natural Ecosystems	Compliance with IFC Performance Standard 6, No offsets
Agriculture, forestry and fishing	Required	
Manufacture of food products	Required	
Manufacture of wood …	Required	
Manufacture of tobacco products	Required	
Manufacturing: Manufacture of wearing apparel	Required	
Manufacture of textiles	Required	
Manufacture of leather and related products	Required	
Construction		Required
Electricity, gas, steam and air conditioning supply		Required
Manufacture of Basic Metals		Required
Manufacture of coke and refined petroleum products		Required
Manufacture of other non-metallic mineral products		Required
Other manufacturing		Required
Manufacture of fabricated metal products, except machinery and equipment		Required

Table 9 - Sectors required to assess their Greenhouse Gas Footprint and if 20% of Scope 1, 2, 3 emissions are from AFOLU, they must set a Land Conversion Target

ISIC Description	No Conversion of Natural Ecosystems
Agriculture, Forestry & Fishing: Silviculture, Logging, Support Services to Forestry	Required
Manufacturing: Manufacture of refined petroleum products	Required
Agriculture, Forestry & Fishing: Aquaculture	Required
Manufacturing: Manufacture of furniture	Required
Manufacturing: Manufacture of pharmaceuticals, medicinal chemical and botanical products	Required
Manufacturing: Manufacture of chemicals and chemical products	Required
Manufacturing: Manufacture of rubber and plastics products	Required
Wholesale and retail trade; repair of motor vehicles and motorcycles	Required
Accommodation and food service activities: Restaurants and mobile food service activities	Required

Land Footprint Reduction

A company is required to set a Land Footprint Reduction target if they align with the following thresholds:

1. **Terrestrial Use is material according to Step 1's materiality screening** ; and
2. Are in the Agriculture, Forestry & Fishing or Manufacturing ISIC sections; and
3. Are required to set an SBTi FLAG target; and
4. One or both of the following:
    a. Have a land occupation footprint of 50,000 hectares or more as calculated using Chapter 7 of the *Greenhouse Gas Protocol Land Sector and Removals Guidance*; and/or
    b. Have 10,000 or more Full Time Employees

Landscape Engagement Target

Any company for which Soil Pollutants is material according to Step 1's materiality screening are required to set a Landscape Engagement Target. All companies are recommended to set a Landscape Engagement Target.

vii. Step 3 Land Target requirements determined by Step 2: Interpret & Prioritize

In the next phase of target setting, Step 2: Interpret & Prioritize[16], companies use the information collected in Step 1 to determine the most important places to set targets on first, in order to effectively mitigate their most significant negative impacts on nature and increase their potential for positive impacts. The activities that are within scope for a given pressure target (e.g. for Terrestrial use/No Conversion) are said to fall within the **target boundary** for that pressure.

[16] https://sciencebasedtargetsnetwork.org/resources/public-consultation-resources/

Note that for companies setting targets on no conversion of natural ecosystems and on land footprint reduction, ALL locations and activities within the target boundary must be included to avoid leakage between locations.

This means companies cannot use a prioritization approach to choose different locations to get started with first in Step 2 for their No Conversion of Natural Ecosystems and Land Footprint Reduction target boundaries; all locations must be included within scope in the first year that targets are set. Companies setting land targets may still be able to have different prioritization of locations for targets on other pressures (e.g. water use) applied during Step 2.

For prioritization of locations and the selection of landscapes, which is required for setting target 3 on landscape engagement, please see section 3.3.1.

No Conversion of Natural Ecosystems

To set SBTs for land, companies in sectors with material land pressures (see Figure 1) are *required* to commit to no conversion of natural ecosystems. The target dates for achieving conversion-free operations and supply chains are differentiated according to the level at which a company operates along supply chains, the type of commodities sourced, and the origins of those commodities. The targets are also differentiated in terms of coverage of sourcing volumes included in the targets.

This chapter of the SBTN Land Guidance sets out:

1. Key definitions relevant for this target
2. Information on **why** the target is needed
3. Information on **who** needs to set the target
4. Information on **what** the target looks like for different companies depending on direct operations and upstream sourcing of commodities
5. Information on **how** to set, report and communicate the target
6. A technical annex articulating the scientific basis of the target

1.1 What is the target?

The intention of the No Conversion of Natural Ecosystems target is to avoid the change of a natural ecosystem to another land use or profound change in a natural ecosystem's species composition, structure, or function. Conversion here includes severe degradation or the introduction of management practices that result in substantial and sustained change in the ecosystem's former species composition, structure, or function. Change to natural ecosystems that meets this definition is considered conversion regardless of whether or not it is legal.

Companies in certain sectors, with material land pressures, will commit to no conversion of natural ecosystems after a fixed **cut-off date** (see Box 3).

The target dates are differentiated according to:

- the level at which a company operates along supply chains,
- the type of commodities sourced, and
- the origins of those commodities.

The No Conversion target is also differentiated in terms of coverage of sourcing volumes included in the target.

Box 3 - Defining cut-off dates and target dates

Cut-off dates: To assess whether land conversion has occurred, land use change events are considered over an assessment period lasting from **a cut-off date until the present**.

The cut-off date provides a **baseline for the target**; after this date, any conversion of natural ecosystems on a given site renders the materials produced on that site non-compliant with a no-conversion target.

As recommended by the Accountability Framework initiative (AFi), cut-off dates should align with existing sectoral or regional cut-off dates where they exist, such as the Amazon Soy Moratorium, and cut-off dates associated with certification should not be later than 2020.

Target dates: Target dates are the time by which companies must achieve their Land targets.

For SBTN Land target 1 (No Conversion of Natural Ecosystems), **companies *must* use cut-off dates no later than 2020 as the reference for assessing conversion of natural ecosystems** (forests and non-forests). When sectoral or regional cut-off dates earlier than 2020 exist, companies *must* use those earlier dates.

SBTN's no conversion of natural ecosystems target dates differ according to the level at which a company operates along supply chains, the type of commodities sourced, and the origins of those commodities. See table 10 below for the target requirement for the no conversion target and the next section for the definition of Group 1 ecosystems.

Companies *can and should* define target dates more ambitious than those required, should they be able to meet the requirements in less time. For example, if a company has an existing zero-deforestation commitment.

Table 10 - No conversion targets: stages of the value chain and their defined target dates. "List A commodities" and "List B commodities" are outlined in Annex 1

Target requirements			
Stage of value chain	**Location of operation**	**Deforestation and conversion free (DCF) target**	
Site owners/operators	All ecosystems	**2025**: 100% deforestation and conversion free (DCF) across all sites	
Producers	All ecosystems	**2025**: 100% deforestation and conversion free (DCF) across primary and secondary commodities (A commodities and B commodities)	
Stage of value chain	**Origin of commodities**	**A- commodities + 10 % threshold of materiality[17]**	**B – commodities**
Direct sourcing	Group 1 ecosystems	**2025**: 100% DCF	
	Other ecosystems	**2027**: 80% DCF **2030**: 100% DCF	
Indirect sourcing (raw or processed)	Group 1 ecosystems	**2025:** 80% DCF **2027:** 100% DCF	**2027:** 80% DCF **2030:** 100% DCF
	Other ecosystems	**2027:** 80% DCF **2030:** 100% DCF	**2030:** 100% DCF
Indirect sourcing (embedded or highly transformed)	All origins	**2025:** 80% DCF OR compensated[18] **2027:** 100% DCF OR compensated	**2027:** 80% DCF OR compensated **2030:** 100% DCF OR compensated

[17] Based on TCFD materiality threshold

[18] Volumes that are embedded and highly transformed and are of unknown origin must be covered by a proposed alternative mechanism for ensuring compliance of these volumes with target requirements.

Mitigation mechanism for ensuring compliance of embedded and highly-transformed volumes with target requirements

It is the perspective of a growing number of organizations, that demanding full traceability of embedded or highly transformed commodities by downstream supply chain companies (e.g., retailers) is in many cases either not possible or not the best allocation of corporate sustainability resources. Whilst traceability remains the clearest way to understand and mitigate the impacts of commodity production and will be required for upstream companies and for the sourcing of raw or processed commodity volumes, a mechanism applicable to embedded and highly transformed volumes of high-impact commodities can open the path to an effective deployment of financial resources at the level of production landscapes.

A mechanism in form of payments and other incentives to landscape initiatives to compensate producers for maintaining natural land and support other landscape stakeholders (e.g., smallholders, local communities, etc.) in halting conversion of natural ecosystems and in improving ecological integrity. Actions required by the mechanisms must be deployed through engagement in landscape initiatives following the guidance in section3.

Such mechanism requires considerable research and a detailed development. It must be considered carefully to avoid unintended consequences. For instance, it cannot be developed in such a way that would create an escape route for companies that are not willing to engage their suppliers to improve transparency and traceability in their value chains.

It should be seen just as the last resort for those volumes that are likely to remain untraceable. On the other side, environmental organizations should see it as a way to ensure companies act now and not in an undefined future when traceability for embedded volumes could be achieved.

Requirements to access the mechanism

Companies purchasing or sourcing products containing embedded and highly transformed commodities, when not able to efficiently and effectively trace these volumes to validate their deforestation and conversion-free status, are required to participate in the compensation mechanism for these volumes provided that:

a. The company has committed to achieving no-conversion across all other supply chain volumes, and is making and disclosing progress toward that goal.
b. The company has achieved or is working to achieve sufficient traceability to assess DCF compliance across all other supply chain volumes.
c. The company calculates and discloses its sourcing footprint of embedded or highly-transformed commodity volumes.

Questions for reviewers: We are open to providing other options for compliance of embedded/highly transformed volumes other than validation of 100% DCF status. This may include financial compensation for embedded volumes in the form of payments to producers or investments in landscape initiatives in production landscapes.

Suggested process:

1. Assessment of volume embedded or highly-transformed commodities in products purchased by the company
2. Calculation of land footprint, defined as the extent of land required for producing such volumes of a commodity (using statistical data, as origin is unknown)
3. Calculation of company's contribution required to cover embedded or highly-transformed volumes of unknown origin

For part 3 of this method, there are a number of ways to calculate a 'meaningful' contribution by companies. Please provide your invite on the preferred option(s) for calculation. Some options are listed below.

Production-based footprint (Ha) is multiplied with the required financial contribution

($/Ha), which could be calculated on:

a. Cost of restoration in the country where most conversion is caused by the production of a specific commodity (e.g., Brazil for Soy, Indonesia for Palm Oil, Brazil for Beef)
b. Cost of restoration in landscape initiatives that are prioritized through the Landscape Engagement methodology (please see section 3.3.1)
c. Please suggest other options

Alternatively, less preferred option, the required contribution could be calculate with an area-based metric area, where the following outcomes must be achieved:

- Remediation of past conversion
  Restoration of ecosystems (please consider the difficulty to define and compare different degrees of restoration in different geographies)
- Please suggest other options.

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826 *Table 11 - No conversion of natural ecosystems target-setting guidance for direct operations and sourcing companies*

No conversion of natural ecosystems target setting				
Stage of value chain	**Data requirements**	**Where to account for conversion**	**Coverage**	**Options available to meet target requirements**
Direct operations	Data requirements are met when all production units and project sites are demarcated by georeferenced boundaries (i.e., polygons), with the exception of small sites (e.g., less than 10ha), for which one point coordinate near the centre of production may be sufficient.	Account for conversion at the level of production unit. Producers of high impact commodities (annex 1) and companies owning and managing mines and project sites **must** account for natural ecosystem conversion at the Production Unit/Project Site. Conversion **must** be accounted starting from the cut-off date to the year before submitting the target for validation.	All production units and project sites with a no conversion target.	New conversion cannot occur after the cut-off date. Existing post- cut-off date conversion must be remediated. Refer to Accountability Framework's Operational Guidance on Environmental Restoration Compensation for general guidelines on remediation of natural ecosystem conversion.
Direct Sourcing (sourcing from producers and from first point of aggregation)	Data requirements are met when all volumes of high-risk, land-intensive commodities (Annex 1) purchased are traceable to production unit or sourcing area or are physically certified using a scheme that delivers no-conversion assurance based on physical chain of custody systems.	Account for conversion at the level of production unit or sourcing areas known to be in the company's supply chain. Companies directly sourcing high-impact commodities **must**	Cover all volumes sourced of material high impact commodities with a no conversion target.	Sourced volumes must be deforestation and conversion-free Directly join or support producers in their remediation efforts. Suppliers providing non-compliant volumes must be engaged in and following timebound improvement plans to ensure that further

No conversion of natural ecosystems target setting				
Stage of value chain	**Data requirements**	**Where to account for conversion**	**Coverage**	**Options available to meet target requirements**
		account for natural ecosystem conversion at the Production Unit/Project Site or at the Sourcing area levels. Conversion **must** be accounted starting from the cut-off date to the year before submitting the target for validation.		conversion will not occur, as well as to remediate past conversion as appropriate.
Indirect Sourcing (raw or processed commodity volumes)	Data requirements are met when all volumes of high-risk, land-intensive commodities purchased are identified and communicated following these requirements: volumes disaggregated per commodity and per traceability level – production unit, sourcing area/jurisdiction/subnational level of origin, national level of origin, global sourcing data. And/ or are physically certified using a scheme that delivers no-conversion assurance based on physical chain of custody systems.	Account for conversion at the level of production unit or sourcing areas. Companies indirectly sourcing high-impact commodities must account for natural ecosystem conversion at the Production Unit/Project Site or at the Sourcing area levels (for all volumes traceable) Conversion must be accounted starting from the cut-off date to the year before submitting the target	Cover all volumes sourced of material high-impact commodities with a no conversion target.	Sourced volumes must be deforestation- and conversion free. Suppliers providing non-compliant volumes must be engaged in and following timebound improvement plans to ensure that further conversion will not occur, ~~as well as to remediate past conversion as appropriate.~~

No conversion of natural ecosystems target setting				
Stage of value chain	**Data requirements**	**Where to account for conversion**	**Coverage**	**Options available to meet target requirements**
		for validation (for all volumes traceable) Untraceable volumes must be disclosed following reporting requirements.		
Indirect Sourcing (embedded and highly-transformed commodity volumes)	Data requirements are met when all volumes of high-risk, land-intensive commodities purchased are identified and communicated following these requirements: volumes disaggregated per commodity and per traceability level – production unit, sourcing area/jurisdiction/subnational level of origin, national level of origin, global sourcing data.	Account for conversion at the level of production unit or sourcing areas. Companies indirectly sourcing high-impact commodities must account for natural ecosystem conversion at the Production Unit/Project Site or at the Sourcing area levels (for all volumes traceable) Conversion must be accounted starting from the cut-off date to the year before submitting the target for validation(for all volumes traceable) Volumes traceable only to national level or untraceable must be disclosed following the	Cover all volumes sourced of material high-impact commodities with a no conversion target.	Sourced volumes must be deforestation and conversion free. Remediate via direct payments/incentives to reduce conversion in [Group 1] areas by 2030. – further guidance is forthcoming Suppliers providing non-compliant volumes must be engaged in and following timebound improvement plans to ensure that further conversion will not occur, as well as to remediate past conversion as appropriate.

No conversion of natural ecosystems target setting				
Stage of value chain	Data requirements	Where to account for conversion	Coverage	Options available to meet target requirements
		reporting requirements.		

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Box 3 - Formulation of No Conversion of Natural Ecosystems target

Direct operations
[Company name] will have zero conversion of natural ecosystems by *[target year]* target year, compared to a 2020* baseline.
And *[Company name]* will remediate all past conversion occurred between 2020* and *[target year]* target year.

Upstream (Direct sourcing)
[Company name] will source 100% of volumes of commodities (list A or list B) from areas known to be conversion-free from 2020*.
And *[Company name]* will remediate all past conversion occurred between 2020* and *[target year]* target year (associated with their share of volumes sourced).

Upstream (Indirect Sourcing of raw and processed commodities)
[Company name] will source 100% of volumes of commodities (list A or list B) from areas known to be conversion-free since 2020*.

Upstream (Indirect Sourcing of embedded/highly transformed commodities)
[Company name] will source 100% of embedded / highly transformed volumes of commodities (list A or list B) from areas known to be conversion-free from 2020* or [TBD] will compensate these volumes through the mitigation mechanism's requirements implemented in landscape initiatives (see section 3 for further guidance).

In cases where the company chooses to source from new lands, and these lands have been converted between the cutoff date and the company's base year, the company must also remediate this conversion.

* Or other regional or sectoral cutoff dates

1.2 Why is the target needed?

The contributions of natural ecosystems are critical to planetary and human health. They provide protection, livelihoods, materials, food, fresh water, and a sense of cultural identity to billions of people, including Indigenous peoples and local communities.[19,20] They store vast quantities of carbon. Forests alone provide habitats for about 80% of amphibian species, 75% of bird species and 68% of mammal species.[21]

Yet humans have converted between 1/3 and 1/2 of habitable land for crop and livestock production, undermining these critical ecosystem services upon which we rely.[22] Deforestation and land degradation cost as much as USD 6.3 trillion a year through their impact on forest and agricultural productivity.[23] In sub-Saharan Africa, over two-thirds of productive land is degraded, compromising its capacity to support people and nature and undermining the livelihoods of at least 450 million people.[24]

The conversion and degradation of forest land has been given significant attention via dedicated initiatives and private sector commitments to end deforestation. Over one-third of forests have been lost globally due to deforestation since it first became a pervasive threat in temperate zones between the 18th and 20th century, and has drastically increased in the tropics over the past 50 years (Hansen et al. 2013; Haddad et al. 2015).

Since 2010, the global net loss of forests was estimated to be 4.7 Mha per year.[25] The rates of tropical deforestation are now particularly dire and are estimated to account for more than 97% of deforestation worldwide in the past century and more than 90% of global deforestation between 2000 and 2018.[26,27] 90% of recent deforestation across the tropics has been driven by agriculture, the majority of which is caused by seven commodities: cattle, palm oil, soy, cocoa, rubber, coffee and plantation wood fibre, with cattle having by far the largest impact.[28]

Despite their critical importance, less attention has been given to the loss of other, non-forest natural ecosystems. **Non-forest ecosystems are suffering conversion rates as high or higher than those of forests**.[29]

For example, **natural grasslands** – which hold high levels of biological diversity, are crucial for the mitigation of climate change and provide significant value to people – are among the

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[19] Beatty, C.R., Stevenson, M., Pacheco, P., Terrana, A., Folse, M., and Cody, A. 2022. The Vitality of Forests: Illustrating the Evidence Connecting Forests and Human Health. World Wildlife Fund, Washington, DC, United States

[20] Chaplin-Kramer et al.: Chaplin-Kramer, Rebecca, Rachel A. Neugarten, Richard P. Sharp, Pamela M. Collins, Stephen Polasky, David Hole, Richard Schuster, et al. "Mapping the Planet's Critical Natural Assets." Nature Ecology & Evolution, November 28, 2022, 1–11. https://doi.org/10.1038/s41559-022-01934-5.

[21] https://www.fao.org/3/cb9360en/cb9360en.pdf

[22] https://www.fao.org/food-agriculture-statistics/en/

[23] Sutton, P.C., S. Anderson, R. Costanza, and I. Kubiszewski. 2016. "The Ecological Economics of Land Degradation: Impacts on Ecosystem Service Values." Ecological Economics 129: 182–192.

[24] UNEP. 2015. *The Economics of Land Degradation in Africa*. Bonn: ELD Initiative. Available online at: https://www.nmbu.no/sites/default/files/pdfattachments/eld-unep-report_05_web_b-72dpi_1.pdf

[25] https://www.fao.org/3/ca8642en/ca8642en.pdf

[26] https://research.wri.org/gfr/latest-analysis-deforestation-trends

[27] https://www.fao.org/3/cb9360en/cb9360en.pdf

[28] Pendrill, F., Gardner, T. A., Meyfroidt, P., Persson, U. M., Adams, J., Azevedo, T., ... & West, C. (2022). Disentangling the numbers behind agriculture-driven tropical deforestation. Science, 377(6611), eabm9267.

[29] https://www.sciencedirect.com/science/article/pii/S2351989419307231

most threatened ecosystems in the world.[30] Efforts towards avoiding the conversion of forests should be broadened to incorporate the conservation of non-forest natural ecosystems[31] and this guidance walks that path.

Table 12 - Amount of conversion of the world ecosystems, grouped by their vegetation/ land cover attribute (Sayre et al., 2020)

Vegetation/Land Cover	Current (actual) Area (thousand ha)	Converted (potential) Area (thousand ha)	Conversion (%)
Forestlands	4,377,500	1,501,203	25.5
Shrublands	1,632,918	202,040	11
Grasslands	1,267,528	891,752	41.3
Sparsely or Non-vegetated	2,967,203	58,316	1.9
Snow and Ice	228,479	10	0.005

For additional information on the importance of natural ecosystems and for the scientific evidence supporting the choice of the no conversion target, please refer to the Annex 4.

[30] Lark, T. J. (2020). Protecting our prairies: Research and policy actions for conserving America's grasslands. Land Use Policy, 97, 104727.
[31] Gonçalves-Souza, D., Verburg, P.H. & Dobrovolski, R. (2020). Habitat loss, extinction predictability and conservation efforts in the terrestrial ecoregions. Biological Conservation, 246, 108579.

1.3 Who needs to set the target?

Companies will *need* to set a no conversion of natural ecosystem target if:

a) It is identified during SBTN's Step 1 (Assess) that land-associated pressures (explained in table 4 in the Introduction section) are material

AND

b) Table 5 of this document indicates that a no conversion target is *required* for the International Standard Industrial Classification of All Economic Activities (ISIC) designated sector(s) of the company. The second column of Table 5 will say either "Required" or "Required by FLAG".

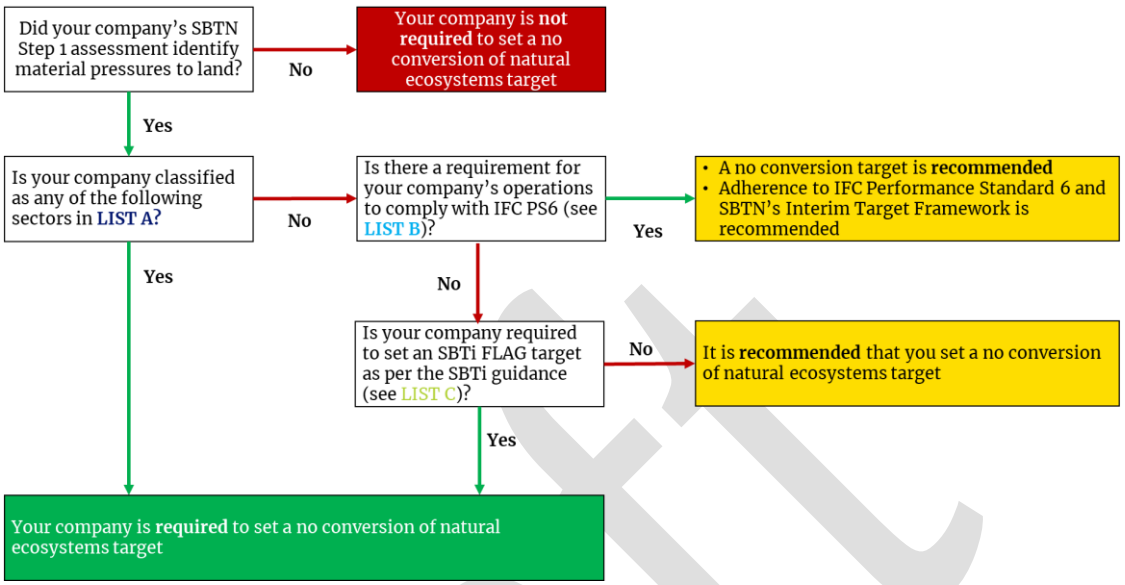
For companies where terrestrial land use has been identified as material in the SBTN Step 1 (Assess), such companies are **required** to set a No Conversion target. It may also be the case that a company learns of its requirement to set a No Conversion target under SBTN when it reaches the materiality threshold under SBTi FLAG guidance. These companies are also required to set a No Conversion target under SBTN. Finally, for a select number of sectors SBTN ***requires*** adherence to International Financial Corporation's (IFC) Performance Standard 6[32] on Biodiversity Conservation and Sustainable Management of Living Natural Resources (PS6), but does not recognize offsets.

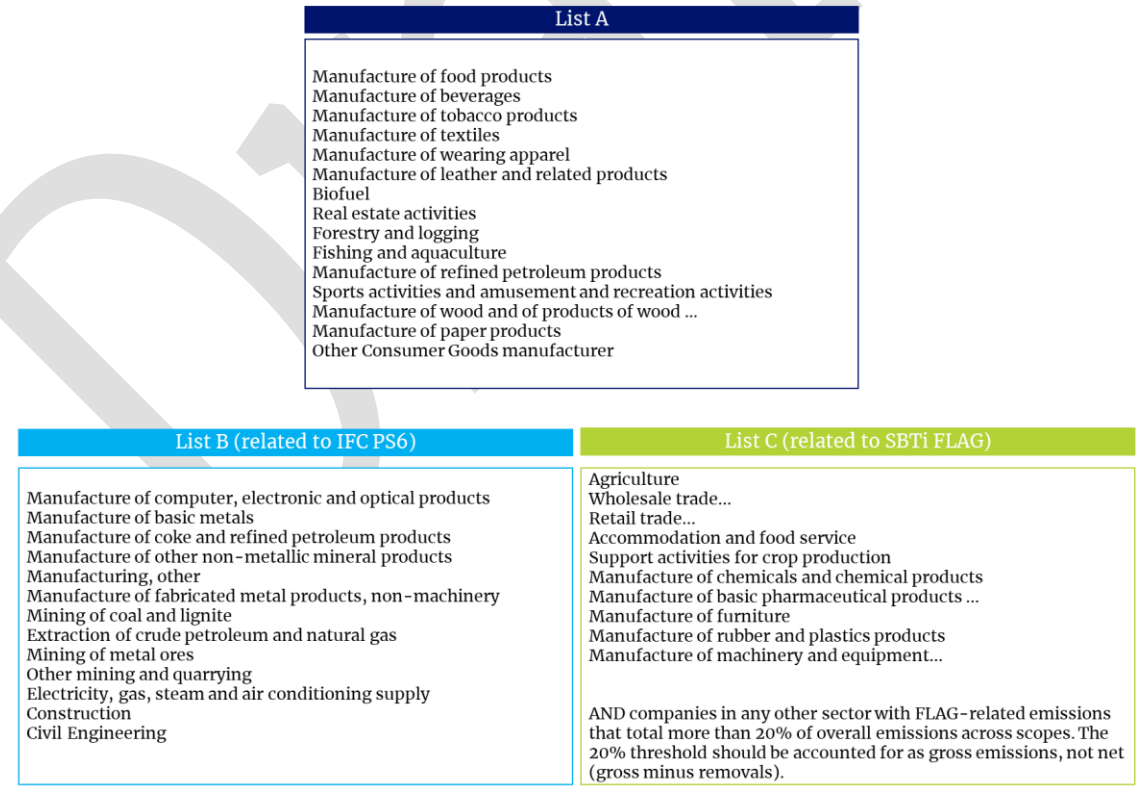
The requirement that certain sectors follow an alternate path for their No Conversion targets is not an endorsement by SBTN of the conversion of natural ecosystems from these sectors. These sectors frequently operate using this Performance Standard and in the absence of a viable no conversion target from a company representing this sector, demonstrated compliance with PS6 – whether required by their production activities or not, may satisfy partial progress on a no conversion target. Biodiversity offsets of Group 1 designated geographies or PS6 designed critical habitat *will not be considered compliant* under an SBTN No Conversion target – reflecting the voluntary nature of SBTN's target framework and the ambition of leading companies.

Built upon the sector requirements of Table 5, the decision-tree below guides companies in understanding their target setting requirements as it relates to no conversion of natural ecosystems.

[32] https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/policies-standards/performance-standards/ps6

Figure 1 - Decision-tree to enable companies to understand the target-setting requirements as it relates to setting of no-conversion of natural ecosystems





- *See here for IFC Performance Standard 6 requirements*
- *See here for SBTi FLAG requirements*
- *See here for SBTN's Interim Target Framework requirements*

1.4 Process overview for setting and measuring natural ecosystem conversion

1. **Assess requirements**

Companies must assess what their requirements are for a No Conversion target. Companies for which Terrestrial Use is material according to Step 1's materiality screening are required to set a Land Conversion Target. Additionally, companies in specific sectors should use their greenhouse gas emissions inventory to assess whether 20% or more of their emissions come from land sector activities (e.g., Agriculture, Forestry and Other Land Use emissions) requiring them to set a Land Conversion target (see section vi.)

Companies sourcing high-impact commodities (Annex 1) must identify material commodities whose sourcing must be included in the scope of the No Conversion target.

2. **Follow the target-setting process for the appropriate stage of value chain**

The target setting process and requirements differ for stages of the value chain, where a company operates, and the form of commodity usage. Multiple approaches can coexist within the same No Conversion target. For example, a company may follow direct sourcing requirements for volumes of high-impact commodities that are sourced directly from producers or from the first point of aggregation, and follow a different approach for embedded volumes, should they be present in the company's product lines.

Producers, site owners, and site operators

i. Map production units (operational sites) and locate them within the natural lands map
ii. Account for any conversion of natural ecosystems at the level of production unit that occurred after cut off date, consulting the natural lands map
iii. Set a No Conversion target for all production units
iv. Ensure remediation of land converted after the cut-off date

Direct sourcing

i. Map value chain and identify origin of volumes of all material commodities to production unit or sourcing area (see traceability requirements in section 1.1.)
ii. Account for conversion of natural ecosystems at the level of production unit that occurred after cut off date, consulting the natural lands map
iii. Ensure remediation of natural ecosystems converted after 2020, directly supporting producers or landscape initiatives linked to sourcing areas and ecosystems where conversion occurred
iv. Account for percentage of commodity volumes in compliance with deforestation-conversion free requirements

Indirect sourcing of raw and processed commodities

i. Map value chain and identify origin of volumes of all material commodities to production unit or sourcing area
ii. For volumes that are traceable, map value chain and identify origin of volumes of all material commodities to production unit or sourcing area
iii. Account for percentage of commodity volumes in compliance with deforestation-conversion free requirements

iv. For volumes that are not traceable, engage the supply chain to enhance traceability and increase the percentage of volumes in compliance with deforestation-conversion free requirements in line with target dates.

Indirect sourcing of embedded and highly-transformed volumes of commodities

i. Account for volumes of embedded and highly-transformed volumes of all material commodities included in purchased products.
ii. For volumes that are traceable, map value chain and identify origin of volumes of all material commodities to production unit or sourcing area Account for percentage of commodity volumes in compliance with deforestation-conversion free requirements
iii. For volumes that are not traceable, follow the requirements of the "mitigation mechanism".

3. **Submit required data for target validation**
A company is ready to submit their data for target validation (see section 1.6). Once the target is approved, a company can make a public statement as per claims guidance.

1.4.1 Global Map of Natural Lands

The relevance of a No Conversion target can be approached through considering areas of direct operations, the activities of upstream suppliers, and the activities of downstream users. This v1 guidance outlines target setting for direct operations and upstream sourcing but does not address downstream impacts yet.

The process and conditions around measuring conversion of natural ecosystems, allocating responsibility for such conversion, and setting targets will be divided into:

- methods for setting No Conversion targets on direct operations and
- targets around upstream sourcing of goods or services that lead to natural ecosystem conversion.

For this method, preventing the conversion of natural ecosystems started from defining natural lands and estimating where they exist by delineating them into a map.

To this purpose, the Land Hub selected the definition of natural ecosystems provided by the Accountability Framework (AFi) and used it to inform the creation of a natural lands map, developed in collaboration with World Resources Institute Land and Carbon Lab.

The approach for identifying natural lands across the globe was to combine the best available global spatial data on land cover/land use into a single harmonized map at a 30-meter resolution.

Where available, local/regional data has been incorporated and prioritized to ensure that regional knowledge is reflected in the map. The AFi definition of natural ecosystems has been operationalized based on existing landcover/land use data. Land cover data that were best for distinguishing between natural and non-natural land covers have been assessed and selected, using additional data where necessary (see: technical documentation of Global Maps of Natural Lands).

The Accountability Framework defines a **natural ecosystem** as "one that substantially resembles – in terms of species composition, structure, and ecological function – what would be found in a given area in the absence of major human impacts" and can include

managed ecosystems as well as degraded ecosystems that are expected to regenerate either naturally or through management (AFi 2019)[33].

While natural forests are of course part of natural ecosystems, a detailed forest definition is also provided by Afi.

Forests are defined as "land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or other land use" (AFi, 2019).

And **natural forests** are defined as possessing "many or most of the characteristics of a forest native to the given site, including species composition, structure, and ecological function."

Natural forests include primary forest, regenerated second-growth forests, managed natural forests and forests that have been partially degraded. Natural forest and tree plantations are considered to be mutually exclusive (AFi, 2019).

AFi's conversion definition is used also in anticipation of using the natural ecosystem map for future monitoring purposes, which includes "a change to another land use or profound change to composition, structure, or function" (AFi, 2019). Such changes are considered to be ecosystem conversion regardless of whether or not the change was legal.

Figure 2 - Land cover classes of natural lands map

In the absence of specific definitions for these ecosystems from AFi, the map is built on other definitions from available data. Here, natural grasslands are defined as areas of land with vegetation shorter than 5 meters and a livestock density based on the top 5% of cattle (>45.15 per km^2) and top 1% of buffalo, goats, and sheep, and can include areas of land dominated by grass or shrubs. Water is defined as surface water present 20% or more of the year. Snow and Ice include any permanent snow and ice. Wetlands are transitional ecosystems with saturated soil that can be inundated by water either seasonally or permanently, and can be covered by short vegetation or trees.

The land cover classes included in the map are largely drawn from two maps of global land cover for 2020:

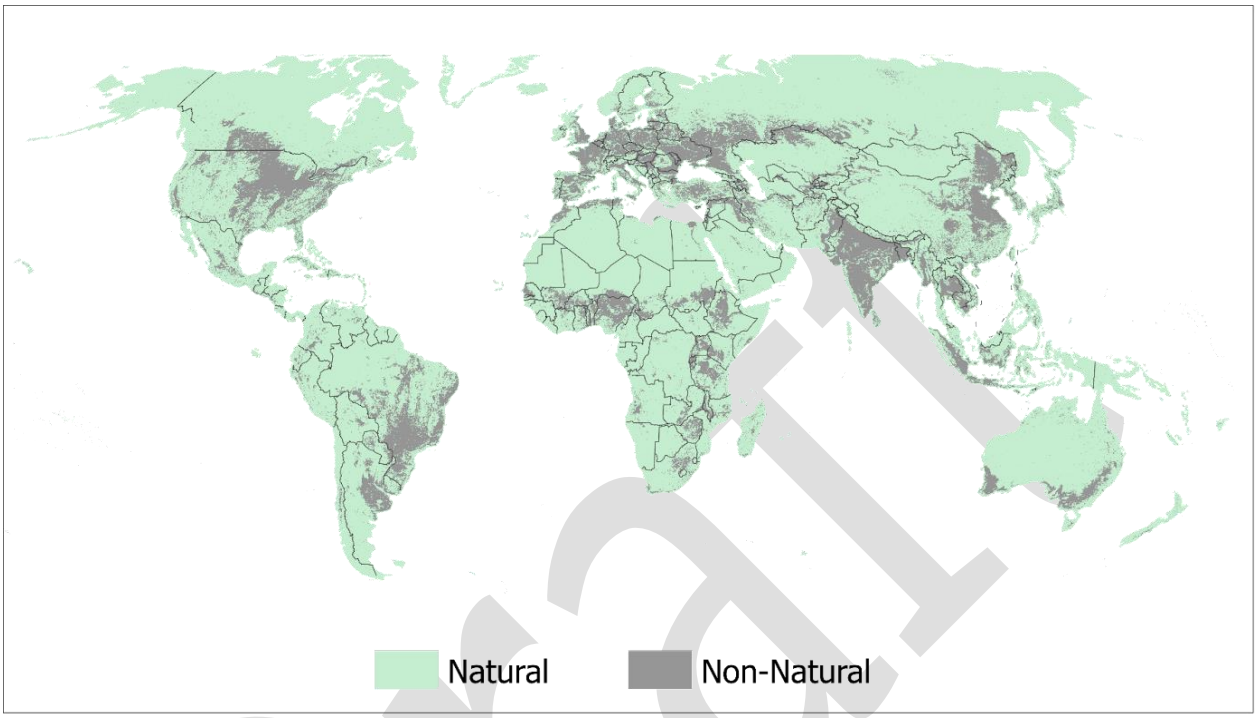
- (a) WorldCover, a 10 meter resolution dataset created by the European Space Agency (ESA) (Zanaga et al. 2021)[34], and
- (b) Global Land Use and Land Cover Change, a 30 meter resolution dataset created by the Global Land Analysis and Discovery Lab at the University of Maryland (UMD) (Hansen et al. 2022[35]; Potapov et al. 2022[36]).

Both share a similar classification scheme, and were compared to decide which made a "best fit" for this map.

[33] https://accountability-framework.org/wp-content/uploads/2019/07/Definitions.pdf
[34] https://worldcover2020.esa.int/download
[35] https://iopscience.iop.org/article/10.1088/1748-9326/ac46ec
[36] https://glad.umd.edu/users/Potapov/GLCLUC2020/frsen-03-856903.pdf

(Table 2A and 2B of the full technical documentation of the Global map of natural lands).

Figure 3 - Global map of natural lands



Note to the figure: there is no data on the glaciers of Greenland. Global scale of map obscures data at smaller scale

Map can be accessed here: https://wri-datalab.earthengine.app/view/sbtn-natural-ecosystems

Technical documentation can be found here:
https://docs.google.com/document/d/17xLt8RathbNxzdFAV_tTv0yOrfT3mziE/edit?usp=sharing&ouid=109275792418911359515&rtpof=true&sd=true

Table 13 - Examples of ecosystem types that may be included under the map's natural land cover classes.

Natural land cover class	Class definition	Ecosystem examples
Forest	Areas with tree cover greater than or equal to 5 meters in height spanning more than 0.5 hectares.	Rainforests, dry forests, montane rainforests, heath forests, temperate forests, boreal forests, woodlands, some types of savannas.
Short vegetation	Areas of land with vegetation shorter than 5 meters, including areas of land dominated by grass or shrubs.	Grasslands, shrublands, heathlands, steppes, vegetated

		deserts and semi-deserts, some types of savannas.
Wetlands	Transitional ecosystems with saturated soil that can be inundated by water either seasonally or permanently, and can be covered by short vegetation or trees.	Peatlands, mangroves, inland, coastal, saline, freshwater, brackish.
Water	Surface water present 20% or more of the year, outside of wetlands.	Rivers, lakes, coastal inlets, bays, lagoons.
Snow/Ice	Areas covered by permanent snow or ice.	Glaciers, perennial snowfields.
Bare land	Areas with exposed rock, soil, or sand with less than 10% vegetated cover.	Sparsely-vegetated deserts, lava flows, screes, alpine rocky outcrops, sandy shorelines.

Note: The ecosystem examples included in this table are not an exhaustive list of all ecosystems included within each land cover class, but are illustrative examples of some types of ecosystems which may be included. Land cover classes are defined based on the biophysical presence and coverage of certain types of vegetation or landforms, and thus a similar type of ecosystem in different regions may fall into different land cover classes depending on the biophysical characteristics present. Please note that in cases where local data was incorporated, we adopted the local definition of the land cover, therefore there may be inconsistencies in how land cover classes are defined (e.g. with regard to tree height threshold for forests, etc.).

Purpose and usability of the natural lands map

The newly created natural lands map must be used to:

- **Estimate natural ecosystem conversion** since 2020 that is associated with company's operations or to commodity volumes in their supply chains;
- Provide a **2020 baseline for *no conversion* calculations** agreed upon by a broad membership of organizations including those of the SBTN Land Hub and The Accountability Framework initiative (AFi).

The natural lands map will **not**:

- Be a resource for scientific research and analysis.
- Supplant existing research and biophysical mapping and analysis on ecosystem science
- Define ecosystems and/or working lands
- Be used to assess the quality of ecosystems, including value for biodiversity

This map demonstrates a conservative approach to mapping non-natural lands, meaning that decisions were made with the aim to be precautionary in assigning a non-natural classification. [Note for reviewers: we intend to describe a process for companies to provide data that contradicts the Natural Lands dataset, but need to work through the safeguards required of such an approach. Guidance on this is welcome during the review period and will be included in the final version.]

Due to the lower resolution and variation in accuracy of some of the input data, additional data were used, where available, to apply additional conditions before removing non-natural classes as an added precautionary step. As a result of the conservative approach, the final dataset may overestimate the area of natural lands in some regions.

Due to this, it is essential that this map be strictly applied to setting a corporate "no conversion of natural ecosystems" target in SBTN Land and not used to assess the extent of natural or non-natural ecosystems.

More details on how to use the map in Annex 3.

1.4.2 Group 1 Ecosystems

"Group 1" refers to places with **acknowledged ecological importance** that require immediate action to prevent conversion due to:

1. Existing legislation and/or initiatives, which include commitments to deforestation and conversion free commodities
2. Extinction/collapse risk, **irreplaceability**, or natural uniqueness
3. Maintaining **natural ecosystem contiguity** and intactness
4. The provision of **critical natural assets** or contributions to people

The guidance outlining how a company sets a science-based target for land in support of *No Conversion of Natural Ecosystems* will require a phased approach.

While the intent of any target that eliminates the conversion of natural ecosystems is immediate, many companies must contend with the realities of complex operations and supply chains.

Stopping ecosystem conversion will require investments in traceability where it is lacking and while these data gaps are addressed over the coming years, the phased approach of the

no conversion of natural ecosystems target requires companies to undertake a spatial prioritization of the natural land where efforts should be focused on the most immediate needs of a no conversion target.

Termed "Group 1" in this guidance, these areas represent a **spatial prioritization that will help companies determine where to focus their initial efforts on eliminating ecosystem conversion within natural lands** identified by the **SBTN Natural Lands Map**.

For many companies that have deforestation free commitments, this process will be familiar. However, in this target, deforestation becomes one of the many types of ecosystem conversion, which includes all natural, terrestrial lands.

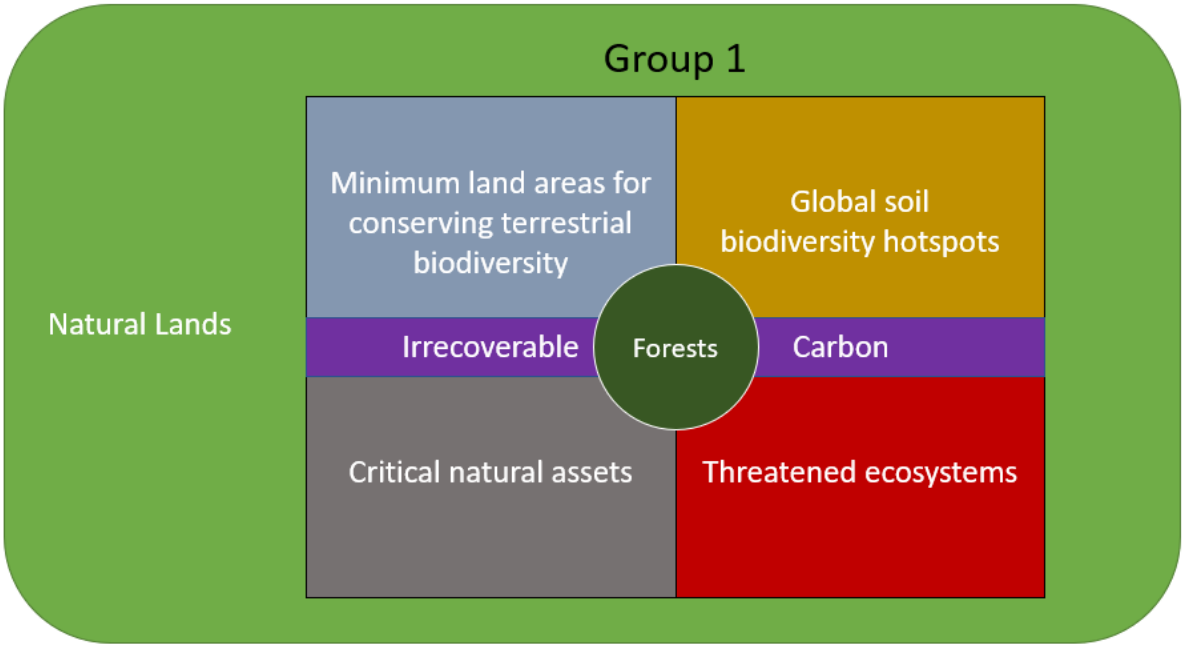
Group 1 does not apply to producers, site owners, or site operators. It is expected that this stage of the value chain does not have data gaps related to the location of operations or production units. Producers of commodities listed in Annex 1 (A and B commodities) must eliminate conversion of natural ecosystems (including forests) by 2025. Site owners and site operators of other business sectors required to set a no conversion target will similarly be required to eliminate natural ecosystem conversion by 2025.

Group 1 applies only to direct and indirect sourcing of commodities listed in the global and regional land-intensive commodity/activity list in Annex 1. For companies sourcing any of these conversion-driving commodities, if materiality meets or exceeds a 10% threshold a Group 1 prioritization must be applied to the no conversion of natural ecosystems target. Direct sourcing of any of these Annex 1 commodities that meet the materiality threshold will require 100% no conversion of Group 1 geographies by 2025.

For indirect (non-embedded sourcing) sourcing of global conversion-driving commodities (A commodities) companies are required to eliminate ecosystem conversion from 80% of these volumes associated with Group 1 by 2025 and 100% by 2027. For B commodities 80% must be conversion free by 2027 and 100% in Group 1 by 2030.

It is important here to remember that areas identified as "natural" in the SBTN Natural Lands Map represent a continuum of "natural ecosystems" based on the Accountability Framework definition. This includes "pristine" lands, regenerated ecosystems, managed natural land, and partially degraded areas that maintain many characteristics of natural ecosystems. As such, a No Conversion target focuses on maintaining existing land use and land cover – which may span many different uses. Group 1 areas highlight that existing natural land cover and its representative ecological productivity should remain intact. However, as better data become available, the natural land classification will become more refined, adding greater clarity to the natural/non-natural designation – especially for non-forest ecosystems.

Figure 4 - Group 1, delineation of the areas



Note to the figure: the delineation of the areas that comprise Group 1 is based on several datasets and analyses that provide a way to better understand the priority of different areas of natural ecosystems for no conversion. In this regard, Group 1 will always be a much smaller subset of the SBTN Natural Lands Map.

Of direct relevance to Group 1 is the inclusion of all natural forests since many companies have existing deforestation free commitments with a 2025 target date, which is also a requirement for SBTi FLAG climate targets. Natural land classified as forest should be included in Group 1 and should remain natural forest. Natural forest that is converted to plantation forests is considered as conversion for the purpose of this guidance, aligning with the forthcoming Greenhouse Gas Protocol Land Sector and Removals Guidance.

Group 1 compiles several relevant datasets to highlight areas of natural land that exhibit exceptional ecological importance. These include the minimum land areas for conserving terrestrial biodiversity (Allan et al. 2022[37]), natural ecosystem areas that have been assessed by the IUCN Red List of Ecosystems as "threatened"[38], hotspots for the ecological conservation of soils (Guerra et al., 2022)[39], irrecoverable carbon[40], and "critical natural assets: identified the 30% percent of global land area that is needed to provide 90% of the total current magnitude of 14 different types of nature's contributions to people (NCP) (Chaplin-Kramer et al., 2022[41]). For a detailed description of these layers and their selection as indicative of Group 1 please see the Natural Lands Map Technical Documentation.

[37] Allan, J.R., Possingham, H.P., Atkinson, S.C., Waldron, A., Di Marco, M., Butchart, S.H.M., et al. (2022). The minimum land area requiring conservation attention to safeguard biodiversity. Science, 376, 1094–1101. https://datadryad.org/stash/dataset/doi:10.5061%2Fdryad.qfttdz0k3 CC0 1.0 Universal Public Domain Dedication license.

[38] Threatened includes ecosystems classified as "Vulnerable", "Endangered", or "Critically Endangered". While Red List of Ecosystem assessments are not yet global in coverage, they provide an additional buffer against the conversion of threatened ecosystems for those areas that have been assessed. See https://assessments.iucnrle.org/

[39] Guerra, C.A., Berdugo, M., Eldridge, D.J., Eisenhauer, N., Singh, B.K., Cui, H., et al. (2022). Global hotspots for soil nature conservation. Nature, 610, 693–698.

[40] Noon, M.L., Goldstein, A., Ledezma, J.C. et al. Mapping the irrecoverable carbon in Earth's ecosystems. Nat Sustain 5, 37–46 (2022). https://doi.org/10.1038/s41893-021-00803-6

[41] Chaplin-Kramer, R., Neugarten, R.A., Sharp, R.P. *et al.* Mapping the planet's critical natural assets. *Nat Ecol Evol* **7**, 51–61 (2023). https://doi.org/10.1038/s41559-022-01934-5

SBTN Land cannot hope to provide comprehensive guidance for companies on where to avoid the conversion of natural ecosystems without a consideration of natural ecosystems that have cultural or social importance for people. In fact, any guidance on where decisions regarding the conversion of natural ecosystems are made, companies should ensure that such conversion has received free prior and informed consent (FPIC).

It is beyond the scope of this guidance to provide global data for how conversion may or may not affect cultural or social importance. In this regard, companies should assess the potential impacts of conversion with local communities and stakeholders as part of a landscape initiative, especially as it relates to their landscape engagement targets and following SBTN guidance on stakeholder engagement.

To assess the relevant areas for Group 1 prioritization, companies will use the Natural Lands map and the associated Group 1 designation based on direct sourcing and indirect sourcing.

- For company direct sourcing that overlaps with these areas, companies will be required to commit to 100% no conversion of these areas by 2025.
- For Indirect Sourcing companies will be required to ensure 80% compliance with no conversion of Group 1 areas by 2025 and 100% compliance by 2027.

[Additional step-by-step guidance will be provided on the steps involved in using the Natural Lands map to identify Group 1 areas in the final version]

1.5 Data requirements for target setting and accounting guidance

This section identifies what data companies need to collect to be able to set a target on no conversion of natural ecosystems.

The section further explains how companies can account for conversion of natural ecosystems consequential to the production or procurement of land-based commodities and/or products containing them.

Data requirements

To set a target on no conversion of natural ecosystems, companies will need data on:

- **Location and area of production units** of high impact commodities that they **own or manage** (see definitions for ownership and high impact commodities in Step 1 methods)
- **Location of mines and project sites** (e.g., infrastructure and construction sites) that they own or manage
- **Origin and volumes of high impact commodities** in their supply chains at the production unit level or sourcing area level (see Annex 1).
    - When origin of all commodities is not yet known at this scale, companies should disclose the volumes of each commodity that is of unknown origin or known only to the country level.
- For producers, site owners, site operators and direct sourcing, **amount of natural ecosystem conversion that occurred later than the company's cut-off date on sites it owns or manages**, on production units known to be in its supply chains, or in sourcing areas from which it sources commodity volumes.

Data requirements vary according to the stages of the value chains where a company operates. Please refer to table 6 above for the definitions of stages of the value chain.

1227

1228 *Table 14 - Minimum data requirements for measuring and estimating conversion of natural ecosystems*

Stage of the value chain	Sectoral examples	Where	Unit of measurement	Spatial data[42]
Producers, site owners & operators	Producers of agricultural commodities	**Required**: Location of all sites where high impact commodities are produced. Areas converted after cut-off date.	Hectares	**Required:** Production units
	Producers of forestry products	**Required**: Location of all sites where high impact commodities are produced. Areas converted after cut-off date.	Hectares	**Required**: Production units
	Mining companies	**Required**: Locations of all mining and project sites.	Hectares	**Required**: Production units
	Infrastructure and construction companies	**Required**: Location of all sites where high impact commodities are produced. Areas converted after cut-off date.	Hectares	**Required**: Production units
Direct sourcing		**Required**: Sourcing area of high impact commodities purchased.	Hectares	**Recommended**
		Recommended: Production unit.	Hectares	**Recommended**
		Required: Volumes of high impact commodities purchased from each production unit or sourcing area.	Metric tonnes or equivalent	N/A
Indirect Sourcing (raw or processed)		**Required for Group 1 ecosystems** Sourcing area of high impact commodities purchased.	Hectares	**Recommended**
		Required: Volumes of high impact commodities embedded into complex products purchased.	Hectares	**Recommended**
		Recommended: Production unit.	Hectares	N/A
Indirect Sourcing (embedded or highly-transformed)		**Recommended**: Production unit or sourcing area of high impact commodities purchased.	Hectares	**Recommended**
		Required: Volumes of high impact commodities embedded into complex products purchased.	Metric tonnes (or equivalent)	N/A

1229

[42] Coordinates of location and map.

Accounting for conversion of natural ecosystems

The following guidelines on accounting have been taken from the AFi's guidance and adapted to the scope of this target setting methodology. The term "land use change" is kept here in alignment with GHG Protocol's accounting guidance.

To effectively set and achieve targets to end deforestation and conversion from operations and supply chains, companies *must* measure and account for land use change in credible and consistent ways. This process is key also to account for LUC emissions for setting SBTi FLAG targets. After having completed the accounting exercise, companies will then use the map to understand which portion of land use change is conversion of natural ecosystems.

1.5.1 Scale at which to assess land use change

Land use change *may* be assessed **based on production unit-level information** and/or **estimated based on the attribution of conversion** occurring at the level of the sourcing area.

The parallel processes for calculating land use change emissions are called direct and statistical land use change, respectively (see Chapter 7 of the GHG Protocol Land Sector and Removals Guidance).

The determination of the appropriate scale of analysis will largely depend on the ability of the company to trace products through the supply chain to their origin, as well as the extent to which that origin is associated with risk of deforestation or ecosystem conversion and the appropriate scale of management given the context of production and sourcing.

Box 4 - Information on traceability from the latest Afi guidance

> For companies that purchase agricultural or forestry commodities, traceability is necessary to determine the origin of the materials in their supply chains and ascertain when land use change took place in these locations of origin. Traceability may be facilitated by internal company systems, business-to-business disclosure by suppliers, third-party certification programs, or other methods for attaching information about origins to product volumes. Traceability to the production unit of origin is preferable in most cases and allows for the highest level of supply chain control and the most precise land use change accounting. However, recognizing that full traceability to production units is not always available, and that in some context a sourcing area or jurisdiction may be the most relevant scale for managing deforestation and conversion risks, this guide also explains how deforestation/conversion and associated emissions can be estimated at an area level.

There are three primary scales at which land-use change can be assessed:

1. **Traceability to the production unit of origin**
    a. It means that companies are able to trace commodity volumes to specific mapped production unit(s), such as farms, ranches, plantations, or forest management units.
    b. The Accountability Framework defines a production unit as a discrete land area on which a producer cultivates crops, manages timber, or raises livestock.
    c. A production unit will generally be a contiguous land area or proximate group of plots managed by the same owner, regardless of any internal subdivisions.
    d. Production units should be demarcated by geo-referenced boundaries (i.e., polygons), with the exception of small sites (e.g., less than 10 ha), for which

one point coordinate near the centre of the production may be sufficient. The same approach explained for production units can be used for project sites (e.g., mining sites, construction sites).

2. **Traceability to the sourcing area**
    a. It means that products are traceable to a known area or region where the material was produced (or extracted), but that the specific production unit of origin is not known.
    b. Sourcing area-level boundaries could include a sourcing radius from a first point of collection or processing facility (e.g., a radius from a palm oil mill), a defined production landscape (e.g., the area covered by a smallholder cooperative), or a subnational jurisdiction (e.g., municipality).
3. **Limited or no traceability** means that product can only be traced to a country of origin or that the origin of products is unknown.

Table 15 - Appropriate measures of land use change and associated LUC emissions. Source: Accountability Framework Initiative

Level of traceability and monitoring	Position in the supply chain	Unit of analysis	Accounting metrics & methods for...	
			deforestation and conversion (disaggregated by commodity)	emissions from land use change
Production unit (Section 4.3)	Own operations (scope 1 emissions)	Own farms/ plantations	• Hectares of deforestation or conversion in operations since cutoff date • % of total ha owned or managed that this represents	Scope 1 dLUC (tons CO_2 equivalent)
	Supply chain (scope 3 emissions)	Known supply chain farms/ plantations	• Hectares of deforestation or conversion on production units in supply chain since cutoff date • % of total ha on known farms that this represents	Scope 3 dLUC (tons CO_2 equivalent)
Sourcing area (Section 4.4.1 and 4.4.2)	Supply chain (scope 3 emissions)	Known sourcing (e.g. mill sourcing radius, production landscapes, or subnational jurisdictions)	Hectares of natural ecosystem conversion in sourcing area since cutoff date that may be attributed to the company	Scope 3 sLUC (tons CO_2 equivalent)
Limited or no traceability (Section 4.4.3)	Supply chain (scope 3 emissions)	Country of origin	Volume of materials (and proportion of total) sourced from each country*	
		Unknown origin	Volume of materials (and proportion of total) sourced for which origin is unknown*	

* When there is limited to no traceability, hectares of deforestation and conversion cannot be estimated.

1.5.2 Accounting for land use change at the production unit

Monitoring conversion change at the level of production units (e.g. farms, plantations, and forest management units) provides the greatest amount of precision about the impact of commodities in company operations and supply chains and is the best way to determine whether products are linked to recent deforestation or conversion.

When accounting for deforestation and conversion at the site level, all conversion in the production unit that has occurred since the cut-off date (for deforestation/ conversion) or during the assessment period (for LUC emissions) *must* be included, regardless of the current

use of that land (i.e., whether it is used to cultivate the commodity of interest, to cultivate another commodity, has not yet been cultivated, or is not currently being cultivated).

1.5.3 Accounting for land use change at the sourcing area

Accounting for deforestation and conversion associated with agricultural and forest commodities at the scale of a sourcing area *may* be appropriate in a range of circumstances, including when:

- Companies do not have physical traceability to the production unit level
- Sourcing area is the most relevant scale for managing deforestation and conversion risk
- Companies source from jurisdictions or landscapes where it can be shown that there has been no or negligible recent conversion.

It is *recommended* that, when allocating land use change at an area level to specific commodity volumes, all land use change that may be related to agriculture (for crop or livestock products) or forestry (for forest products) is included in the analysis. Consideration of all agriculture- or forestry-related land use change allows companies and others to best account for varied land use change trajectories or indirect land use change pressures, providing an appropriately conservative approach to allocation.

The GHG Protocol provides two recommended approaches for allocating land use change in a given area (see AFi guidance[43] and Chapter 7 and 17 of the GHG Protocol Land Sector and Removals Guidance[44]):

1. allocation based on land occupation
2. allocation based on commodity expansion

In all cases, the method and data sources used to allocate land use change and associated emissions to products within a sourcing area *must* be clearly disclosed.

Please consult Annex 2 for additional information on accounting.

1.6 Case Study—No Conversion of Natural Ecosystems

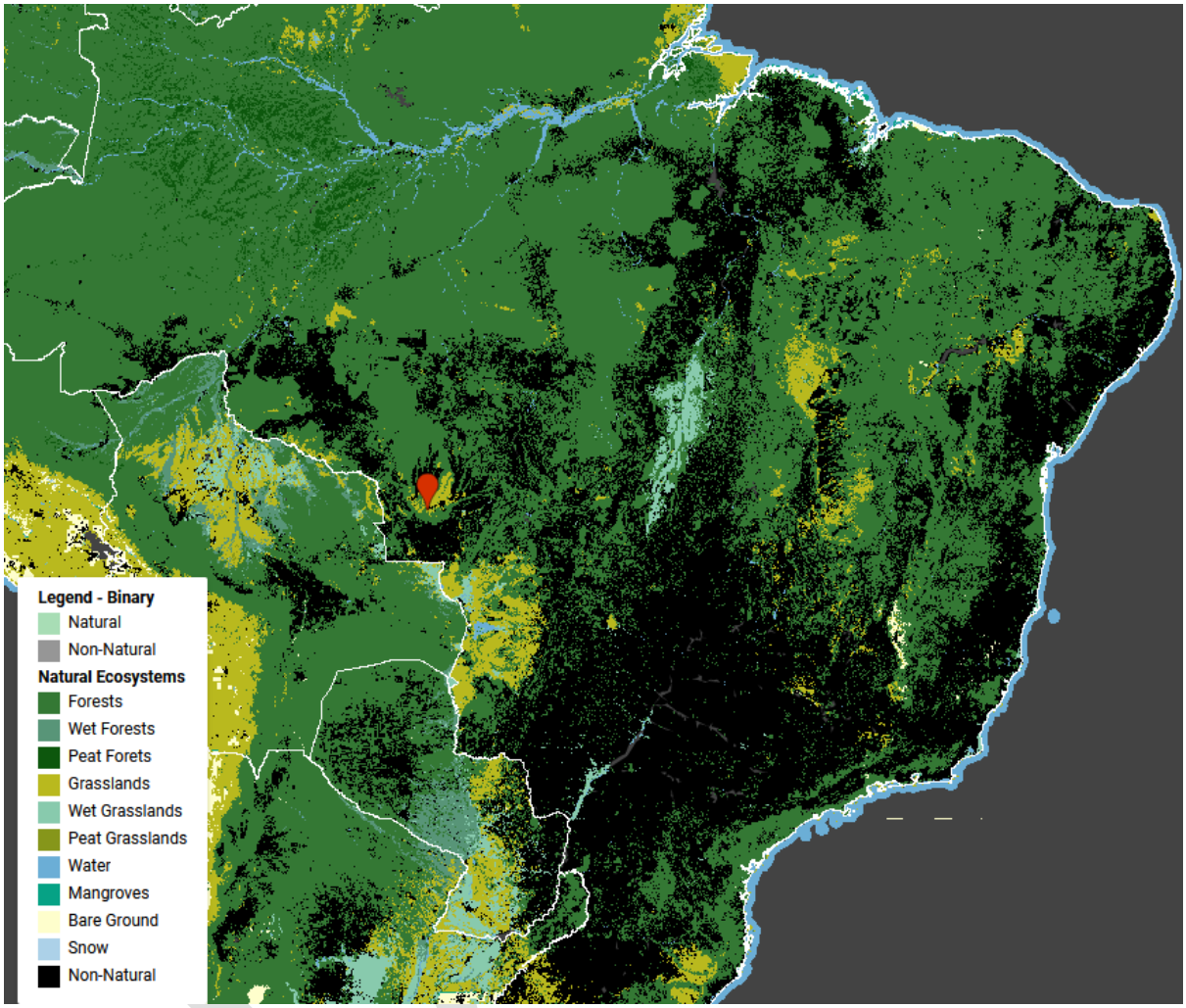
Ursus Nourishment is a food and beverage producer (List A company) that specializes in plant-based drinks and food. This hypothetical data comes from a SBTN Case study for steps 1(Assess) and 2(Prioritize). This case study will be publicly available with the launch of Science Based Targets for Nature v1. Based on this analysis of materiality, value chain, pressures, state of nature, business activities, and commodities target boundaries were determined for climate change, land use, land use change, water use, soil pollution, and water pollution. For this case study we will focus on land use change. After calculating the index value, Ip (pressure (land use change) x SoNp (Percent Tree Cover Loss (2010-2021)) the priority rank within target boundary for direct operations and land use change was growing of non-perennials in France, Spain, and Germany. The priority rank within target boundary for upstream and land use change was Tree Nuts in Côte d'Ivoire, Tree Nuts in United States, and Soy in Brazil.

The focus of this case study will be upstream and direct sourcing of soy as the high impact commodity (List A commodity) in Brazil. Soy passes the 10% materiality threshold of 20% untraceable volumes. Brazil has many natural ecosystems bordering non-natural as seen in the map below from the SBTN-Natural-Ecosystems map. Brazil also is home to numerous forests, wet grasslands, peat forests, water, grasslands, and mangroves. The red locater

[43] https://accountability-framework.org/
[44] https://ghgprotocol.org/land-sector-and-removals-guidance

mark is in the State of Mato Grosso which is well known for its copious soy farming. This is a group 1 ecoregion containing forests and priority commodity engagement areas.

Figure 5 - An example of a natural and non-natural ecosystems map of a soy farm site in the State of Mato Grosso in Brazil.



The cut-off date was set to 2018 for forests and other natural ecosystems. The volume of soy sourced from 2018-2022 was 100,000 metrics tons and the area converted was 218,880 ha. Soy is used here as a high impact commodity example and spatial representation of the proximity of natural ecosystems and non-natural land in western Brazil. Ursus Nourishment would have to set a target for 100% DCF (deforestation and conversion free) by 2025 across their supply chain volumes. The company would also set another no conversion target for other natural ecosystems by 2030 across their supply chain volumes.

1.7 Target validation

To begin the target validation process companies *must* submit:

- ISIC sector classification(s) describing their direct operations and upstream activities
- Data required in section 1.5
- Accounting of conversion between cut-off date and the year before targets are submitted (e.g., 2020 – 2023)

1.8 Key definitions relevant for this target

Natural ecosystem: An ecosystem that substantially resembles – in terms of species composition, structure, and ecological function – one that is or would be found in a given area in the absence of major human impacts. This includes human-managed ecosystems where much of the natural species composition, structure, and ecological function is present. Natural ecosystems include:

- Largely "pristine" natural ecosystems that have not been subject to major human impacts in recent history;
- Regenerated natural ecosystems that were subject to major impacts in the past (for instance by agriculture, livestock raising, tree plantations, or intensive logging) but where the main causes of impact have ceased or greatly diminished and the ecosystem has attained species composition, structure and ecological function similar to prior or other contemporary natural ecosystems;
- Managed natural ecosystems (including many ecosystems that could be referred to as "semi-natural") where much of the ecosystem's composition, structure, and ecological function are present; this includes managed natural forests as well as native grasslands or rangelands that are, or have historically been, grazed by livestock;
- Natural ecosystems that have been partially degraded by anthropogenic or natural causes (e.g., harvesting, fire, climate change, invasive species, or others) but where the land has not been converted to another use and where much of the ecosystem's composition, structure, and ecological function remain present or are expected to regenerate naturally or by management for ecological restoration.[45]

Conversion: A change of a natural ecosystem to another land use or profound change in a natural ecosystem's species composition, structure, or function. Deforestation is one form of conversion (conversion of natural forests). Conversion includes severe degradation or the introduction of management practices that result in substantial and sustained change in the ecosystem's former species composition, structure, or function. Change to natural ecosystems that meets this definition is considered to be conversion regardless of whether or not it is legal.[46]

1.9 Best practices for disclosure

SBTN is assessing reporting requirements for companies that will set a No Conversion of Natural Ecosystem Target-

Pending final decision, companies may be required to disclose transparently the following information to SBTN:

- Deforestation and conversion footprint in their operations
- Commodity volumes in their supply chains disaggregated per level of traceability as follows:
    - Traceable to production unit
    - Traceable to sourcing area/jurisdiction/subnational level
    - Traceable to country of origin
    - Not traceable

- For all volumes, the percentage that is assessed to be deforestation and conversion-free must be indicated.

Annual reporting will ensure that SBTN and other stakeholders will be able to have a clear view on how the company is progressing towards the achievement of their target.

[45] https://accountability-framework.org/wp-content/uploads/2022/09/AFI-LUC-and-Emissions-Guidance-09_2022.pdf
[46] https://accountability-framework.org/wp-content/uploads/2022/09/AFI-LUC-and-Emissions-Guidance-09_2022.pdf

In alignment with AFi, this guidance suggests companies to disclose the above information by using CDP forests questionnaire[47] and by following the GRI Agriculture, Aquaculture, and Fisheries Sector Standard[48].

[47] https://guidance.cdp.net/en/guidance?cid=31&ctype=theme&idtype=ThemeID&incchild=1&microsite=0&otype=Guidance&tags=TAG-646%2CTAG-609%2CTAG-600

[48] https://www.globalreporting.org/standards/standards-development/sector-standard-for-agriculture-aquaculture-and-fishing/

Land Footprint Reduction

This chapter of the SBTN Land Guidance sets out:

1. Key definitions relevant for this target
2. Information on **why** the target is needed
3. Information on **who** needs to set the target
4. Information on **what** the target looks like for different companies depending on direct operations and upstream sourcing of commodities
5. Information on **how** to set, report and communicate the target
6. A technical annex articulating the scientific basis of the target

2.1 What is Land Footprint Reduction?

A company's land footprint, also known in LCA terms as "land occupation," is defined for this target as the amount of agricultural land required per year to produce the products produced or sourced by a company, and it is reported in hectares per year.

This target helps companies reduce the amount of agricultural land needed to produce the products in their value chain over time. "Land footprint" for the purpose of this target refers to working lands used to produce agricultural products – not necessarily all land owned or controlled by companies. "Land footprint" and "land occupation" are also referred to as "terrestrial ecosystem use" in the SBTN Technical Guidance for Steps 1 and 2.

2.2 Why is the target needed?

Expansion of agriculture, forestry, and other human land uses (e.g., mining, infrastructure) is the leading driver of natural ecosystem conversion. Therefore, while companies set targets to end natural ecosystem conversion (terrestrial ecosystem use change) (target 1), it is also important to set targets to limit or decrease pressure on those natural ecosystems by reducing the amount of land occupied by human activities (terrestrial ecosystem use) to free up land for ecosystem restoration.

As mentioned in the introduction of this document, the landscape engagement target (target 3) works to ensure that companies appropriately balance the need to use land more efficiently while avoiding unsustainable forms of agricultural intensification (e.g., overuse of fertilizers and chemical inputs, irrigation practices that deplete freshwater resources), all while building resilience. In this way, the three targets work together to incentivize the high level actions needed to achieve nature goals in land systems – namely halting conversion of natural ecosystems (target 1), reducing pressure on those ecosystems and freeing up land for ecosystem restoration (target 2), and improving the ecological integrity of landscapes, including working lands, to enhance ecosystem structure, composition and function (target 3).

This version of SBTN Land targets (target 2) only requires large companies producing or sourcing agricultural products (e.g., food, animal feed, fibres, bioenergy feedstocks) to set a land footprint reduction target.

This is because agriculture (including cropland and pastureland) is the world's largest user of land. Furthermore, a number of studies, summarized in Table 21 in the section "Science-based rate of land footprint reduction over time" below, have modelled needed reductions in agricultural land occupation. Subsequent versions of Land SBTs will explore the applicability of this target-setting methodology for other major users of land.

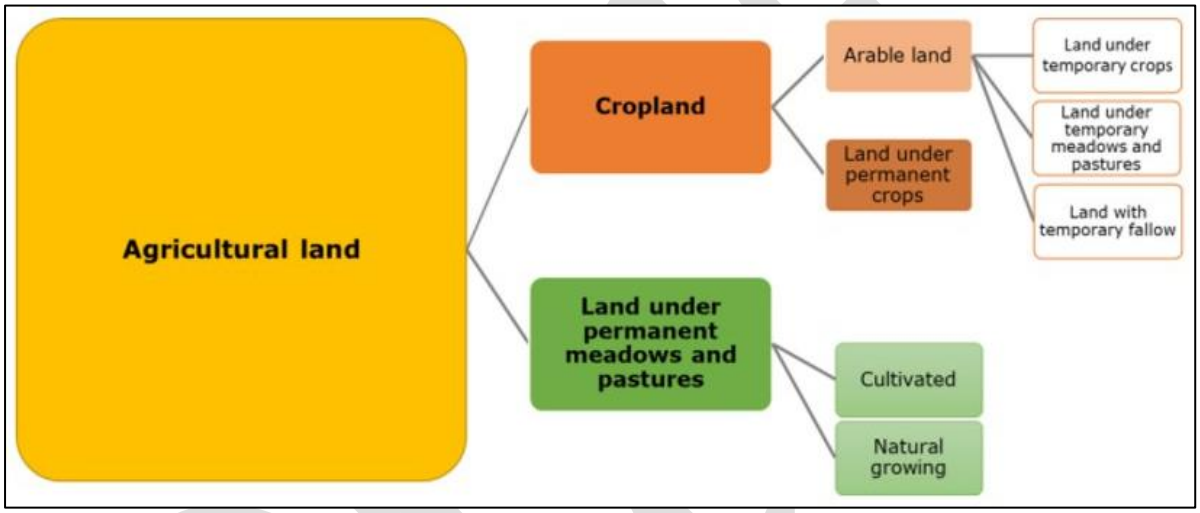
The target is applicable to large companies with agricultural land occupation of over 50,000 hectares and/or 10,000 full time equivalent (FTE) employees.

As mentioned above, "land footprint" or "land occupation" for the purpose of this target refers to working lands used to produce agricultural products—not necessarily all land owned or controlled by companies. The implications of this are that reductions cannot be applied to extensive land holdings held in reserve but must be applied to land under current

agricultural production. Land occupation can include both direct operations and upstream impacts, as detailed in the SBTN Technical Guidance for Steps 1 and 2 (SBTN forthcoming), but for this target only agricultural lands are counted. Agricultural lands that are not attributable to direct operations or upstream value chain activities should not be counted within the Land Footprint Reduction target.

For crops and livestock products, land occupation refers to all agricultural land: cropland and land under permanent meadows and pastures (FAO, 2022)[49] (Figure 6).

Figure 6 - Components of Agricultural Land in FAOSTAT. Source: Land statistics and indicators: Global, regional and country trends, 2000–2020. FAO 2022. https://fenixservices.fao.org/faostat/static/documents/RL/cc0963en.pdf.



2.3 Who needs to set the target?

SBTN *requires* companies that meet the following three criteria to set a Land Footprint Reduction target:

i) **Companies from the following designated sectors**:

a. Food and Agriculture Production (ISIC A_1)
b. Food Processing (ISIC C_10)
c. Food Manufacturing (ISIC C_11)
d. Tobacco Processing (ISIC C_12)
e. Textile Manufacturing (ISIC C_13)
f. Apparel Manufacturing (ISIC C_14)
g. Leather Manufacturing (ISIC C_15)
h. Rubber Tire Manufacturing (ISIC C_22_221)
i. Wholesale Food (ISIC G_46_461, 462, 463)
j. Wholesale Textiles (ISIC G_46_464)
k. Retail with Food (ISIC G_47_471, 472)
l. Retail Apparel (ISIC G_47_475_4751)
m. Restaurant, Catering & Food Service (ISIC I_56_561, 562)
n. Biomass/Biofuels (ISICD_35_351_3510);

[49] https://fenixservices.fao.org/faostat/static/documents/RL/cc0963en.pdf

AND

ii) **Companies that are required to set an SBTi FLAG target (as in box X above pp20)**

AND

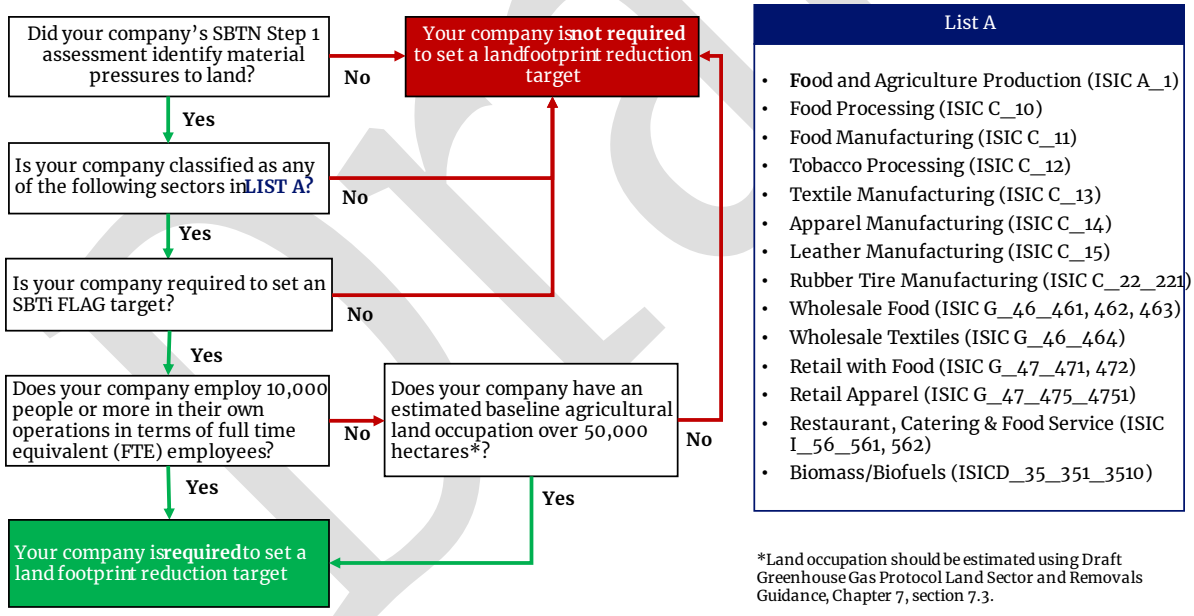
iii) **Companies who surpass AT LEAST ONE of the thresholds below**:

a. Company employs 10,000 people or more in their own operations AND/OR

b. Company has an estimated baseline agricultural land occupation over 50,000[50] hectares (land occupation should be estimated using *Greenhouse Gas Protocol Land Sector and Removals Guidance*, Chapter 7, section 7.3).

The decision-tree below visualizes these requirements and guides companies in understanding their target setting requirements as it relates to land footprint reduction.

Figure 7 - Decision-tree for setting a land footprint reduction target



2.4 Process overview for setting the Land Footprint Reduction target

1. Assess requirements

A company is required to set a Land Footprint Reduction target if they align with the following thresholds:

a. Terrestrial Use is material according to Step 1's materiality screening; and

b. Are in the Agriculture, Forestry & Fishing or Manufacturing ISIC sections; and

c. Are required to set an SBTi FLAG target; and

[50] Threshold set using 0.01% of total land occupation reduction of agricultural activities estimated using IPCC Special Report on Global Warming of 1.5°C, 2018, SSP1 scenarios in Figure 2.24 at 200 Mha by 2030 and 500 Mha by 2050.

d. One or more of the following:
    a. Have a baseline agricultural land occupation of 50,000 hectares or more ; and/or
    b. Have 10,000 or more Full Time Employees

2. **Calculate agricultural land occupation**
A company must calculate agricultural land occupation following the process explained in *SBTN Technical Guidance for Steps 1 and 2* (sections 3.1-3.2), and in the *Greenhouse Gas Protocol Land Sector and Removals Guidance* (sections 7.3 and 17.3).

3. **Select a method for the allocation of land footprint reduction**
    a. Absolute land footprint reduction approach (section 2.4.2)
    b. Intensity land footprint reduction approach (section 2.4.2)

4. **Calculate the land footprint reduction target**
A company uses the following information to calculate their target:
    - land occupation data in a selected baseline year
    - preferred reduction approach (absolute or intensity)
    - target date

5. **Submit required data for target validation**
A company is ready to submit their data for target validation (see section 2.6). Once the target is approved, a company can make a public statement as per claims guidance.

2.4.1 Calculate agricultural land occupation

The process to calculate a company's agricultural land occupation (whether to set a baseline or an updated annual inventory) is described in the *SBTN Technical Guidance for Steps 1 and 2* (sections 3.1-3.2), and in the *Greenhouse Gas Protocol Land Sector and Removals Guidance* (sections 7.3 and 17.3).

To set a land footprint reduction target, companies *may* collect spatial or statistical data as follows:

- **For purchasing companies with an upstream agricultural land footprint**: statistical (non-spatial) data on quantities of land-based products sourced, locations (e.g., countries and/or sub-national jurisdictions) if known, and yield (output per hectare) of each product for each location;

- **For producing companies with an agricultural land footprint in direct operations**: statistical (non-spatial) data on quantities of land-based products produced, and statistical or spatial data allowing for calculation of total surface area of working lands producing those products

- When using statistical data with quantities of products produced or sourced (e.g., in tonnes), companies can use the simple equation of:

$$\frac{Quantity\ of\ product\ in\ tonnes}{Yield\ of\ that\ product\ in\ tonnes\ per\ hectare\ per\ year} = \text{Land occupation (ha)}$$

for each product companies would sum all estimates across all products to have their complete land occupation "inventory" (GHGP forthcoming, Equation 17.12).

- When using spatial data, companies should simply total up the hectares in all of their active agricultural production areas to estimate total land occupation.

When using statistical data, following the GHG Protocol guidance, companies *should* use the most spatially-explicit data available for each commodity produced or purchased, and seek to improve traceability and data quality over time. If a product origin is unknown, a default assumption (e.g., production assumed to be from the same world region as company headquarters) *may* be used to select the appropriate yield data if well justified to SBTN.

When estimating land occupation of purchased mixed products, companies *should* either try to back-calculate the amounts of raw products for the purpose of estimating land occupation or use reasonable assumptions to simplify the exercise without unduly sacrificing accuracy (e.g., categorizing each mixed product according to its primary ingredient or its top 3 ingredients). Because estimating land occupation using statistical data can never be perfect, emphasis *should* be given to estimating the land occupation related to products containing high-impact commodities (e.g., meat stews versus vegetable-based condiments).

2.4.2 Allocation of global agricultural land footprint reduction to a company

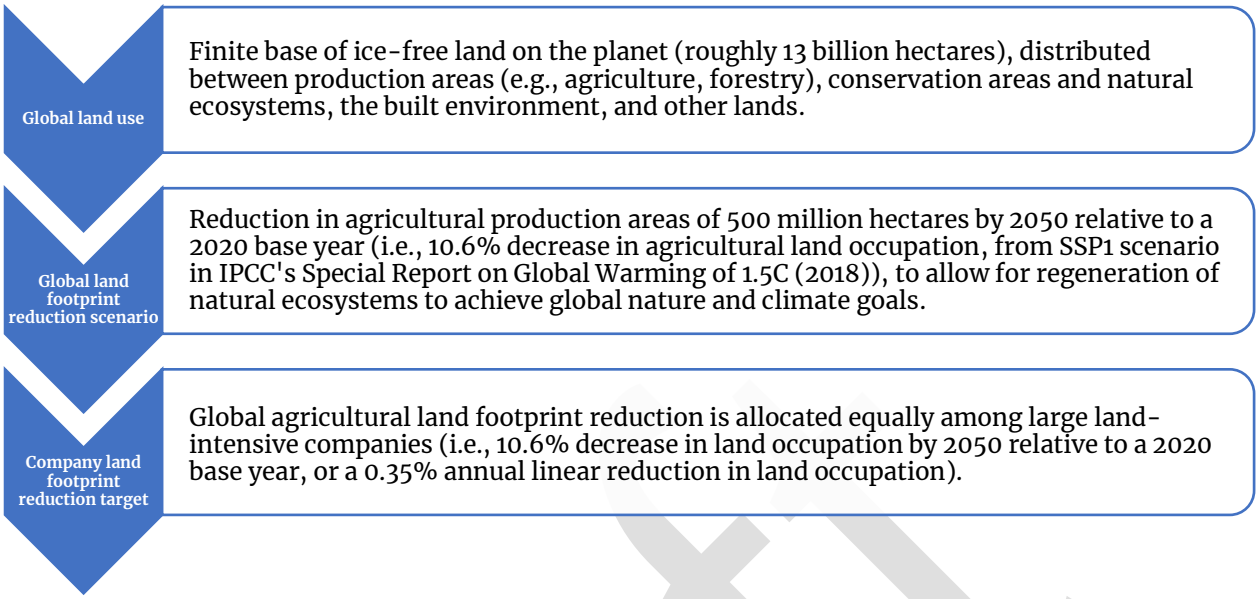
There are two methods for setting a land footprint reduction target: the absolute reduction approach and the intensity reduction approach. This section provides an overview of these two methods.

Absolute land footprint reduction approach

A common target-setting method under the Science Based Targets initiative (SBTi)[51] is "absolute reduction," in which all companies reduce impacts at the same rate, regardless of baseline performance. Following this SBTi approach, setting targets for land footprint reduction involves setting a corporate target in line with the global target for reduction of agricultural land occupation, as shown in Figure 8[52].

[51] https://sciencebasedtargets.org/resources/files/SBTi-Corporate-Manual.pdf
[52] https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/

Figure 8 - SBTN Method for Absolute Land Footprint Reduction



Through the absolute reduction approach, all companies setting land footprint reduction targets reduce absolute impacts at the same rate, regardless of baseline performance. Consequently, an absolute reduction target is defined in terms of an overall reduction in the amount of land occupied in the target year, relative to the base year (e.g., reduce annual agricultural land occupation 3.5% by 2030, from a 2020 base year). This method is a simple, straightforward approach to set and track progress toward targets that is applicable to the agriculture sector. Table 16 summarizes the inputs and outputs of the method. Box 5 details how a fictional company sets its land footprint reduction target for 2030 with a long-term target for 2050.

Table 16 - Characteristics of the Absolute Reduction Approach

Method	Company Input	Method Output
Absolute Reduction	- Base year - Target year - Sector - Base year agricultural land occupation ("land footprint" or "terrestrial ecosystem use"), disaggregated by direct operations versus upstream impacts (SBTN Step 1 output)	Overall reduction in the amount of agricultural land occupied by the company by the target year, relative to the base year, using a rate of 0.35% annual linear reduction

Box 5 - Land target 2: formulation of the land footprint absolute reduction target

[Company name] commits to reduce absolute agricultural land occupation, from direct operations *[and upstream impacts]*, [*percent reduction]* % by [*target year]* from a [*base year]* base year.

Intensity land footprint reduction approach

SBTi also includes an "intensity reduction" target-setting option, in which companies reduce intensity of climate impacts (per unit of product) based on the following options:

- Convergence option: to a common value by a given year as dictated by a global pathway
- Contraction option: at the same rate across all companies, regardless of baseline performance

With global food demand projected to grow 45% between 2017 and 2050 (Searchinger et al. 2021), it follows that if productivity in terms of food produced per hectare also grew at this rate (a 1.4% annual linear rate), no further agricultural land expansion would be needed to meet projected demand. When these productivity increases are coupled with changes to consumption (e.g., reduced food loss and waste, shifts to healthy and sustainable diets), it would liberate well more than the 500 Mha goal of global agricultural land footprint reduction in the SSP1 scenario in IPCC's Special Report on Global Warming of 1.5°C (Searchinger et al., 2019, IPCC, 2018)[53].

In a similar vein, the Food and Land Use Coalition (2019)'s "Better Futures" scenario also exceeds this global 500 Mha agricultural land footprint reduction goal, and includes annual linear productivity growth of 1.1%, along with demand-side measures.

To be precautionary and ambitious, SBTN Land proposes that the land footprint intensity reduction method (if included as an option in the final target methodology, depending on feedback during the public consultation) should be based on the higher productivity growth (1.4% annual linear rate; 45% growth between 2017 and 2050). This level of productivity growth also corresponds to roughly a 1% reduction in land occupation per unit of food produced per year (e.g., per kilogram).[54] Table 17 summarizes the inputs and outputs of this intensity reduction (contraction) method.[55]

Companies may also set land footprint intensity reduction (productivity increase) goals differentiated by product and region, mindful that yield gaps and sustainable intensification opportunities are not the same for all commodities in all places. This approach would be most similar to SBTi's intensity reduction (convergence) method. Further guidance for differentiation of intensity targets by product and region will be provided as part of version 2 of this guidance.

Box 6 - Land target 2: formulation of the land footprint intensity reduction target

TARGET:

[Company name] commits to reduce agricultural land occupation intensity, from direct operations *[and upstream impacts]* [*reduction]* % per [*unit]* by [*target year]* from a [*base year]* base year. This corresponds to a % change in absolute land occupation by *[target year]* from the *[base year]* base year."

53 http://www.sustainablefoodfuture.org.

54 This is because a 45% growth in productivity per hectare corresponds to a 31% reduction in land occupation per unit of food (1 / 1.45 = 0.69), which over a period of 33 years is roughly a 1% reduction in land occupation per unit of food per year.

55 Because yields of different foods vary so widely (both between food types and across countries and regions), a "convergence" land occupation intensity reduction approach would be very complex to design.

Table 17 – Characteristics of the Intensity Reduction Approach

Method	Company Input	Method Output
Intensity Reduction	- Base year - Target year - Sector - Base year agricultural land occupation, disaggregated by direct operations versus upstream impacts (Step 1 output) - Activity level in the base year (e.g., amount of food produced or purchased) - Projected change in activity by target year	A reduction in the amount of agricultural land occupied by the company by the target year per unit of food, relative to the base year, using a rate of 1% annual linear reduction, and its translation to absolute change in land occupation. Could also be differentiated by product and region.

Pros and cons of absolute versus intensity land footprint reduction targets

Absolute and intensity targets each have advantages and disadvantages (Table 18). In addition, when setting an intensity target, the choice of denominator (i.e., how the "unit" of food is expressed) is important, and there are several options, drawing from food LCA studies (Table 19). At this time, use of total weight (e.g., kg or t), kilocalories, or protein (e.g., kg or t) are recommended. Use of monetary values (e.g., purchasing or sales) for the denominator are discouraged because price fluctuations can hide true trends in land occupation intensity. Although at the time of this publication there is no universally agreed-upon unit that captures overall nutritional quality, a variety of metrics and indices exist that could also be potentially used (FAO 2021)[56].

Table 18 – Considerations regarding absolute vs. intensity targets for land footprint reduction

Aspect	**Absolute target**	**Intensity target**
Simplicity	Simpler to calculate and communicate; simpler to link to global 500 Mha agricultural land footprint reduction goal	Requires more judgment calls and can be more complex to calculate and communicate; needs additional steps to convert into absolute target to link to global goal
Equity	Bias toward large producers and purchasers; unfair for small landowners; unfair for small companies producing more sustainable products (similar to SBTi for absolute GHG emissions)	Can accommodate both large and small producers and purchasers
Link to business growth projections	No link; no guarantee that company will be "doing its share" of contribution to global productivity growth;	Company "does its share" of contribution to global productivity growth, regardless of their size and projected business growth

[56] https://www.fao.org/documents/card/en/c/cb8054en/

	targets can be met for wrong reason (business failure)	
Risk of unintended consequences for nature (note: risk mitigated somewhat in v1 through the No Conversion and Landscape Engagement targets)	Could incentivize unsustainable agricultural intensification; safeguards needed (company must also set SBTi FLAG climate and SBTN water targets, as well as v2 land targets that include soil health) ; could disincentivize forms of agriculture that are lower yielding but have lower local environmental impacts	Could incentivize unsustainable agricultural intensification; safeguards needed (company must also set SBTi FLAG climate and SBTN water targets, as well as v2 land targets that include soil health); could disincentivize forms of agriculture that are lower yielding but have lower local environmental impacts

Table 19 - Considerations for choosing denominator for intensity target

Denominator	Benefits	Challenges
Weight (e.g., kg or t)	Relatively easy to measure and communicate	Does not capture food functionality or nutrition; incentivizes commodities high in water content, including land-intensive ones (e.g., milk)
Spend or sales (e.g., USD)	Most businesses already measure this, easy to communicate	Commodity prices fluctuate so less accurate as land occupation indicator
Kilocalories	Moderately easy to measure with conversion ratios from weight; covers all foods	Does not describe nutrition more broadly than energy content; incentivizes energy-dense commodities, including nutrient-poor ones (e.g., sugar)
Protein	Moderately easy to measure with conversion ratios from weight; covers all land-intensive foods	Does not describe nutrition more broadly than protein content; is not meaningful for protein-poor foods and can disincentivize some healthy ones (e.g., vegetables)
Combined nutrient quality metric or index	Potentially most meaningful in terms of balancing resource use with health and nutrition	Most complex to measure and communicate; lack of consensus about which metric or index is most appropriate to use

Source: Adapted from FAO (2021), Table 10.

2.4.3 Guidelines for choosing corporate response options to deliver Land Footprint Reduction targets

It is well understood in the literature that working with area-based measures can sometimes drive unintended consequences. SBTN understands the limitations of such a metric and thus provides additional guidance on the types of response options companies *can* focus on in their delivery of the land footprint reduction target and also highlights some safeguards that *should* be considered in their implementation.

Setting multiple SBTN targets (e.g., land, water, climate) for nature should also help companies think through potential trade-offs across response options, and how such trade-offs can be managed. Moreover, as mentioned previously, the SBTN Land landscape engagement target (target 3) works to ensure that companies avoid unsustainable forms of agricultural intensification and instead improve the ecological integrity of working lands and surrounding landscapes. A detailed table of potential response options is included in Annex 6, but they are summarized at a high level below:

- *Increasing yields and production efficiency.* Crop and livestock yields vary widely across the globe, differing between some places by up to an order of magnitude (Herrero et al. 2013). Increasing yields and achieving higher crop and livestock productivity—especially where yields are currently low—is a natural and necessary response to the need to reduce agricultural land occupation even as global food demand continues to grow. Indeed, increased agricultural productivity is a common assumption across all of the scenarios of reduced agricultural land occupation listed in the modelling studies in Table 21 in the "Scientific basis of land footprint reduction" section below. However, these productivity gains need to occur with a broader view toward optimizing use of inputs, managing runoff, safeguarding freshwater and soil resources, and improving animal health and welfare. If increased yields are achieved by overuse of fertilizer and agricultural chemicals, or by large-scale irrigation expansion, GHG emissions and water scarcity and/or pollution are likely to increase. Companies should therefore manage interventions with a holistic mindset. Improved soil and water management practices like agroforestry, especially in low-yielding areas, can increase yields while reducing reliance on chemical inputs. In addition, if increased land-use efficiency leads to increased farm profitability, it can lead to agricultural expansion at the local level (Jevons paradox) even while limiting expansion at the global level; pairing agricultural improvements with ecosystem protection in the same landscape (via combination with Targets 1 and 3) will be essential to counteract this effect (Leclère et al. 2020; Phalan et al. 2016).
- *Reducing loss and waste.* Approximately one-third of global food production is lost or wasted between the farm and the plate. Rates of loss and waste vary by commodity, region, and supply chain position, but this is another popular and necessary response to reduce land requirements of agricultural supply chains.
- *Producing or sourcing less land-intensive foods.* More than three-quarters of agricultural land globally is used to produce meat, dairy, and other animal-based foods, including both pasture land for grazing and cropland for animal feeds. While the majority of global pasture lands cannot grow crops or trees, and while grazing lands can be an important buffer to natural habitats, nearly a billion hectares of pasture land was formerly forest (Searchinger et al. 2018) and cattle pastures represent a leading driver of recent tropical deforestation (Goldman et al. 2020). In higher-income countries, shifting high-meat diets toward plant-based foods can generally reduce agricultural land occupation. Companies should take a holistic approach when considering these options based on the commodities and places where they operate or source.

- *Riparian buffer zones, agroforestry/silvopasture, and restoring lands into natural ecosystems.* Taking lands out of direct production and increasing on-farm set aside areas can contribute to climate mitigation, water filtration, and soil stabilization on working lands. That said, if yields fall this response option can lead to leakage of agricultural land occupation elsewhere (and, potentially other companies' land occupation increasing) given the ongoing growth in global food demand.

2.4.4 Target period and target dates

In alignment with climate targets, for both intensity and absolute targets:

- *The choice of base year must be no earlier than 2015.*
- *SBTN Land recommends companies to choose a base year that is representative of the company's activity (e.g., a year greatly affected by the COVID-19 pandemic should not be chosen as a base year).*
- *Land footprint reduction targets must cover a minimum of 5 years and a maximum of 10 years from the date the target is submitted to the SBTN for an official validation.*

Companies are encouraged to develop long-term targets (e.g., to 2050) in addition to near-term targets.

2.5 Data requirements for target setting and accounting guidance

Data requirements vary according to the stages of the value chains where a company operates.

Table 20 - Data requirements for a Land Footprint Reduction target according to stages of the value chain

Stage of the value chain	Sectoral examples	Type of data	Unit of measurement
Producers of agricultural commodities and site owners/operators	Producers of crops and livestock	**Required** Statistical data on volumes of commodities produced by production location	Metric tonnes
		Required Spatial or statistical data (spatial preferred) on operational sites where commodities are produced	Hectares
Purchasers of agricultural commodities	Food manufacturers, retailers, or food service providers	**Required** Statistical data on volumes of commodities purchased, differentiated to the extent possible by sourcing location	Metric tonnes
		Required Statistical data on yield of each product, matched to the extent possible with the sourcing locations linked to the purchasing volume data above (e.g., national or sub-national yield data)	Metric tonnes per hectare per year

Note that for statistical data, if the company has already calculated GHG emissions associated with its land-based operations (scope 1) and/or upstream activities (scope 3), in line with reporting via the GHG Protocol and/or target-setting via the SBTi, the company is likely to already have its "activity data" on quantities of agricultural products produced or sourced well-organized for calculating the associated land occupation. The company *may* even be able to use the same environmental database that they used to calculate GHG emissions (e.g., Ecoinvent) to also calculate land occupation. Companies should follow the accounting guidance in the *Greenhouse Gas Protocol Land Sector and Removals Guidance* (sections 7.3 and 17.3)[57] to calculate the land occupation associated with the products they produce or source.

Companies *should* seek to improve the quality of the data they collect over time. To enable consistent tracking over time, companies *shall* recalculate base year land occupation when significant changes in company structure or calculation methodology occur.

Recalculation is required when the following changes occur and have a significant impact on the total amount of land occupation calculated:

- Structural changes in the reporting organization, such as mergers, acquisitions, divestments, outsourcing, and insourcing
- Changes in calculation methods, improvements in data accuracy, or discovery of significant errors
- Changes in the categories or activities included in the inventory

Purchasing companies *should* seek to work with their current suppliers to improve performance over time, rather than just shifting to more efficient (higher-yielding) suppliers. A strategy of shifting to higher-yielding suppliers carries social risks (potentially harming livelihoods of current suppliers), and/or potentially does not affect global agricultural land demand, if other buyers just switch to purchasing from the company's current suppliers.

2.6 Case Study—Land Footprint Reduction

Ursus Nourishment is a food and beverage producer that specializes in plant-based drinks and food.

The company must set a FLAG target and No Conversion target alongside a Land Footprint Reduction target. The company's agricultural land occupation resides in its upstream impacts, and in its base year of 2020 came from sourcing 417,500 metric tonnes of cocoa (Côte d'Ivoire, Ecuador, Ghana), maize (Belgium, USA), soy (Argentina, Brazil, India), sugar (Philippines, Sri Lanka), and tree nuts (Côte d'Ivoire, India, Spain, United States). Using yield data from each country, Ursus divides the quantity of each product sourced in 2020 by its yield to estimate agricultural land occupation, totaling up to 755,000 hectares across the different countries. Ursus decides to set a 10-year target to 2030 relative to the base year of 2020.

Using the absolute reduction approach with the standard 0.35% linear annual rate of reduction, Ursus sets its absolute land footprint reduction target at a 3.5% reduction by 2030,

[57] https://ghgprotocol.org/land-sector-and-removals-guidance

relative to the base year of 2020. Looking further ahead, the company also uses the same approach to set a 10.5% land footprint reduction target by 2050, relative to the base year 2020.

2.7 Target validation

To begin the target validation process, companies *must* submit to SBTN:

- ISIC sector classification(s) for activities within their direct operations and upstream
- Number of employees
- Disclosure of land occupation (from direct operations and from upstream impacts) in the base year
- Activity amounts (quantities of land-based products produced or purchased) in the base year
- Calculation details for base year land occupation (e.g., yield estimates used and sources; spatial data used and sources; any other statistical data used and sources)
- Calculation details for land footprint reduction target (number of years in the target period between base year and target year; use of 0.35% linear annual absolute reduction rate; use of 1% linear annual intensity reduction rate; use of differentiated intensity reduction rate by product and region)

2.8 Overview of suggested tools and databases

Companies *may* refer to the SBTN Technical Guidance for Step 1 (Appendix 7; Data and tools under consideration for use in the value chain pressure assessment) and the GHG Protocol Land Sector and Removals Guidance (Section 17.3) for lists of tools and databases that include yields (in tonnes/hectare/year) and/or land occupation factors (essentially the reciprocal of yields, in m2a) that can be used when companies have statistical activity data.

2.9 Key definitions relevant for this target

Land footprint and land occupation*:* A company's land footprint, also known in LCA terms as "land occupation," is defined for this target as the amount of agricultural land required per year to produce the products produced or sourced by a company, and it is reported in hectares per year.[58] For crops, land occupation is also referred to as "harvested area" in FAOSTAT.

Importantly, "land footprint" or "land occupation" for the purpose of target-setting related to Land SBTs refers to "working lands" used to produce agricultural products in corporate supply chains—not necessarily all land owned or controlled by companies.

Please note as well that "land footprint" and "land occupation" are referred to as *terrestrial ecosystem use* in the SBTN Technical Guidance for Steps 1 and 2. Terrestrial ecosystem use is one of the eight main environmental pressures that SBTN companies are required to assess in Step 1.

Yield: Yield refers to intensity of production per unit of land area. It is defined as the amount of product produced in a year divided by the amount of land occupied by that product. For crops, it refers to amount produced divided by harvested area. For livestock products, it refers to amount produced divided by the total area needed for livestock production (both to house the animals and to produce the crop- and/or pasture-based animal feeds).

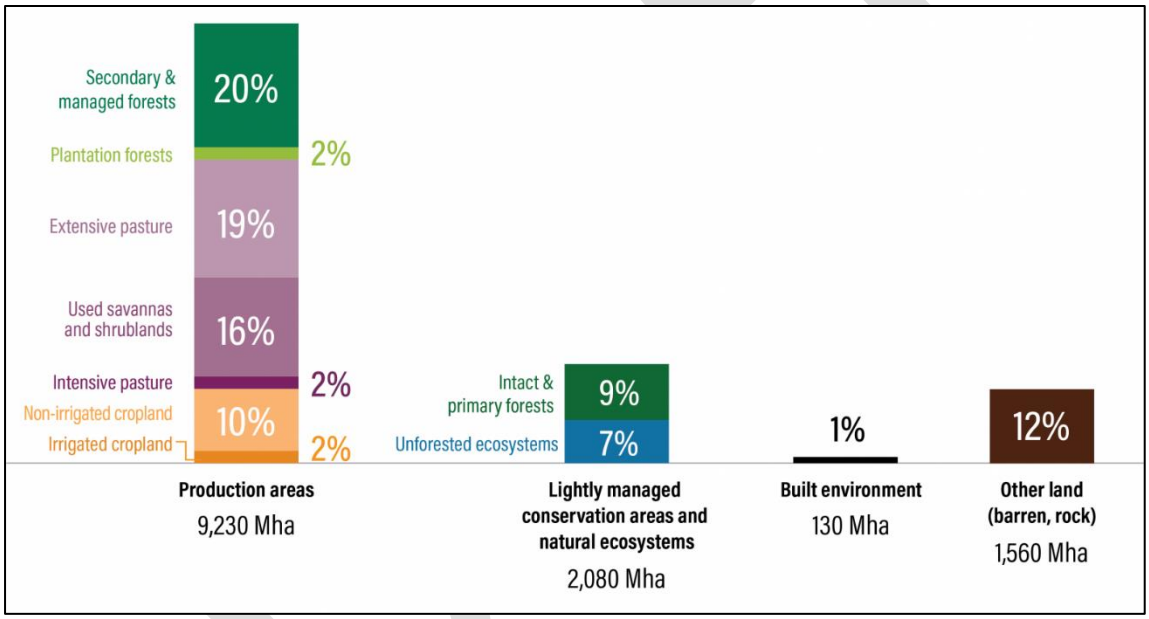
[58] (GHG Protocol Land Sector and Removals Guidance, forthcoming).

Land footprint intensity and land occupation intensity: Land footprint (or occupation) intensity is essentially the reciprocal of yield, referring to the amount of land needed to produce a given unit of product. As shown in Table 19, the unit of product in the denominator of this calculation can vary (e.g., weight, kilocalories, protein).

2.10 Scientific basis of agricultural land footprint reduction

The world has a finite base of ice-free land, comprising about 13 billion hectares (Bha), and it is already heavily used. Production areas—including cropland, pasturelands, managed and plantation forests, and other used lands—account for the majority of the world's land, with only 16% of land remaining as intact and primary forests and other natural ecosystems as of 2015 (IPCC SRCCL 2019, Figure 9)[59].

Figure 9 - Global land use (2015) Source: Adapted from IPCC Special Report on Climate Change and Land, 2019.



As the global population grows from about 8 billion in 2022 to nearly 10 billion by 2050[60], these production areas are projected to expand to fulfill growing human demands for food, feed, fiber, fuel, and shelter. According to one recent satellite-based study, cropland expanded by 102 million hectares (Mha) between 2003 and 2019[61], and expansion accelerated during that time period to reach a rate of 9 Mha per year by 2016-19. Cropland and pastureland expansion, as well as expansion of plantation forests, are leading to tropical deforestation; another satellite-based study found that just seven commodities—cattle, oil palm, soy, cocoa, rubber, coffee and plantation wood fiber—accounted for 72 Mha of tree cover loss from 2001 to 2015, with cattle pasture alone occupying 45 Mha of former forest during that period.[62] Agricultural expansion is the leading historical and current driver of

[59] https://www.ipcc.ch/srccl/
[60] https://population.un.org/wpp/
[61] https://www.nature.com/articles/s43016-021-00429-z
[62] https://www.wri.org/research/estimating-role-seven-commodities-agriculture-linked-deforestation-oil-palm-soy-cattle

biodiversity loss[63] and land-use change is responsible for at least a quarter of the carbon that humans have released to the atmosphere since 1750.[64]

Global food demand is projected to grow by 45% between 2017 and 2050[65] and global demand for wood products by a similar amount during that time. Bioenergy policies to dedicate cropland and forest land for energy production threaten to further increase land use competition and reduce extent of unused natural ecosystems. And while the built environment occupied only about 1% of the world's ice-free land in 2015, urban expansion is projected to add pressure as well.

Against this backdrop of ongoing increases in demand for land for human needs, it is perhaps unsurprising that goals to end deforestation by 2020 were not met—and that achieving the Glasgow Leaders' Declaration on Forest and Land Use[66] goal to halt and reverse forest loss and land degradation by 2030 will be extremely challenging. In order to end ecosystem conversion and provide opportunities for restoration, protect biodiversity and nature's contributions to people, and meet climate change mitigation and adaptation goals, a shift in the other direction is urgently necessary: peaking and then reducing the amount of land occupied by human activities.

2.10.1 Science-based rate of agricultural land footprint reduction over time

To keep global warming below 1.5°C, even while feeding and housing a growing global population, models generally agree that significant reductions in land dedicated to food and feed crops, as well as to pasture, will be necessary between now and 2050, alongside increases in extent of natural ecosystems. Several recent examples are listed in Table 21.

Table 21 - Recent studies with global land footprint reduction targets

Source	Reduction in land dedicated to cropland (food and feed) and pastureland by 2050 (Mha)	Base year	Comment
Griscom et al. (2017)[67]	678 (95% uncertainty bound: 230-1,125)	2016	Estimated a total maximum reforestation potential of 678 Mha (by 2030), when taking into account biodiversity, food security, and fiber production safeguards—along with sustainable intensification of livestock production and dietary shifts. (SBTN authors assume the reforestation will need to occur on liberated agricultural land.)
IPCC (2018)[68]	500 in SSP1 "sustainability" scenario (0-1,150 across multiple scenarios)	2010	The IPCC Special Report on Global Warming of 1.5°Cfound that 1.5°C pathways included decreases of up to 800 Mha of pastureland and up to 450 Mha of cropland dedicated to food and feed crops, and included increases of up to 950 Mha in forestland (Figure 2.24). The SSP1 scenario, which is aligned with the Sustainable Development Goals (and therefore balance human needs with goals for nature and

[63] Millennium Ecosystem Assessment 2005, https://www.millenniumassessment.org/en/index.html
[64] IPCC 2019 - https://www.ipcc.ch/srccl/, Le Quere et al. 2016 - https://essd.copernicus.org/articles/8/605/2016/
[65] Searchinger et al. 2021 - https://www.wri.org/research/pathway-carbon-neutral-agriculture-denmark; this annualized level of increase is similar to projections in Leclere et al. 2020 (supplement).
[66] https://ukcop26.org/glasgow-leaders-declaration-on-forests-and-land-use/
[67] https://www.pnas.org/doi/abs/10.1073/pnas.1710465114
[68] https://www.ipcc.ch/2018/10/08/summary-for-policymakers-of-ipcc-special-report-on-global-warming-of-1-5c-approved-by-governments/

			climate), include a decrease of 200 Mha of agricultural land (cropland plus pastureland) by 2030 and a decrease of 500 Mha by 2050. These changes are generally driven by demand changes, increased production efficiency, and policy changes.
Searchinger et al. (2019)[69]	611	2010	The *World Resources Report: Creating a Sustainable Food Future* estimated that fully reforesting 585 Mha of liberated agricultural lands by 2050, along with 26 Mha of peatland restoration, could offset global agricultural production emissions for many years and achieve a net-zero-emissions land sector, provided agricultural emissions could be greatly reduced to below 5 GtCO2e/year by 2050. This scenario also required agricultural intensification, reduction of food loss and waste, and dietary shifts. The model assumed the restored forests and peatlands were no longer used for productive purposes.
Food and Land Use Coalition (2019)[70]	1,184	2010	The *Growing Better* report included a "Better Futures" scenario in which nearly 200 Mha of croplands and about 1 Bha of pasturelands are freed up for restoration of natural ecosystems by 2050, through a combination of productivity gains, reduced food loss and waste, dietary shifts, and supportive policies. Under this scenario, biodiversity declines also halt and begin to reverse between 2020 and 2050.
Leclère et al. (2020)[71]	690 (reduction in agricultural and forestry land; IAP scenario)	2010	The authors use land-use and biodiversity models to assess how humanity can reverse the declines in terrestrial biodiversity caused by habitat conversion. Actions in the "integrated action portfolio" (IAP) scenario, which include sustainable agricultural intensification, reduced food waste, dietary shifts, ecosystem protection, and restoration of degraded lands, address the largest threat to biodiversity—habitat loss and degradation—and are projected to reverse declines for five aspects of biodiversity, leading to restoration of 430-1,460 Mha of land by 2050.
Roe et al. (2021)[72]	~300 (cost-effective potential), ~1,000 (technical potential)	2020	Estimated potentials of afforestation and reforestation, noting that trade-offs include competition with food production and biodiversity, depending on location and methods of implementation (e.g., natural regeneration, monoculture plantations, mixed species planting). (SBTN authors assume the afforestation/reforestation will need to occur on liberated agricultural land.)

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[69] https://research.wri.org/sites/default/files/2019-07/creating-sustainable-food-future_2_5.pdf
[70] https://www.foodandlandusecoalition.org/wp-content/uploads/2019/09/FOLU-GrowingBetter-GlobalReport.pdf
[71] https://www.nature.com/articles/s41586-020-2705-y#Sec12; supplement notes that areas dedicated to agriculture and forestry in the IAP scenario decreased by 690 Mha on average by 2050 relative to 2010 across the various models.
[72] https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15873

Although most of the examples in Table 21 include mitigation of climate change as a primary lens, it is clear that halting further agricultural expansion and instead allowing for restoration of some amount of liberated agricultural lands into natural ecosystems is also necessary for curbing and reversing biodiversity loss. To this end, Leclère et al. (2020) analyse a number of scenarios to reverse declines in terrestrial biodiversity, and show that reduction of agricultural land occupation through food system transformation is a necessary ingredient to achieve global biodiversity goals by 2050.

The need to produce food for a growing population on less land, while achieving nature and climate goals, raises the question of "land sparing" (whereby agricultural yields are increased to reduce land demand and liberate lands for restoration) versus "land sharing" (whereby biodiversity and carbon stocks, rather than yields, are maximized on working lands) (Phalan 2018). As noted above, unsustainable forms of agricultural productivity gains can degrade soil and water resources, emit GHGs unnecessarily, and undermine long-term productivity and resilience (IPCC 2019). Furthermore, a number of traditional production systems (e.g., extensive ruminant livestock systems in arid lands) are important for food security, livelihoods, and resilience, and should not be disincentivized by corporate land footprint reduction targets. On the other hand, shifting from higher-yielding to lower-yielding agricultural systems may reduce local environmental impacts, but also may increase land use demands and pressures on natural ecosystems elsewhere—negatively impacting those off-farm ecosystems' biodiversity and carbon stocks. It is also important to note that both "technological" and "agroecological" approaches can increase agricultural productivity while reducing environmental impacts and building resilience (Ross et al. 2019, Phalan 2018). Taken together, because there is no one correct approach across the nearly 5 billion hectares of global agricultural land, companies should plan response options thoughtfully, taking into account all three SBTN Land Targets—and indeed the whole range of SBTN issue areas (land, water, and climate).

For the purposes of this target, SBTN aligns with the SSP1 scenario in IPCC's Special Report on Global Warming of 1.5°C (2018), which achieves the Sustainable Development Goals and thereby balances food security and other human needs as well as those of nature and the climate. This scenario requires a 200 Mha decrease in cropland and pasture area by 2030 and a 500 Mha decrease by 2050. The 500 Mha reduction in global agricultural land occupation corresponds to 10.6% of the world's roughly 4.7 billion hectares of agricultural land as of 2020.[73]

2.11 Best practices for disclosure

Following on from the draft GHG Protocol Land Sector and Removals Guidance, below is a list of disclosure requirements for companies tracking their agricultural land footprint (land occupation) over time:

- Companies *shall* account for and report their agricultural land occupation on an annual basis
- Companies *shall* apply their land occupation accounting methods consistently across their entire land occupation "inventory"
- Companies *shall* report agricultural land occupation of direct operations and of upstream impacts separately
- Companies *shall* disclose the data sources, methods, and assumptions used to quantify agricultural land occupation
- Companies *may* separate out their land occupation reporting by type of land use (e.g., cropland, pastureland), products produced or sourced, location, and/or ecoregion

[73] https://www.fao.org/faostat/en/

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Landscape Engagement

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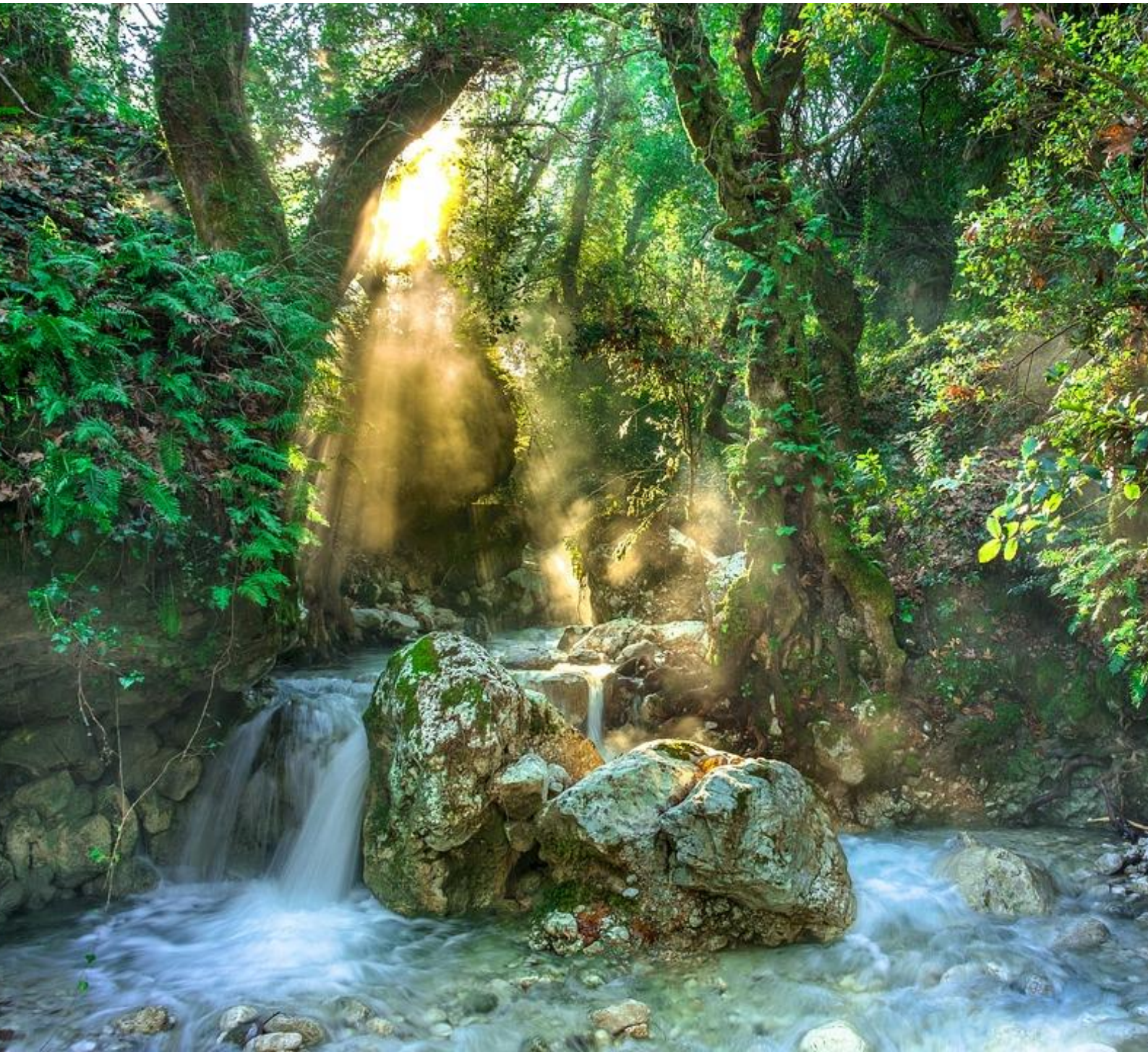


This chapter of the SBTN Land Guidance sets out:

1. Key definitions relevant for Landscape Engagement
2. Information on **why** a Landscape Engagement target is needed
3. Information on **who** needs to set the target
4. Information on **how** to set, report and communicate on Landscape Engagement
5. Technical annexes articulating the scientific basis of the target

3.1 What is Landscape Engagement?

The intention of Landscape Engagement is to enable **regenerative, restorative, and transformational actions** in company-relevant landscapes through both corporate actions that improve ecological integrity and supporting the enabling conditions that help ensure successful landscape approaches. The implementation of the target is designed to benefit a company's long term viability through supporting the collective processes that are required to sustain increases in ecological integrity in places that are material to a company. The target is also designed to recognize companies already investing in landscape initiatives and provide a simplified, integrated metric for quantifying and recognizing their contributions. This target aligns corporate actions with many key components of the Convention on Biodiversity Diversity and Land Degradation Neutrality under the UN Convention to Combat Desertification, outlined in the introduction of these Land Methods (see section iii.).

It is important to note that over the next 1-2 years, there will be significant advances in scientific data and methods that will allow SBTN to refine this approach in a version 2 of the SBTN Land methods. While all the targets included in version 1 on this guidance will evolve based on the more refined methods of the next version of science-based targets for land, the Landscape Engagement target will evolve to include much greater specificity for companies in directing actions in places. Due to this, it will be important that the guidance on the Land Engagement target be appropriately inclusive of company engagement in places, but not so prescriptive that progress on Land Engagement precludes further developments of upcoming work.

As an example, we currently lack place-specific ecological thresholds answering the question "what should the state of nature be in this place to avoid tipping points?". Additionally, we also lack the translational science to link specific activities to changes in land metrics and outcomes. Because of the urgency of biodiversity loss and land degradation, we feel the **need for collective actions at the landscape scale now outweighs the importance of measurement in the interim**.

Landscape Engagement is broad by design and encompasses a variety of potential actions that companies and other stakeholders can implement for achieving holistic, multiple-objective environmental, biodiversity, and social outcomes.

In particular:

- Landscape Engagement requires companies to prioritize landscapes for engagement and to measure the baseline status of ecological integrity based on **the Ecological Integrity Index (EII)** (see box 7). Refer to section 3.1.2 for further elaboration on the need to act at the landscape scale for increasing ecological integrity and to section 3.3.3 for guidance on how to calculate a target to increased ecological integrity at the landscape level.
- Additionally, Landscape Engagement is a vehicle to further guide the implementation of the **No Conversion on Natural Ecosystems** and **Land Footprint Reduction Targets**.

Box 7 - The Ecosystem Integrity Index (EII)

This index provides a simple, yet scientifically robust, way of **measuring, monitoring and reporting** on **ecosystem integrity** at any geographical scale. It is formed of three components, structure, composition, and function, and measured against a natural (current potential) baseline on a scale of 0 to 1:

- **Structure** - The metric for structure is derived from a total of **12 spatial layers of features associated with anthropogenic pressure on biodiversity**, including population density, built-up areas, agriculture, roads, railroads, mining, oil wells, wind turbines and electrical infrastructure.
- **Composition** - The metric for composition is a combination of the assessment of the **impact of human pressures on the total abundance of species** within a community and the assessment of the similarity between the relative abundance of each of the species in a community in a non-natural landscape with those in a natural landscape.
- **Function** - The metric for function is estimated using the **difference between potential natural and current net primary productivity (NPP) within each 1km grid cell**.

For target setting purposes, companies must calculate the EII score for landscapes selected for Landscape Engagement (section 3.3.3). The calculation of the EII score is based on the EII layer provided by UNEP-WCMC.

3.1.1 How Landscape Engagement works in relation with the other two Land targets

No Conversion of Natural Ecosystems

Payments generated through the mitigation mechanism (see section 1.1) for embedded and highly-transformed volumes of high-impact commodities must be redirected to landscape initiatives as part of Landscape Engagement.

Land Footprint Reduction

The selected landscape initiatives provide a framework to link liberated land in the land footprint reduction target with the broader nature goals.

Liberated land can be used for restoration objectives, climate mitigation, biodiversity outcomes, or other stakeholder determined priorities that align with objectives determined at the landscape scale.

3.1.2 Why work at the landscape scale?

According to ISEAL[74] landscape investments and actions aim to have impacts beyond individual supply chains. A key differentiating factor of landscape investments and actions is that they seek to i**mprove conditions in the landscape as a whole**, and they aim to tackle root causes of biodiversity loss and decrease in ecological integrity that cannot be tackled by individual companies.

[74] https://www.isealalliance.org/get-involved/resources/what-constitutes-company-landscape-investment-or-action-2022

When investing in production landscapes, companies at all stages of the supply chain prioritize support for those enterprises that are producing their raw materials, whether that is focused on improved productivity, quality, or livelihoods.

Landscape investments and actions complement supply chain investments by creating a more resilient environment and better conditions for the long-term well-being of local communities.

Target setting in a landscape context allows the company freedom to allocate responses aligned with existing landscape initiatives where they choose. This may result, for instance, in selecting investments and actions that mutually benefit the companies themselves and the broader landscape.

Multi-stakeholder approaches at the landscape level, therefore, help ensure that the social, economic, and cultural needs of local communities are taken into account when defining such actions and how they should be implemented for achieving landscape goals.

Figure 10 - Key issues addressed in a Landscape and/or Jurisdictional Initiative Figure taken from Proforest (2023)

Landscape investments and actions can include support to supply chain enterprises where it is clear how this will deliver on the landscape initiative's goals and will have impacts beyond a company's supply chain. For example, supporting producers to ameliorate or protect riparian zones for waterways on their properties can have wider impacts on water quality, while restoration of natural ecosystems on farmlands contiguous to natural areas of high conservation value will strengthen the resilience of that ecosystem. (ISEAL, 2022)

Besides, corporate actions can be amplified and become more effective when implemented collectively and at a wider scale, as shown in the increasingly growing number of active landscape initiatives (Proforest 2020)[75].

According to Sayer et al. (2013)[76], landscape approaches imply shifting **from project- or site-oriented actions to process-oriented activities**. In this sense, the actions taken in a place help to satisfy the objectives of the action taken, but in the context of how that action contributes to the broader landscape as well. This requires changes at all levels of interventions, from problem definition to monitoring and funding. It provides local stakeholders with **long-term, iterative processes**, giving them responsibilities and empowering them. Moreover, it tends away from top-down engineered solutions toward **emergent, negotiated actions and, consultative, cooperative approache**s that build the local ownership and governance essential to achieving ecological integrity goals.

Many companies in agricultural commodity supply chains have made commitments to responsible sourcing of commodities. According to Proforest (2020)[77] responsible sourcing of commodities includes, for example, taking action to reduce and eliminate deforestation, improve labor conditions, address gender inequities and inequality, support smallholder producers, and respect and support human rights.

There are many ways in which companies can contribute to these objectives of responsible sourcing, but they often need to **collaborate with other companies, government agencies and civil society** organizations to deliver on their commitments.

Landscape initiatives can bring efficiency to delivery of company commitments (e.g. to stop conversion of natural ecosystems by supporting development of landscape or producer level traceability and monitoring systems) and they can help to future proof companies sourcing by protecting forest and working with companies and communities to raise understanding of sustainable practices before land is cleared for development.

For instance, landscape initiatives can increase the efficiency in delivering company commitments by supporting the development of traceability or monitoring systems at the landscape level, which would also help sourcing companies to proof the deforestation and conversion free status of commodity's volumes purchased from a landscape.

Companies can implement actions both within and beyond their own supply chains:

- **Within supply chains,** companies can require assurances from their suppliers that the volumes they purchase were produced responsibly, through certification or legal assurance. Companies can also engage with their suppliers to cascade commitments up the supply chain, driving changes in production practices.
- **Beyond a company's own supply chain**, collaboration and **alignment at landscape, jurisdictional or sectoral scale** can address root causes of ecological degradation that require collective action and deliver wider impact (see for example Agricultural

[75] https://www.proforest.net/fileadmin/uploads/proforest/Documents/Publications/Engaging_with_landscape_initiatives_Indonesia.pdf

[76] https://www.pnas.org/doi/abs/10.1073/pnas.1210595110

[77] https://www.proforest.net/fileadmin/uploads/proforest/Documents/Publications/Engaging_with_landscape_initiatives_Indonesia.pdf

Commodity Responsible Sourcing (ACRES)[78], Proforest Responsible Sourcing and Production BN13[79]).

Figure 11 – Examples of company actions within and beyond their supply bases. Figure taken from Proforest (2023)

3.1.3 Why increase Ecological Integrity?

Around two-thirds of the world's habitable land is under some form of management by humans (i.e., "working lands"):

- Almost half of the world's habitable land is used of agriculture (4.7 billion hectares)[80].
- Around 30% of the world's forests is managed primarily for the production of wood and non-wood forest products (1.15 billion hectares), while a further ~20% is designated for multiple use, which often includes production (749 million hectares)[81].
- 1% of habitable land comprises urban areas and infrastructure (150 million ha)[82].

The adoption of Land targets on ecosystem conversion and land footprint will drive a reduction of the existing and expanding footprint of working land for SBTN companies that are required to set these targets, protecting the natural ecosystems which exist today and freeing up land for restoration to deliver outcomes for climate, nature and people.

The third SBTN Land target works to drive nature outcomes on the landscape including lands that will remain as working land – the land which we depend upon to grow food, to harvest timber, for livelihoods and where we live. These working lands are where companies can have significant impact on nature through shifting towards more sustainable management practices. Companies also rely upon the functioning of these working lands in terms of provision of many ecosystem services.

For example, dramatic decline in insect populations – dubbed the "insect apocalypse" - puts at risk the US$235 - 577 billion of crop production that depends on animal pollination.[83] Loss

[78] https://www.proforest.net/resources/publications/agricultural-commodity-responsible-sourcing-acres-taking-action-within-and-beyond-supply-chains-13426/
[79] https://www.proforest.net/news-events/news/responsible-sourcing-and-production-briefings-a-retrospect-11323/
[80] https://www.fao.org/documents/card/en/c/cc2211en
[81] https://www.fao.org/forest-resources-assessment/2020/en/
[82] https://ourworldindata.org/land-use based on https://www.fao.org/faostat/en/#home data
[83] OECD. 2019. Biodiversity: Finance and the Economic and Business Case for Action. Prepared by the OECD for the French G7 Presidency and the G7 Environment Ministers' Meeting.

of biodiversity on farm reduces resilience to shocks, increasing the likelihood of "tail end" risks such as concurrent crop failures in several of the world's main food-producing regions.[84]

This target will ensure that Land SBTs can address the physical arrangement of natural ecosystems in landscapes, the intensity of lands uses within these working landscapes, and the ecological, social, and economic functions that these areas provide.

While the first two land targets address avoidance and reduction of impacts, this target will provide companies with guidance and requirements that incentivize corporate responses, that support regenerative, restorative, and transformative practices. The actions incentivized may help align companies with any **nature-positive outcomes** from successful landscape initiatives.

3.2 Who needs to set a Landscape Engagement Target?

Companies are *required* to set a Landscape Engagement Target if:

A. It is **identified during SBTN's Step 1 (Assess) that land-associated pressures of terrestrial ecosystem use and soil pollution are material**;

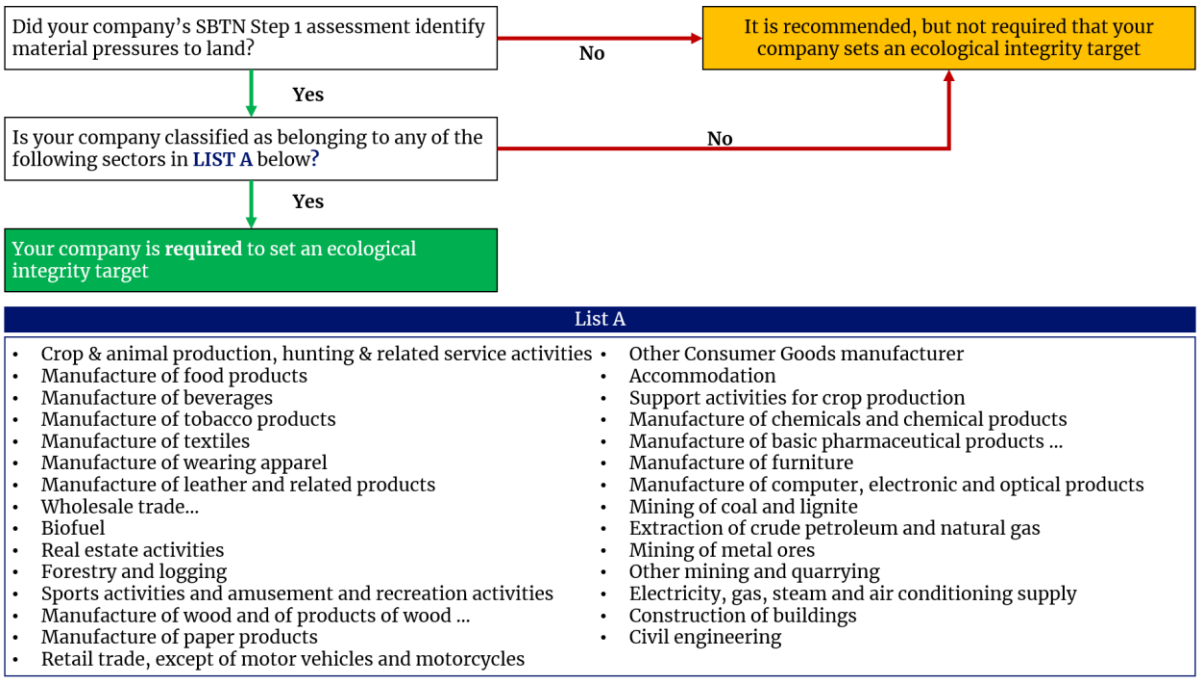
AND

B. **Table 5**, in the introduction section, **indicates that a Landscape Engagement Target is required for select sectors** based on their International Standard Industrial Classification of All Economic Activities (ISIC) designated sector(s).
    - Following Table 4 (pp19), **all sectors listed,** with the exception of manufacture of machinery and equipment and "other sectors", **are required to set a Landscape Engagement Target.**

The decision-tree below visualizes these requirements and guides companies in understanding their target setting requirements as it relates to ecological integrity targets.

[84] https://www.fao.org/3/CA3129EN/CA3129EN.pdf

Figure 12 - Decision-tree for setting an ecological integrity target



3.3 Process overview for setting a Landscape Engagement Target

1. **Selection of landscapes for engagement**
   a. Use one of three approaches (outlined in more detail in section 3.3.1 below) for prioritization of landscapes
      i. Approach 1. Choosing Landscape for Engagement in Connection with Steps 1 & 2
      ii. Approach 2. Choosing Landscapes for Engagement in Connection with No Conversion of Natural Ecosystems
      iii. Approach 3: Choosing Landscapes for Engagement in Connection with Land Footprint Reduction
   b. Investigate availability and readiness of existing landscape initiatives in the prioritized areas using the Validation Matrix developed by CDP
   c. Submit % coverage of land use impact for submission to SBTN for validation and rationale for landscapes chosen.
   d. If, while following point 1.a above, companies are not able to find an existing landscape initiative in prioritized landscapes, they can follow guidance to set up new initiatives in Section 0 below.

2. **Calculate the EII score as ecological integrity baseline for the landscape**
   For selected landscapes, companies *must* calculate the mean EII score at the landscape level (Section 3.3.3).

3. **Calculate a target to increase EII in the landscape**
   For selected landscapes, companies *can* calculate a target that would result in a substantial increase of ecological integrity at the landscape level relatively to the baseline EII score.

4. **Develop an action plan for engagement in the landscape**
   a. Commit to collective actions within landscape initiatives that enable a [X%] substantial increase the Ecological Integrity Index score by 2030 choosing

other appropriately aligned indicators as outlined by the selected landscape initiative.

b. Additionally, companies can commit to a [X%] increase of the Ecological Integrity Index score by 2030 choosing other appropriately aligned indicators as outlined by the selected landscape initiative.

5. **Monitor progress at the landscape level**
   a. Transparently report (on annual basis) your contributions to the Landscape initiative using the landscape assessment framework (e.g., LandScale and Proforest (CGF)) utilized by the landscape initiative.
   b. Metrics of existing assessment framework must be mapped with components of the EII layer to estimate potential effects on EII of actions measured by such metrics (e.g., hectares in restoration, hectares converted, etc.).

Reporting requirements

Reporting requirements will be framed around the metrics of the landscape initiative's assessment framework and will ensure that SBTN will be empowered to estimate (indeed with some degree of uncertainty) the contribution of corporate actions toward the EII target. In the absence of an annual recalculation of the EII.

Other requirements

Over time, companies will need to conduct a reassessment and expand the influence deeper into their supply chain and impact areas.

Additional information

For additional information on landscape engagement, please look at Annex 10.

Box 8 - Formulation of Landscape Engagement target

3.3.1 The three approaches for selection of landscapes

Three main approaches are outlined below and they provide guidance on **how a company will prioritize landscapes for engagement**:

- Approach 1
  - This approach is for companies who have **low levels of conversion in their operations or supply chains** and who did not qualify to set the Land Footprint Reduction target. This approach links back to analysis carried out in Steps 1 & 2 of the SBTN methodology.
- Approach 2
  - This approach is suitable for companies with **significant amounts of conversion** within their operations or supply chain.
- Approach 3
  - This approach is suitable for companies who are required to set a **Land Footprint Reduction Target**.

Approach 1. Choosing Landscapes for Engagement in Connection with Steps 1 & 2

For companies without embedded volumes or a requirement to set a land footprint reduction target, Landscape Engagement should be prioritized using Steps 1 & 2 of SBTN's guidance.

Within SBTN Steps 1 and 2, companies have already estimated their value chain pressures in Step 1b. Using the pressure estimates generated for those sector activities or high impact commodities in Step 1b for Land Use (km^2) and the State of Nature Assessment in Step 2, – companies can choose the landscapes within which to set Landscape Engagement Targets in one of three ways.

1. **For companies who are only setting SBTN land targets**, we recommend a combination of **impact of land use area x State of Nature assessment** approach to determine the top ranked landscapes for which to set Landscape Engagement targets.
    a. Using the outputs of Step 1b and 2, rank landscapes using both Land Use area (km^2) and any combination of terrestrial ecosystem State of Nature criteria (e.g., Ecosystem Integrity Index, % Tree Cover Loss, Species Threat Abatement and Restoration metric) to rank landscapes for potential engagement.
    b. Then choose a % coverage based on the Land Use area for your supply chain as appropriate to your supply chain position.
        i. We recommend at least 10% coverage for the first year, but the number may be higher for production side companies and lower for demand side companies. In your validation form, disclose your approach to landscape selection and percent coverage including a justification statement for each.
2. **For companies who are setting multiple targets across water, land, and climate**, we recommend an **impact on multiple pressures x State of Nature assessment**.
    a. Companies should follow the same approach as outlined above, but also add priority water basins or climate impact landscapes to the analysis.
    b. Companies will need to concentrate resources across multiple areas of activity and this approach allows them to get to scale.
    c. Companies should still be transparent about the % coverage and rationale of their Land Use estimates and State of Nature assessment, however we recognize that the coverage may be lower if choosing to focus in places that provide multiple outcomes.

Box 9 - Example for selection of landscapes using approach 1

For companies who have a low land footprint or already have advanced significant sustainability improvements on their sourcing lands (e.g., 100% Forest Stewardship Council certification on fibre sourced), it may be more appropriate for them to prioritize landscapes using the state of nature assessment as the leading indicator.

To comply with this approach, companies should complete the assessment in Steps 1b and 2, and document for each landscape the improved land management practice or landscape investments already completed in that landscape. Then use the state of nature criteria to select landscapes for engagement and document rationale. Please note that this approach will be accepted for the next 1-2 years of SBTN land targets.

Once version 2.0 is launched with the thresholds and translational science to link outcomes to corporate actions, a company may need to come back and assess whether the sustainable management activities they have implemented on their sourcing lands are in fact, enough. This could result in a re-calibration of activities on sourcing lands to align them with the necessary global biodiversity and nature outcomes.

Box 10 – Example for selection of landscapes using approach 1

Building on the example from Steps 1 & 2, take the case of Ursus Nourishment with seven sites across Europe. Each site is plotted within the Biodiversity Risk Filter (www.riskfilter.org) and 'Pressures on Biodiversity' are assessed. The results reflect that the sites 5, 6 and 7 are rated as having the highest biodiversity risk and they cover 15%, 35%, and 39% of the company's estimated land use impact (89% collectively). This information can be taken into the next steps of assessing Landscape Engagement Readiness.

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2238 *Table 22 – Illustrative data for Ursus case*

Table 12. Illustrative data for Ursus case - Direct operations pressure estimates per category.

Site ID	Activities at site	Location	Climate Change (tCO_2)	Land use - (km^2)	Land use change (km^2)	Water use (m^3)	Water pollution (kg P-eq)
DO #1	Manufacture of other food products; Packaging	Belgium	6,000 (industrial emissions)	5	0	1,000,000	500,000
DO #2	Manufacture of other food products; Packaging	France	3,000 (industrial emissions)	5.5	2	700,000	115,000
DO #3	Manufacture of other food products n.e.c.	United Kingdom	2,800 (industrial emissions)	3	0	300,000	300,000
DO #4	Manufacture of other food products n.e.c.	Spain	4,200 (industrial emissions)	4	0	250,000	160,000
DO #5	Growing of non-perennials	Spain	10,000 (LULUC emissions)	20	16	2,800,000	1,450,000
DO #6	Growing of non-perennials	Germany	8,000 (LULUC emissions)	45	23	1,000,000	1,200,000
DO #7	Growing of non-perennials	France	6,000 (LULUC emissions)	50	15	1,200,000	900,000
		Totals	40,000	129.5	0	6,550,000	4,625,000

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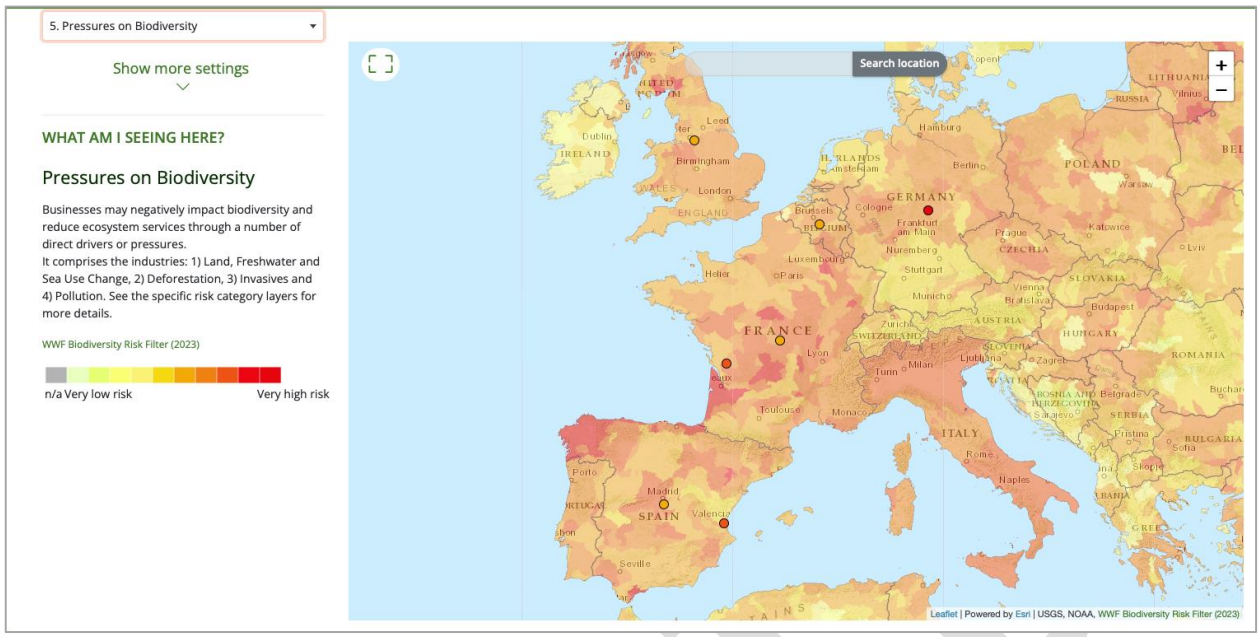
Figure 13 - Example of pressures on biodiversity consulting [WWF Biodiversity Risk Filter]



Approach 2. Choosing Landscapes for Engagement in Connection with No Conversion of Natural Ecosystems Target

The *No Conversion of Natural Ecosystems Target* requires companies to **commit to achieving no-conversion across their supply chain volumes** and to make and disclose progress toward that goal.

However, there is an additional mechanism in *no conversion* to address highly-transformed, embedded volumes of commodities given the difficultly in identifying the provenance of these specific volumes.

For companies who choose this approach, they should first calculate and disclose their estimated sourcing footprint of embedded or highly-transformed commodity volumes and use the provided methodology for determining the appropriate amount of compensation for these volumes. Once the amount of compensation has been determined, companies should prioritize landscapes for their compensation investment/actions in Group 1 designated areas that is a major producer of the type of embedded commodity within their supply chain.

Box 11 - Example for selection of landscapes using approach 2

A pharmaceutical retailer sells medicines with a lipid-based formulation and drug delivery system containing palm oil derivatives. The palm oil is highly transformed and embedded by this stage of the supply chain and traceability back to source is extremely limited. The company should first determine whether any portion of the palm oil is traceable and treat that as 'indirect sourcing'.

For the remaining portion of the embedded commodity, using the methodology it is determined that these palm derivatives are associated with XX hectares of conversion of natural ecosystems and the compensation should be XX. The retailer should review the Group 1 ecosystem list and identify a landscape in a major palm oil producing region with an active initiative that meets the criteria in section XX below. The company should provide that compensation to the initiative and document that this portion of their No Conversion target has been addressed.

Approach 3. Choosing Landscapes for Engagement in Connection with Land Footprint Reduction Targets

The Land Footprint Reduction Target requires certain companies within the food/agriculture sector to calculate the land occupation associated with their production and upstream sourcing and set a target to reduce that area over time.

The rationale behind this target is that agricultural expansion is the leading driver of terrestrial biodiversity loss and the some agricultural land needs to be freed up from production and eventually restored to natural ecosystems to provide other services to humanity. The Land Footprint Reduction Target in itself does not ensure that the lands taken out of production convert back to natural lands.

Companies who set a Land Footprint Reduction target should use the Landscape Engagement Target to align those reduced lands with the biodiversity (CBD), climate (UNFCCC), and land degradation (UNCCD) agendas over time. In this approach companies will prioritize landscape selection based on **where the company has the largest land footprint** and follow the instructions for Landscape Engagement. Companies should report on the % of their freed up lands that each landscape engagement is estimated to cover in their validation submission and track and disclose over time.

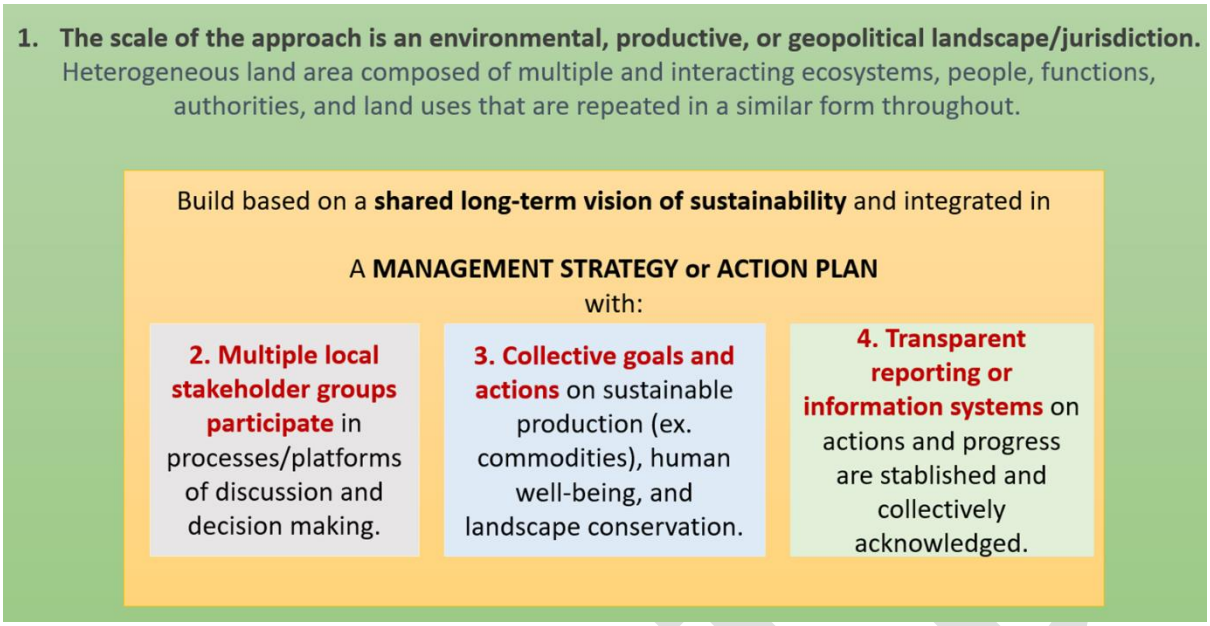
3.3.2 Screening of initiatives through the Maturity Validation Matrix

Due to the necessity to assess the credibility or matureness of companies' landscape and jurisdictional disclosures, CDP together with ISEAL, Proforest, and Tropical Forest Alliance developed a maturity validation methodology to assess the extent to which landscape and jurisdictional approaches disclosed in CDP's Forests Questionnaire follow the best principles (Sayer, 2013) and contain the characteristics of effective, robust approaches based on thought leadership and available guidance in the space.

The validation matrix outlined in this paper is anticipated to be used by SBTN as a tool for assessing initiatives in which companies will engage as a means to successfully meet their Landscape Engagement Target. The tool will guide companies in the selection of suitable landscape initiatives, which SBTN will recognize as compliant with its target requirements.

Insights gained from the literature have described shared elements of effective landscape approaches. Figure 14 summarizes these in a nested way, recognizing that the scale of an approach is a prerequisite to other elements of a mature, effective landscape initiative..

Figure 14 - Summary of key criteria of landscape initiatives



See the following for further details on each of the **four key criteria**:

1. **Operation at the scale of a landscape or jurisdiction**

    a. Every landscape or jurisdictional approach should operate at the scale of a recognized ecological (such as watershed or land ecosystem) or administrative area (such as states, provinces, municipalities, districts, etc). This is a precondition or mandatory element.

2. **Multi-stakeholder process/platform**

    a. The visions and needs of relevant stakeholders groups should be included in the design, implementation, and monitoring of an initiative. Usually, this requires an established or formal governance structure mainly integrated by the local stakeholders (civil & governments) that meets in a frequent and structured way to discuss and make decisions about the course of the landscape goals and implementation strategy. Inclusivity of representation including an appropriate gender and age balance, as well as local and indigenous communities participation is key for this criteria.

3. **Collective goals and actions for nature**

    a. An effective landscape or jurisdictional initiative should determine and act upon multiple goals shared among relevant stakeholders, addressing sustainable production (such as commodities), human well-being, and landscape conservation.

4. **Transparent reporting or information system**

    a. Baseline assessments for landscape performance, data sharing between stakeholders, and monitoring systems to track progress, are crucial for corporates to demonstrate accountability and contributions to landscape level performance and outcomes. Therefore, it is expected that companies provide a transparent reporting or present an information system on the actions/investments made in the initiative. According to CDP disclosure insights, this criterion is usually the least developed on corporate engagements in landscape initiatives due to the level of coordination it requires with all of the above criteria. An indicator of progress on this criteria

includes using specific landscape-level assessment tools such as: LandScale, Source-up, the activity framework of the Forest Positive Coalition, among others.

Validation Matrix and assessment process

When assessing a reported landscape or jurisdictional engagement from companies against all four criteria, **three level of maturity** are defined as follow:

- **Comprehensive**
  - the landscape or jurisdictional initiative is **robust enough or at a stage of maturity** to deliver lasting sustainability outcomes based on the collective goals in the landscape or jurisdiction in question. Companies engaging in "comprehensive" landscape and jurisdictional initiatives demonstrate that their initiatives comply successfully or adequately with all four criteria of integrated landscape approaches.
- **Partial**
  - the landscape or jurisdictional initiative is in an **early/mid stage of development and demonstrates is progressing steadily towards maturity**. Landscape and jurisdictional initiatives require time to mature; therefore, companies engaging in "partial" landscape initiatives are also considered credible engagements. Partial engagements should demonstrate that the initiative complies with the first criteria of scale and that progress towards complying with the three additional criteria is presented. Partial engagements could have maximum one criteria (except the scale, scale is mandatory) without development.
- **Uncertain**
  - the landscape or jurisdictional initiative is not considered credible or presents limited information about it. Initiatives considered "uncertain" either do not operate at the scale of a recognized geographic, administrative, or ecological boundary, or do operate "at scale" however lack information that demonstrates evidence of addressing or planning to address the additional three criteria.

2353 *Table 23 - Landscape and Jurisdictional Maturity Validation Matrix*

Criteria	Operation at the scale of a landscape or jurisdiction	Multi-stakeholder process/platform	Collective goals and actions	Transparent reporting or information system
Comprehensive	Scale of initiative corresponds to a recognized geographic, administrative, or ecological boundary. E.g., the initiative works in a subnational jurisdiction partnership between three municipalities that support the management of a watershed.	Several local stakeholders groups (civil & governments) are organized and involved in the design, implementation,and monitoring. Gender, age and local and indigenous communities representativity is ensured and effectively included. E.g., NGO's, local and indigenous communities, local governments, private sector regularly meet to collaborate and discuss the progress and next steps on the initiative.	Stakeholders have defined collective goals related to human well-being, sustainable production (e.g., of high impact commodities), and landscape conservation. Collective actions and investments making progress against the defined goals. E.g., the landscape stakeholders have agreed on their collective goals and actions for sustainable development, using collaborative workshops for goal and target-setting in early project stages.	Assessment baseline and progress at the landscape scale is tracked by several involved stakeholders and is publicly reported through an information system. E.g., the company supported the establishment assessment baseline using a recognized global assessment tool, and is now supporting an independent monitoring system for the initiative which transparently tracks progress against the collective goals.
Partial	Scale of initiative corresponds to a recognized geographic, administrative, or ecological boundary. E.g., the initiative works in a subnational jurisdiction partnership between three municipalities that support the management of a watershed.	Some stakeholders groups are involved. E.g., the company collaborates with an NGO that is supporting the landscape partnership, with no local representation or collaboration with government.	Actions go beyond internal company objectives and are determined by some stakeholders, or plan to be developed collaboratively. E.g., a company supports the initiative to improve its traceability and certification strategy, while also having a designated conservation area.	Actions are reported by some stakeholders.
Uncertain	Area of initiative is limited to specific sourcing plots/plantations of company interest, covers several geographically	Only the reporting company is involved in the initiative. No	Only internal company objectives are included, or holistic goals have not yet been determined.	Only the reporting company carries out monitoring and internal reporting for their own goals; there is not a

	distinct and separate boundaries, or does not describe any boundary.	additional stakeholder groups participate in the initiative.	Ex. Selected goals and qualitative responses only address production/productivity goals.	collective information system in place.

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3.3.3 Process to calculate EII at the landscape level

Calculation of the EII baseline score at the landscape level

Companies that have prioritized landscapes will retrieve data from stakeholders of landscape initiatives on boundaries. The boundaries will be overlapped with the spatially-explicit EII layer and descriptive statistics across the landscape will be calculated (please note that when acting at the landscape level, there is no need to calculate different EII scores for different ecosystem typologies as there is no need to compare scores of different location/holdings. Of interest, if the framing of the landscape initiative's action toward the improvement of the EII by target date).

Calculation of the target at the landscape level

For a landscape with an average score of 0.15, the desired threshold of 0.7 (see box 12) is subtracted, resulting in a deficit in EII of 0.55. A five percent increase equates to an increment of 0.0275 EII, increasing the average to 0.1775 across holdings. We would expect that this increase would be spread relatively evenly across the grid cells across the landscape (accepting a certain degree of variance, considering the different land-uses within a landscape). This avoids the concentration of efforts in just one region as a means of raising EII across the landscape, maximizing the benefits of an increment in ecological integrity.

Question: should areas within landscape with EII above 0.7 be excluded from baseline calculations? This would be a precautionary measure to avoid that landscape boundaries would be drawn in such way to included extensive natural and pristine areas within the baseline calculation, highly increasing the EII average and "watering" the target requirement. I think this is a benefit of using a percent increase target and even if a landscape is drawn in such a way as to top-load the EII scores, the objective can exceed 0.7. In fact, this might be necessary to make sure that companies don't get to 0.69 and then keep EII there so it remains in their baseline.

Question: is calculating EII based on the mean at the landscape scale a satisfactory approach or are there better ways to aggregate EII scores across landscapes that will be more meaningful or more feasible for company targets?

Box 12 - Naturalness threshold in the Ecosystem Integrity Index (EII)

To guide management actions, such as identification of areas in which degradation should be avoided, it is useful to distinguish high integrity or 'natural' areas from lower integrity or 'non-natural' areas. Although the EII provides a continuous scale of naturalness, for simplicity we can adopt a threshold value that distinguishes high integrity areas. The threshold of what is considered to be natural has been set at an EII of 0.7. Above this threshold we expect land cover to fall into categories such as primary forest and natural grasslands where degradation is lower. Below this threshold we expect land use classes with lower integrity, such as pasture and cropland, to occur.

Spatial analyses have been undertaken to validate the position of this naturalness threshold at 0.7. The EII has been overlaid with spatially-explicit land use layers (Global land cover and land use 2019 | GLAD (umd.edu)) to check the consensus between these layers when the natural threshold is set to 0.7. This land use data offers a viable option for robust validation as it has not been included as an input into any of the three EII component layers. Both the structural and composition layers take alternative land use data, whilst the functioning layer relies on climatic variables and remotely sensed NPP. We found that 99.1% of all cropland was concentrated in areas with EII values below the 0.7 threshold. Whilst for urban areas this was 96.3%. The high level of agreement between the EII layer and the independent land use layer validates the position of this naturalness threshold.

3.4 Data requirements for target setting

To set a Landscape Engagement Target, companies *will* collect data on:

1) Location and area of holdings pertaining to high impact commodities and locations prioritised in Step 2 (see Annex 1 and Annex 3)
2) Origin and volumes at the production unit level or sourcing area level

All companies which want to implement landscape engagements will have to collect data required by the validation matrix in section xx to demonstrate the status of the landscape initiative.

Data requirements for setting the target to increase ecosystem integrity will vary according to the stages of the value chains where a company operates.

Table 24 - Minimum data requirements for setting a Landscape Engagement Target

Stage of the value chain	Sectoral examples	Where	Unit of measurement	Spatial data[85]
Producers and site owners/operators		**Required** Location of all operational sites (at ecosystem level) prioritized in step 2.	Hectares	
Direct sourcing		**Required** Sourcing area of high impact commodities purchased.	Hectares	N/A
		Required (TBD) Volumes of high impact commodities purchased from each production unit or sourcing area.	Metric tonnes or equivalent	Volumes will be required only if quantification of corporate impact at the landscape level is required. See question 14. In revision form.
Indirect Sourcing (non-embedded)		**Required** Sourcing area of high impact commodities purchased.	Hectares	N/A
		Required (TBD) Volumes of high impact commodities embedded into complex products purchased.	Metric tonnes (or equivalent)	
		Recommended	Hectares	N/A

[85] Coordinates of location and map.

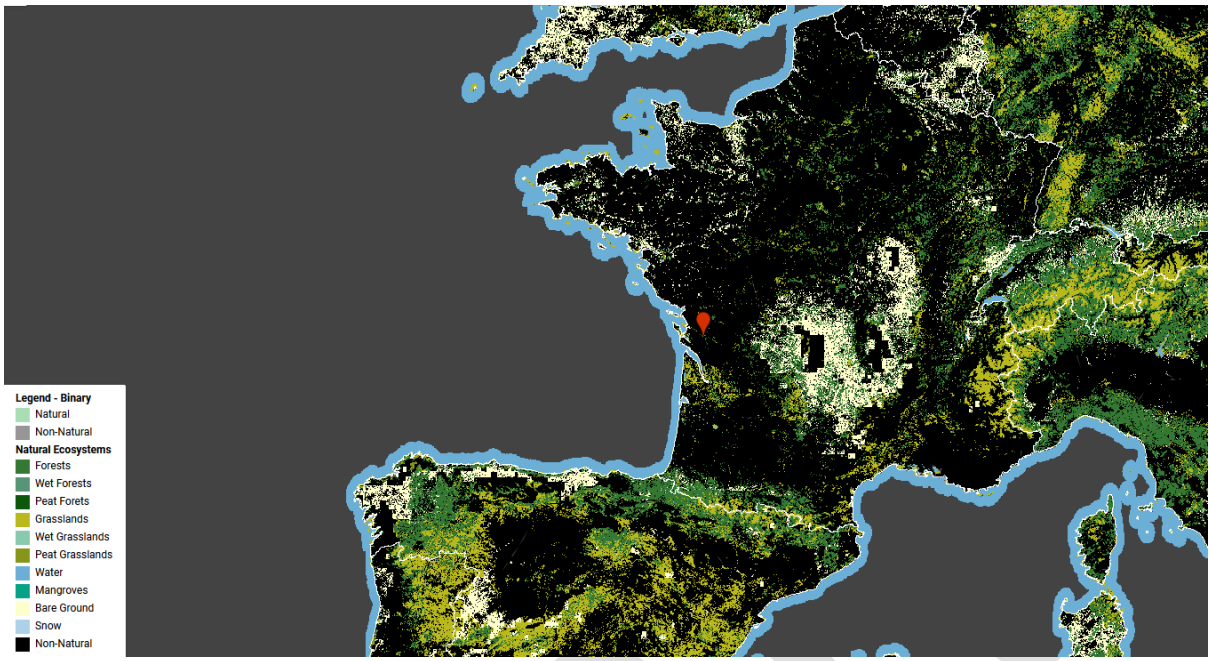
Stage of the value chain	Sectoral examples	Where	Unit of measurement	Spatial data[85]
Indirect sourcing (embedded or highly-transformed)		Sourcing area of high impact commodities purchased.		
		Required (TBD) Volumes of high impact commodities embedded into complex products purchased.	Metric tonnes (or equivalent)	

3.5 Case Study—Landscape Engagement

Ursus Nourishment is a food and beverage producer that specializes in plant-based drinks and food. This hypothetical data comes from a SBTN Case study for Steps 1(Assess) and 2(Prioritize) (Approach 1 Choosing Landscape for Engagement in Connection with Steps 1&2). This case study will be publicly available with the launch of Science Based Targets for Nature v1. Based on this analysis of materiality, value chain, pressures, state of nature, business activities, and commodities target boundaries were determined for climate change, land use, land use change, water use, soil pollution, and water pollution. For this case study we will focus on land use. After calculating the index value, Ip (pressure (land use) x SoNp (Ecosystem Integrity) the priority rank within target boundary for direct operations and land use was growing of non-perennials in France, Spain, and Germany. The priority rank within target boundary for upstream and land use was Maize in United States, Tree Nuts in United States, and Soy in Brazil.

The focus of this case study will be direct operations of growing non-perennials in France. France has many natural ecosystems bordering non-natural as seen in the map below from the SBTN's Global Map of Natural Lands. France is home to forests, grasslands, and water. The red locater mark is in western France in a territory that is heavily degraded and non-natural. The results of the Biodiversity Risk Filter reflect that France's land use impact is estimated at 39%. The ecosystem types are forest, non-natural, and water.

Figure 15 - An example of a natural and non-natural ecosystems map of a non-perennials farm site in Western France.



Ursus Nourishment then screened their initiatives in France through the Validation Matrix. The landscape was reported as a *Partial* level of maturity. The EII score at the landscape level was calculated at 0.22 (0-1). The desired threshold of 0.7 is subtracted resulting in a deficit in EII of 0.48. A 6 percent increase equates to an increment of 0.0132 EII. The target set is based on Goal A of the Montreal-Kunming Global Biodiversity Framework. Ursus Nourishment commits to collective actions within landscape initiatives that enable a 6% increase of EII (structure, composition, and function) score by 2030. The company is following the Action Plan as well with the scale of the approach as a jurisdiction, multiple stakeholders involved in decision making, multiple sustainable development, human well-being and conservation objectives, and monitoring systems are publicly available and interconnective.

Collectively interventions according to the ARRRT framework are selected including the following:

1. **Avoid** deforestation and degradation
2. **Reduce** impact through conservation agriculture practices e.g., intercropping, cover crops, crop mosaics
3. **Restore** the landscape with native vegetation or pollinator habitat
4. **Regenerate** the soil with improving soil health through mulching and fertility management, and
5. **Transform** the community with a community garden and encouraging plant-based diets.

Ursus Nourishment then should follow the instructions in Section 3.3 regarding monitoring progress at the landscape level and reporting requirements.

3.6 Target validation

To begin the target validation process, companies *must* submit to SBTN:

1. Demonstrated engagement with landscape initiatives that cover 10% of land use impact.

2. Descriptive rationale of the process chosen for the selection of priority landscapes.
3. Results of the screening of readiness status of landscape initiatives selected using the validation matrix (section 3.3.2).
4. Demonstrated engagement within an iterative process of stakeholder consultation that includes relevant parties as needed.
5. Show that an adequate and impartial assessment of needs of local communities has taken place within this stakeholder consultation.
6. Alignment of corporate actions with community needs and objectives resulting from the stakeholder consultation process.
7. Calculation of the EII baseline score and descriptive statistics at the landscape level.

3.7 Best practices for disclosure

The ideal metrics for reporting on progress at the landscape scale should come from landscape initiatives themselves. These initiatives, especially if they use common landscape assessment approaches, will already have mandatory reporting metrics and companies should align their reporting on this target with the metrics of the landscape initiatives within which they are participating.

In addition to this, there are several basic metrics that are relatively simple to calculate based on the data required for this target, through either the landscape or the operational site approach. The below metrics represent potential future reporting requirements that companies with validate target will have to fulfil.

Baselining and annual progress reporting

These metrics have been compiled based on those that will be simple to calculate using SBTN methods, common landscape metrics used within landscape assessment frameworks (e.g., Landscale, Restoration Opportunities Assessment Methodology) as well as metrics included as part of the Convention on Biological Diversity's Global Biodiversity Framework monitoring guidance.

- EII score and descriptive statistics at the landscape scale (dependent on EII recalculation frequency)
- Proportion of land area under productive and sustainable land management.
- Percentage of area exceeding the 0.7 threshold of naturalness to the total landscape area
- Hectares of natural lands converted between 2020 (SBTN Natural Lands Map)
- Hectares classified as Group 1 for *No Conversion* Target
- Hectares "under restoration" in the landscape
- Coverage of protected areas and Other Effective Conservation Measures (OECMs)
- Number of stakeholder organizations with full, equitable, inclusive, effective and gender-responsive representation and participation in decision-making, including a gender-action plan.
- Proportion of total adult population with secure tenure rights to land, (a) with legally recognized documentation, and (b) who perceive their rights to land as secure, by sex and type of tenure

Other recommended metrics

- Biodiversity risk assessment including dependencies and impacts to biodiversity
- Water risk assessment using the Water Risk Filter or Aqueduct

- Species Threat Abatement and Restoration (STAR) score at the landscape scale (using freely available 5km^2) resolution data.
- Species Threat Abatement and Restoration (STAR) score at the landscape scale (using finer resolution data resolution data through an IBAT subscription).
- Services provided by ecosystems or an assessment of critical natural assets
- Total climate regulation services provided by ecosystems by ecosystem type (System of Environmental Economic Accounts)
- Carbon stocks and annual net GHG emissions, by land-use category, split by natural and non-natural land cover

For other recommended metrics see Annex 10.

3.8 Key definitions

Ecosystem: A dynamic complex of plant, animal and microorganism communities and the non-living environment interacting as a functional unit.[86]

Within this definition, the term 'unit' relies on the identification of a distinct function as well as a 'dynamic' grouping of biotic and abiotic factors. When using an ecosystem approach to conservation, the United Nations Convention on Biological Diversity (CBD) suggest an ecosystem can refer to any functioning unit, regardless of scale. Thus, the term is not necessarily synonymous with 'biome' or 'ecological zone' but it is better determined by the problem that is being addressed.

Ecosystem integrity: Ecosystem integrity encompasses the full complexity of an ecosystem, including the physical, biological and functional components, together with their interactions, and measures against a 'natural' (i.e., current potential) reference level .[87]

Carter et al. (2019), simplified this further to define ecosystem integrity as the " extent to which the **composition**, **structure**, and **function** of an ecosystem fall within their natural range of variation".

- **Structure** comprises the three-dimensional aspect of ecosystems – the biotic and abiotic elements that form the heterogeneous matrix supporting the composition and functioning. Structure is dependent on habitat area, intactness, and fragmentation.
- **Composition** refers to the biotic constitution of ecosystems – the pattern of the makeup of species communities and the interactions between them. It refers to the identity and variety of life.
- **Function** describes the ecological processes and ecosystem services provided by the ecosystem.

The Ecosystem Integrity Index (EII): This index provides a simple, yet scientifically robust, way of **measuring, monitoring and reporting** on **ecosystem integrity** at any geographical scale. It is formed of three components, structure, composition, and function, and measured against a natural (current potential) baseline on a scale of 0 to 1:

- **Structure** - The metric for structure is derived from a total of **12 spatial layers of features associated with anthropogenic pressure on biodiversity**, including population density, built-up areas, agriculture, roads, railroads, mining, oil wells, wind turbines and electrical infrastructure.

[86] https://www.cbd.int/ecosystem/description.shtml
[87] https://link.springer.com/article/10.1007/s00267-019-01163-w

- **Composition** - The metric for composition is a combination of the assessment of the **impact of human pressures on the total abundance of species** within a community and the assessment of the similarity between the relative abundance of each of the species in a community in a non-natural landscape with those in a natural landscape.
- **Function** - The metric for function is estimated using the **difference between potential natural and current net primary productivity (NPP) within each 1km grid cell**.

The index has been developed to help national governments measure and report on various of the goals and targets being developed within the draft post-2020 Global Biodiversity Framework being negotiated under the Convention on Biological Diversity, and for non-state actor contributions to also be recognized.

Landscape approaches: Collaboration of stakeholders within a defined natural or social geography, such as watershed, biome or company sourcing area. These approaches seek to reconcile competing social, economic and environmental goals through "integrated landscape management" – a multi-stakeholder approach that builds consensus across different sectors with or without government entities[88]. (Proforest 2020).

Landscape: For the purpose of this guidance, the landscape is the **area where a landscape approach is being implemented**. In ideal cases the landscape will have been defined through a broad stakeholder led process into which a company may begin its participation. This may not always be the case for areas that are relevant for companies. In these cases, a more prescriptive approach to landscape identification may be required. Here it may be possible to utilize water basin boundaries identified through the SBTN Freshwater target methodology or through SBTN's Step 2 prioritization process.

[88] https://jaresourcehub.org/wp-content/uploads/2020/09/JA-Practical-Guide.pdf

Glossary of terms and acronyms

AFi
Accountability Framework initiative.

Agricultural land
Cropland and land under permanent meadows and pastures.

Avoid
Prevent impact happening in the first place, eliminate impact entirely.

Bare land
Areas with exposed rock, soil, or sand with less than 10% vegetated cover.

Baseline
Value of impacts (on nature) or state (of nature) against which an actor's targets are assessed, in a particular previous year.

CBD
Convention on Biological Diversity

CGF
Consumer Goods Forum

Composition of an ecosystem
It refers to the biotic constitution of ecosystems – the pattern of the makeup of species communities and the interactions between them. It refers to the identity and variety of life.

Conversion
A change of a natural ecosystem to another land use or profound change in a natural ecosystem's species composition, structure, or function. Deforestation is one form of conversion (conversion of natural forests). Conversion includes severe degradation or the introduction of management practices that result in substantial and sustained change in the ecosystem's former species composition, structure, or function. Change to natural ecosystems that meets this definition is considered to be conversion regardless of whether or not it is legal.

Cut-off dates
The cut-off date provides a baseline for the target; after this date, any conversion of natural ecosystems on a given site renders the materials produced on that site non-compliant with a no-conversion target.

Direct operations
It covers all activities and sites (e.g. buildings, farms, mines, retail stores) over which the enterprise has operational or financial control. This includes majority owned subsidiaries. It is referred as the sphere of control (with control being one end of an influence spectrum).

Downstream
It covers all activities that are linked to the sale of products and services produced by the company setting targets. This includes the use and re-use of the product and its end of life to include recovery, recycling and final disposal.

Ecosystem
A dynamic complex of plant, animal and microorganism communities and the non-living environment interacting as a functional unit. Within this definition, the term 'unit' relies on the identification of a distinct function as well as a 'dynamic' grouping of biotic and abiotic factors. When using an ecosystem approach to conservation, the United Nations Convention on Biological Diversity (CBD) suggest an ecosystem can refer to any functioning unit, regardless of scale. Thus, the term is not necessarily

synonymous with 'biome' or 'ecological zone' but it is better determined by the problem that is being addressed.

Ecosystem integrity

Ecosystem integrity encompasses the full complexity of an ecosystem, including the physical, biological and functional components, together with their interactions, and measures against a 'natural' (i.e., current potential) reference level. It is the extent to which the composition, structure, and function of an ecosystem fall within their natural range of variation.

EII

Ecosystem Integrity Index: an index that provides a way of measuring, monitoring and reporting on ecosystem integrity at any geographical scale. It is formed of three components, structure, composition, and function, and measured against a natural (current potential) baseline on a scale of 0 to 1.

Embedded or highly-transformed commodities

Volumes of high impact commodities that are included into complex products. In this case, companies do not purchase a commodity in its raw or processed forms, but they purchase a product which contains them.

FLAG

Science Based Targets initiative's Forest, Land and Agriculture (FLAG) Guidance

FOLU

Food and Land Use Coalition

Forests

Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or other land use.

Function of an ecosystem

It describes the ecological processes and ecosystem services provided by the ecosystem.

GBF

Final Montreal-Kunming Global Biodiversity Framework (GBF)

GHGP

Greenhouse Gas Protocol

Goal

In global (e.g. UN) sustainability framings, a high-level statement of ambition, including a timeframe. Example: By 2030, ensure healthy lives and promote well-being for all at all ages (SDG3).

IFC

International Financial Corporation's (IFC)

Impacts

Can be positive or negative contributions of a company or other actor toward the state of nature, including pollution of air, water, soil; fragmentation or disruption of ecosystems and habitats for non-human species; alteration of ecosystem regimes.

Indirect sourcing

Sourcing from stages of the value chain that are downstream the first point of aggregation

Indicator

A specific metric by which a target is measured. Example: Red List Index (SDG Target 15.5; Aichi Target 12).

ISIC

International Standard Industrial Classification of All Economic Activities

Land footprint

See "Land occupation."

Land occupation

Land occupation is the amount of land occupied for a certain time to produce a product. For purposes of annual tracking and target-setting by companies, it is defined as the amount of land required per year to produce or extract the products produced or sourced by a company. It is reported in hectares per year. For crops, land occupation is also referred to as "harvested area" in FAOSTAT. It refers to working lands used to produce or extract land-based products—not necessarily all land owned or controlled by companies.

Land footprint intensity

See "Land occupation intensity."

Land occupation intensity

Land occupation intensity is essentially the reciprocal of yield, referring to the amount of land needed to produce a given unit of product.

Landscape

A socio-ecological system that consists of natural and/or human-modified ecosystems, and which is influenced by distinct ecological, historical, economic and socio-cultural processes and activities. For the purpose of this guidance, the landscape is the area where a landscape approach is being implemented. In ideal cases the landscape will have been defined through a broad stakeholder led process into which a company may begin its participation. This may not always be the case for areas that are relevant for companies. In these cases, a more prescriptive approach to landscape identification may be required. Here it may be possible to utilize water basin boundaries identified through the SBTN Freshwater target methodology or through SBTN's Step 2 prioritization process.

Landscape approach

Collaboration of stakeholders within a defined natural or social geography, such as watershed, biome or company sourcing area. This approach seeks to reconcile competing social, economic and environmental goals through "integrated landscape management" – a multi-stakeholder approach that builds consensus across different sectors with or without government entities.

Land cover

The observed physical and biological cover of the earth's land

Land use

All the arrangements, activities, and inputs undertaken in a certain land cover type (a set of human actions) or the social and economic purposes for which land is managed (e.g., grazing, timber extraction, conservation).

Land Use Change (LUC)

Land uses can change over time due to both natural and anthropogenic causes. Such changes can be represented by land use change categories (e.g., forest land converted to cropland). Where the land use category remains the same but land use subcategory changes, for example conversion from a primary forest (natural forest) to a plantation forest (planted forest), this should be accounted for as land use change.

Materiality

Significance of an entity's environmental impact.

Measurement

The process of collecting data for baseline setting, monitoring, and reporting.

Monitoring

Tracking progress towards targets.

Natural Ecosystem

Ecosystem that substantially resembles – in terms of species composition, structure, and ecological function – what would be found in a given area in the absence of major human impacts.

Natural forests

Natural forests possess many or most of the characteristics of a forest native to the given site, including species composition, structure, and ecological function.

Nature

All non-human living entities and their interaction with other living or non-living physical entities and processes (IPBES Global Assessment 2019[89]). This definition recognizes that interactions bind humans to nature, and its subcomponents (e.g. species, soils, rivers, nutrients), to one another. This definition also recognizes that air pollution, climate regulation and carbon are part of 'nature' more broadly, and therefore, when we talk about acting for nature, we are talking about acting on issues related to climate change as well.

Nature contributions to people (NCP - previously: ecosystem services)

All the beneficial and detrimental contributions that we obtain from and with nature (IPBES Global Assessment: 26). In general NCPs are categorized as material NCPs like wild-harvested foods, regulating NCPs that govern biophysical processes (e.g. carbon storage, flood regulation), and non-material NCPs that provide cultural services.

In total, the different categories of NCP recognized by IPBES include: habitat creation and maintenance (NCP 1), pollination and dispersal of seeds and other propagules (NCP 2), regulation of air quality (NCP 3), regulation of climate (NCP 4), regulation of ocean acidification (NCP 5), regulation of freshwater quantity, location and timing (NCP 6), regulation of freshwater and coastal water quality (NCP 7), formation, protection and decontamination of soils and sediments (NCP 8), regulation of hazards and extreme events (NCP 9), regulation of detrimental organisms and biological processes (NCP 10), energy (NCP 11), food and feed (NCP 12), materials, companionship and labor (NCP 13), medicinal, biochemical and genetic resources (NCP 14), learning and inspiration (NCP 15), physical and psychological experiences (NCP 16), supporting identities (NCP 17), maintenance of options (NCP 18).

Nature loss

The loss and/or decline of the state of nature.

Nature positive

A high level goal and concept describing a future state of nature (e.g. biodiversity, nature's contributions to people) which is greater than the current state.

Pressures

Following IPBES, five key pressures contribute most to the loss of nature globally: Land and sea use change; direct exploitation of organisms; climate change; pollution; and invasion of alien species. While we generally follow IPBES definitions for these categories, we take a slightly broader conceptualization of 'direct exploitation' to include both biotic and abiotic resources, such as water use--we thus use the term "Resource exploitation".

Raw and processed commodities (non-embedded)

Commodities purchased in their raw or processed form (and not included as ingredients or components of complex products)

Reduce

Minimize impacts, from a previous baseline value, without eliminating them entirely

Regenerate

Actions designed within existing land uses to increase the biophysical function and/or ecological productivity of an ecosystem or its components, often with a focus on specific nature's contributions to people (e.g. on carbon sequestration,

[89] https://ipbes.net/global-assessment

food production, and increased nitrogen and phosphorus retention in regenerative agriculture (adapted from FOLU 2019[90])

Reporting

Preparing of a formal written document typically connected to desired objectives, outcomes or outputs, such as those connected to targets and goals.

Restore

Initiate or accelerate the recovery of an ecosystem with respect to its health, integrity and sustainability with a focus on permanent changes in state (adapted from Society of Ecological Restoration[91])

Science-based targets (SBTs)

Measurable, actionable and time-bound objectives, based on the best available science, that allow actors to align with Earth's limits and societal sustainability goals.

SBTi

Science Based Targets initiative

Short vegetation

Areas of land with vegetation shorter than 5 meters, and can include areas of land dominated by grass or shrubs.

Site(s)

Operational locations within a company's value chain/spheres of control and influence (including direct operations). Sites can include operations from any phase of a product's life cycle, from extractive operations (e.g. mines), material processing (e.g. mills), production facilities (e.g. factories), logistics facilities (e.g. warehouses), wholesale and retail (e.g. stores), and recycling/end of life (e.g. material recovery).

Snow/Ice

Areas covered by permanent snow or ice.

SMT[92]

Sectoral Materiality Tool

States

Unless otherwise specified, we use the term 'state' to mean 'state of nature' in three key categories: species (abundance and extinction risk), ecosystems (extent, integrity, and connectivity), and nature's contributions to people.

Structure of an ecosystem

It comprises the three-dimensional aspect of ecosystems – the biotic and abiotic elements that form the heterogeneous matrix supporting the composition and functioning. Structure is dependent on habitat area, intactness, and fragmentation.

Target

In global (e.g. UN) sustainability framings, a more specific quantitative objective, usually nested under a goal, with defined measurement and an associated indicator. Example: By 2020, pollution, including from excess nutrients, has been brought to levels that are not detrimental to ecosystem function and biodiversity (Aichi Target 8).

Target dates

Target dates are the time by which companies must achieve their Land targets.

Threatened ecosystems

[90] https://www.foodandlandusecoalition.org/wp-content/uploads/2019/09/Regenerative-Agriculture-final.pdf

[91] https://cdn.ymaws.com/www.ser.org/resource/resmgr/docs/standards_2nd_ed_summary.pdf

[92] https://sciencebasedtargetsnetwork.org/wp-content/uploads/2022/02/Sectoral-Materiality-Tool_UNEP-WCMC_January-2022.xlsx

Ecosystems which are classified as threatened by the IUCN Red List of Ecosystems. It includes "Vulnerable", "Endangered", or "Critically Endangered" ecosystems. While Red List of Ecosystem assessments are not yet global in coverage, they provide an additional buffer against the conversion of threatened ecosystems for those areas that have been assessed

Transform

Actions contributing to system-wide change, notably the drivers of nature loss, e.g. through technological, economic, institutional, and social factors and changes in underlying values and behaviours (adapted from IPCC and IPBES 2019[93])

UNCCD

The United Nations Convention to Combat Desertification

Upstream

It covers all activities associated with suppliers, e.g. production or cultivation, sourcing of commodities of goods, as well as transportation of commodities to manufacturing facilities.

Validation

An independent process involving expert review to ensure the target meets required criteria and methods of science-based targets.

Value chain

A series of activities, sites, and entities, starting with the raw materials and extending through end-of-life management, that (a) supply or add value to raw materials and intermediate products to produce final products for the marketplace and (b) are involved in the use and end-of-life management of these products. The value chain can be divided into upstream and downstream sites/activities.

Verification

An independent third party confirmation of either or both: a) baseline values of a target indicator (e.g. a company's water or GHG inventory) and b) progress made toward achieving the target.

Water

Surface water present 20% or more of the year, outside of wetlands.

Wetlands

Transitional ecosystems with saturated soil that can be inundated by water either seasonally or permanently, and can be covered by short vegetation or trees.

Working Lands

Farms, forests, rangelands, and infrastructure that is managed to provide services such as transportation, energy, and water.

Yield

It refers to intensity of production per unit of land area. It is defined as the amount of product produced in a year divided by the amount of land occupied by that product. For crops, it refers to amount produced divided by harvested area. For livestock products, it refers to amount produced divided by the total area needed for livestock production (both to house the animals and to produce the crop- and/or pasture-based animal feeds).

References

For public consultation, references are included as footnotes throughout the text.

[93] https://ipbes.net/sites/default/files/Initial_scoping_transformative_change_assessment_EN.pdf

ANNEXES

ANNEX 1: Land intensive commodity list

Table 25 - "A commodities" - Land conversion driving commodities that are relevant globally and across biomes

Soft Commodities	**Source**
Cattle Pasture (Beef/ Dairy/ Leather)	Multiple Sources
Cocoa	Multiple Sources
Coffee	Hoang, 2021[94]
Maize	Multiple Sources
Oil Palm	Multiple Sources
Rice	Multiple Sources
Rubber	Multiple Sources
Sorghum	Phalan, 2013[95]
Soybeans	Multiple Sources
Sugarcane	Phalan, 2013[96], Dryad, 2020[97]
Timber/Wood Fiber	Multiple Sources
Wheat	Multiple Sources
Activities/Applications	**Source**
Biofuels (Ethanol, Solid Biomass, etc.)	Multiple Sources
Feed for Animal Protein - Cattle, Pork, Chicken, Aquaculture, etc.	Multiple Sources

Table 26 - "B commodities" - land conversion driving commodities that are relevant to a particular region or biome

Soft Commodities	**Source**
Avocados	Dryad, 2020[98]

[94] Hoang, Nguyen Tien and Kanemoto, Keiichiro. 'Mapping the deforestation footprint of nations reveals growing threat to tropical forests,' Nature Ecology & Evolution, VOL 5, June 2021, 845-853.
[95] Phalan B, Bertzky M, Butchart SHM, Donald PF, Scharlemann JPW, et al. (2013) Crop Expansion and Conservation Priorities in Tropical Countries. PLoS ONE 8(1): e51759. doi:10.1371/journal.pone.0051759
[96] Phalan B, Bertzky M, Butchart SHM, Donald PF, Scharlemann JPW, et al. (2013) Crop Expansion and Conservation Priorities in Tropical Countries. PLoS ONE 8(1): e51759. doi:10.1371/journal.pone.0051759
[97] Quantis, Dryad model for deforestation based on FAO production and crop expansion data. Accessed 2020 as part of project for WWF contract identifying the deforestation driving commodities for Project Gigaton.
[98] Quantis, Dryad model for deforestation based on FAO production and crop expansion data. Accessed 2020 as part of project for WWF contract identifying the deforestation driving commodities for Project Gigaton.

Banana	Meyfroidt,2014[99], Jayathilake, 2021[100]
Beans	Phalan, 2013[101]
Buckwheat	Plowprint, 2022[102]
Camelina	Plowprint, 2022[103]
Canola	Plowprint, 2022[104]
Cassava	Phalan, 2013[105], Jayathilake, 2021[106]
Charcoal, Commercial	Jayathilake, 2021[107]
Coconut	Dryad, 2020[108], Jayathilake, 2021[109]
Cotton	Dryad, 2020[110]
Cowpeas	Phalan, 2013[111]
Grapes	Plowprint, 2022[112]
Groundnut	Phalan, 2013[113]
Millet	Phalan, 2013[114]

[99] Meyfroidt, Patrick, et al. 'Multiple pathways of commodity crop expansion in tropical forest landscapes,' Environmental Research Letter, 9 (2014) 074012 (13pp).

[100] Jayathilake, H. Manjari, et al. 'Drivers of deforestation and degradation for 28 tropical conservation landscapes,' Royal Swedish Academy of Science. Ambio 2021, 50:215-228.

[101] Phalan B, Bertzky M, Butchart SHM, Donald PF, Scharlemann JPW, et al. (2013) Crop Expansion and Conservation Priorities in Tropical Countries. PLoS ONE 8(1): e51759. doi:10.1371/journal.pone.0051759

[102] WWF, 2022 PlowPrint Report, 2022

[103] WWF, 2022 PlowPrint Report, 2022

[104] WWF, 2022 PlowPrint Report, 2022

[105] Phalan B, Bertzky M, Butchart SHM, Donald PF, Scharlemann JPW, et al. (2013) Crop Expansion and Conservation Priorities in Tropical Countries. PLoS ONE 8(1): e51759. doi:10.1371/journal.pone.0051759

[106] Jayathilake, H. Manjari, et al. 'Drivers of deforestation and degradation for 28 tropical conservation landscapes,' Royal Swedish Academy of Science. Ambio 2021, 50:215-228.

[107] Jayathilake, H. Manjari, et al. 'Drivers of deforestation and degradation for 28 tropical conservation landscapes,' Royal Swedish Academy of Science. Ambio 2021, 50:215-228.

[108] Quantis, Dryad model for deforestation based on FAO production and crop expansion data. Accessed 2020 as part of project for WWF contract identifying the deforestation driving commodities for Project Gigaton.

[109] Jayathilake, H. Manjari, et al. 'Drivers of deforestation and degradation for 28 tropical conservation landscapes,' Royal Swedish Academy of Science. Ambio 2021, 50:215-228.

[110] Quantis, Dryad model for deforestation based on FAO production and crop expansion data. Accessed 2020 as part of project for WWF contract identifying the deforestation driving commodities for Project Gigaton.

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[112] WWF, 2022 PlowPrint Report, 2022

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[114] Phalan B, Bertzky M, Butchart SHM, Donald PF, Scharlemann JPW, et al. (2013) Crop Expansion and Conservation Priorities in Tropical Countries. PLoS ONE 8(1): e51759. doi:10.1371/journal.pone.0051759

Mustard	Plowprint, 2022[115]
Onions	Plowprint, 2022[116]
Pineapple	Meyfroidt, 2014[117]
Potato	Plowprint, 2022[118]
Radishes	Plowprint, 2022[119]
Rye	Plowprint, 2022[120]
Safflower	Plowprint, 2022[121]
Speltz	Plowprint, 2022[122]
Sugar Beets	Plowprint, 2022[123], Dryad[124]
Triticale	Plowprint, 2022[125]
Vetch	Plowprint, 2022[126]
Hard Commodities	**Source**
Bauxite	Luckeneder, 2021[127]
Coal, Surface Mining	Yu[128]
Copper	Luckeneder, 2021[129]
Gold	Luckeneder, 2021[130]
Iron	Luckeneder, 2021[131]

[115] WWF, 2022 PlowPrint Report, 2022

[116] WWF, 2022 PlowPrint Report, 2022

[117] Meyfroidt, Patrick, et al. 'Multiple pathways of commodity crop expansion in tropical forest landscapes,' Environmental Research Letter, 9 (2014) 074012 (13pp).

[118] WWF, 2022 PlowPrint Report, 2022

[119] WWF, 2022 PlowPrint Report, 2022

[120] WWF, 2022 PlowPrint Report, 2022

[121] WWF, 2022 PlowPrint Report, 2022

[122] WWF, 2022 PlowPrint Report, 2022

[123] WWF, 2022 PlowPrint Report, 2022

[124] Quantis, Dryad model for deforestation based on FAO production and crop expansion data. Accessed 2020 as part of project for WWF contract identifying the deforestation driving commodities for Project Gigaton.

[125] WWF, 2022 PlowPrint Report, 2022

[126] WWF, 2022 PlowPrint Report, 2022

[127] Luckeneder, Sebastian, et al. 'Surge in global metal mining threatens vulnerable ecosystems,' Global Environmental change, 69 (2021) 102303.

[128] Yu, Le, et al. 'Monitoring surface mining belts using multiple remote sensing datasets: a global perspective,' Ore Geology Reviews, Volume 101, October 2018, Pages 675-687.

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[130] Luckeneder, Sebastian, et al. 'Surge in global metal mining threatens vulnerable ecosystems,' Global Environmental change, 69 (2021) 102303.

[131] Luckeneder, Sebastian, et al. 'Surge in global metal mining threatens vulnerable ecosystems,' Global Environmental change, 69 (2021) 102303.

Lead	Luckeneder, 2021[132]
Manganese	Luckeneder, 2021[133]
Nickel	Luckeneder, 2021[134]
Palladium	SBTN HICL, 2022[135]
Platinum	SBTN HICL, 2022[136]
Silver	Luckeneder, 2021[137]
Zinc	Luckeneder, 2021[138]
Activities/Applications	**Source**
Urban/Settlement & Infrastructure Development	Jayathilake, 2021[139]
Hydroelectric Dam Development	WWF, Deforestation Fronts[140]
Oil & Gas Exploration	Jayathilake, 2021[141]

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[132] Luckeneder, Sebastian, et al. 'Surge in global metal mining threatens vulnerable ecosystems,' Global Environmental change, 69 (2021) 102303.
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[138] Luckeneder, Sebastian, et al. 'Surge in global metal mining threatens vulnerable ecosystems,' Global Environmental change, 69 (2021) 102303.
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ANNEX 2: Accounting for land use change at the level of the production unit

Monitoring land use change at the level of production units (e.g. farms, plantations, and forest management units) or project sites (e.g., mining sites, construction sites) provides the greatest amount of precision about the impact in company operations and supply chains and is the best way to determine whether products or sites are linked to recent deforestation or conversion. Accounting for land use change at this level requires known and mapped locations of the given production units, demarcated by geo-referenced boundaries. The role of any given company in monitoring and accounting for land use change at the site level may differ depending on its position(s) in the supply chain. Upstream supply chain actors (i.e., producers, primary processors, and traders with visibility to the production unit) are in the position to monitor on-the-ground conditions. They should directly monitor and document land use change and furnish downstream buyers with information about land use change associated with the products being sold. Downstream companies that purchase commodities or derived products may assess recent deforestation and conversion at the site level by gathering data collected by their suppliers, monitoring known production sites directly using spatially explicit remote sensing data, or using third party certification schemes with chain of custody models that provide traceability to origin.

Companies should apply the following steps to account for land use change and associated emissions at the scale of the production unit:

1. Identify the spatial boundaries of production units owned or managed by the company or known to produce materials in a company's supply chain.

2. Identify land use change events that occurred within the spatial boundary since the cutoff date and during the emissions assessment period. Deforestation and conversion identified since the cut-off date should be reported through appropriate indicators. If there has been no deforestation or conversion on a production unit since the cut-off date, then product volumes from that production unit may be considered deforestation/ conversion free.

Accounting for land use change at an area level

It is sometimes not possible or appropriate to assess conversion of natural ecosystems at the scale of specific production units in a company's supply chain. In these cases, both supply chain deforestation/conversion and scope 3 land use change emissions may be accounted for at the scale of a sourcing area in which production units are located.

Depending on the location, production context, and commodity, a sourcing area may be the supply-shed of a processing facility (such as a radius surrounding a palm oil mill), a production landscape (such as the area encompassing a smallholder cooperative), or a subnational jurisdiction. When sourcing areas are not known, LUC emissions may be estimated at national or global scales.

Assessments at an area level serve as a proxy for direct land use change, and emissions accounting uses statistical land use change (Sluc) methods. By providing an estimate of land use change potentially allocated to a given product, Sluc inherently also considers some amount of indirect land use change – that is, pressure by expansion of one commodity that may lead to LUC for another commodity (see Section 4.5).

When land use change may be assessed at the level of a sourcing area

Accounting for deforestation and conversion associated with agricultural and forest commodities at the scale of a sourcing area may be appropriate in a range of circumstances, including when: • Downstream companies do not have physical traceability to the production unit level and may therefore need to monitor land use change at the sourcing area level as the best available option. In this case, the sourcing area should be the smallest geographic area from which commodity volume is known to originate, and companies should also take steps to increase traceability of these volumes. • A sourcing area is the most relevant scale for managing deforestation and conversion risk, for example where: • Upstream companies

such as primary processors source commodity volumes from a specified radius or source-shed around their facilities without maintaining long-term buying relationships with specific producers. Companies source from smallholder producers whose materials are aggregated at the level of a co-op or collection point and where further traceability is not possible. • Companies source from jurisdictions or landscapes where it can be shown that there has been no or negligible recent conversion. In these cases, companies may find it cost-effective to monitor deforestation/conversion at the level of such areas. Doing so requires regular monitoring to assess or confirm the risk status of these jurisdictions and identify any changes in risk status.

Methods to allocate land use change in a sourcing area to commodity volumes (Afi Guidance)

There are many approaches to allocating area-level data on land use change to commodity volumes sourced from that area, and improved data and methodologies are rapidly being developed. All such methods utilize remote sensing data repeated over the relevant time frames as well as statistics about agricultural production and land use in the area. Land use change included in the allocation process It is recommended that, when allocating land use change at an area level to specific commodity volumes, all land use change that may be related to agriculture (for crop or livestock products) or forestry (for forest products) is included in the analysis. Consideration of all agriculture- or forestry related land use change allows companies and others to best account for varied land use change trajectories or indirect land use change pressures, providing an appropriately conservative approach to allocation. Time frame of land use change included in the allocation process When accounting for LUC emissions, the 20-year or longer assessment period should be used to calculate land use change to be allocated. When accounting for deforestation and conversion, the cut-off date should be used to calculate the land use change to be allocated. When a sectoral or commitment cut-off date does not exist, a fixed reference date should be specified that is not later than 2020 and is recommended to be at least five years previous to the reporting year. Possible allocation approaches The GHG Protocol provides two recommended approaches for allocating land use change in a given area: 1. 2. Allocation based on land occupation allocation based on commodity expansion Table 2 provides descriptions of these two approaches, and Chapters 7 and 17 of the draft GHG Protocol Land Sector and Removals Guidance for additional detail on applying allocation methods to LUC emissions.

Table 27 - approaches to allocation of land use change at the level of a sourcing area

Basis for allocation	Method	Data needs specific to allocation approach	Data needs common to both allocation approaches
Relative land occupation *Called 'shared responsibility approach' by GHG Protocol*	Allocate recent land use change across products based on the relative land area occupied by each product	Total land area in agriculture and/or forestry in sourcing area Amount of land area in production for commodity of interest in sourcing area	Area of LUC in sourcing area • deforestation/conversion associated with agriculture and/or forestry since cutoff date • associated LUC emissions for each year of assessment period Quantity of commodity of interest produced in the area Quantity of commodity of interest sourced by the company from the area
Relative product expansion *Called 'product expansion approach' by GHG Protocol*	Allocate recent land use change across products based on the relative area of expansion for each product	Total area of expansion of agriculture and/or forestry production since cutoff date and in each year of the assessment period Expansion of production area of commodity of interest since cutoff date and in each year of the assessment period	

Other allocation methods may be used if they meet the above criterion of considering all agricultural or forestry related land use change in the sourcing area. Especially when commodities are a relatively small component of land use in an area, other more context-specific approaches may be warranted. Allocation approaches based on product-specific conversion – those which only consider land use change on land currently used for the production of a given commodity – may not effectively account for land use change trajectories in a sourcing area and therefore may not be credible. Such methods may be assessed through the piloting process of the GHG Protocol Land Sector and Removals Guidance, and determination of whether this approach (called 'spatially explicit Sluc approaches' by the GHG Protocol) will be acceptable for LUC emissions accounting will be made following that period. In all cases, the method and data sources used to allocate land use change and associated emissions to products within a sourcing area should be clearly disclosed.

Steps for land use change accounting at the level of a sourcing area

Companies should apply the following steps to account for land use change and associated emissions at the level of a sourcing area.

1. Select an appropriate spatial boundary based on physical traceability of the product to a given area, f**or example a sourcing region or subnational jurisdiction.**
2. Use suitable data products to identify all areas within the spatial boundary where land use ch**anged from a forest or other natural ecosystem to agriculture or plantation forestry since the cutoff date (for deforestation/conversion accounting) and within the assessment period (for LUC emissions accounting).**
3. Allocate deforestation and conversion iden**tified since the cutoff date to product volumes, using one of the approaches identified in Table 2 or a similar credible method.**
    - Deforestation/conversion footprint should be reported through appropriate indicators (see Section X), along with information on allocation methods and data sources.

- If no land use change is identified within a given sourcing area, then volumes sourced from that area may be considered deforestation/conversion free (see Section 4.6).

Box 13 - comparison with cut-off dates for Land Use Change emissions accounting

LUC emissions accounting and target setting (guided by the GHG Protocol and SBTi FLAG, respectively) requires companies to measure LUC and corresponding emissions based on a retrospective assessment period of 20 years or longer, starting from the reporting year and looking back in time.

If products have a crop cycle or rotation period greater than 20 years, then the assessment period should be at least as long as the crop rotation period. The length of the assessment period reflects the average time that it takes for soil carbon stocks to reach a new equilibrium following land use or conversion and in consideration of diverse land use change trajectories.

The GHG Protocol and SBti FLAG guidance allows for flexibility in the approach used to allocate the total LUC emissions over the assessment period. Specifically, companies may choose to apply either linear discounting or equal discounting over time. See Chapter 7 of the GHG Protocol Land Sector and Removals Guidance for more detail.

The longer timeframe included in LUC emissions for GHG accounting is based on how long emissions from ecosystem conversion remain in the global emissions budget. However, this calculation does not provide guidance on when that land conversion should stop, only the length of time that emissions must be reflected in the GHG inventory. The 2020 cut-off for SBTN Land's no conversion target acts independently of this GHG accounting guidance and provides a cut-off date for conversion of natural ecosystems aligned with the (draft) Post 2020 Global Biodiversity Framework.

ANNEX 3: Technical guidance for consulting the natural ecosystems map

How to use the map to calculate conversion of natural ecosystems after 2020

This section provides guidance on how a company can consult the map to calculate conversion of natural ecosystems based on direct measurements or statistical calculation of conversion. There are different prerequisites and associated pathways for companies at different stages of supply chains.

[Note to reviewers: Where the map will be hosted is yet unclear. Once the online "home" of the map will be selected, an in-depth guide on how to use the software/platform to consult the map will be included as a technical annex]

Producers and project site owners and operators

Producers and project site owners/operators are required to collect data (as per section 1.5) on their production units and recent conversion occurring after the 2020 baseline year.

With the data collected, companies can overlap the spatial data displaying recent conversion with the map. The map will allow a company to identify whether the conversion that occurred is of natural ecosystems or other non-natural land.

The conversion of natural ecosystems caused that has occurred must be disclosed to SBTN or transparently reported via CDP Forests or following GRI requirements.

All conversion of natural ecosystems that happened after 2020 must be remediated based on the remediation guidance of Afi 2020 and the [Group 1] considerations outlined in this guidance (forthcoming).

Direct sourcing

Companies who are directly sourcing commodities and products driving conversion are required to collect data (as per section 1.5) on production units or sourcing areas. When accounting directly for conversion through production unit's spatial data, companies can consult the map following the same procedure used by producers.

Companies using data on sourcing areas must follow the accounting guidance for estimating the area converted using statistical land use change methods.

For a given sourcing area, data on conversion must be retrieved. All conversion must be assessed through the map for understanding the hectares of natural ecosystems converted. Allocation methods presented in the accounting guidance must be used to allocate responsibility of conversion to a given company.

Indirect sourcing

Companies who are indirectly sourcing commodities or products driving conversion are required to collect data (as per section 1.5). For volumes traceable to production unit, companies can consult the map using the same procedure defined for producers. For volumes traceable to sourcing areas, companies can consult the map following the same procedure used by producers.

For volumes that are not yet traceable and/or highly transformed, companies cannot use the map to assess and quantify conversion of natural ecosystems. In this case, companies are asked to collect data on the volumes purchased of all commodities and products containing them and disclose them following best practices in disclosure (section 1.9).

ANNEX 4: Scientific insights on conversion of natural ecosystems and the contribution of a no conversion target to other environmental goals

Conversion is defined[142] as a change of a natural ecosystem to another land use or profound change in a natural ecosystem's species composition, structure, or function. Deforestation is one form of conversion (conversion of natural forests). Conversion includes severe degradation or the introduction of management practices that result in substantial and sustained change in the ecosystem's former species composition, structure, or function. Change to natural ecosystems that meets this definition is considered to be conversion regardless of whether or not it is legal.

Humans have converted between a third and a half of habitable land for crop and livestock production. Globally, agriculture and forestry are the primary drivers of ecosystem conversion. 90% of recent deforestation across the tropics has been driven by agriculture[143]. The majority of this conversion is caused by seven commodities: cattle, palm oil, soy, cocoa, rubber, coffee and plantation wood fibre, with cattle having by far the largest impact.

Cattle pasture has replaced 45.1 million hectares of forest[144], and also has lead to the destruction of woodlands, savannahs, and grasslands in South American and elsewhere. Many natural grasslands around the world are used for livestock grazing. As global demand for meat products increases, this will drive both conversion of natural grasslands into planted pastures as well as the conversion of other ecosystems for both pasture and feed.

Oil palm has replaced 10.5 million hectares from 2001 to 2015, with soy replacing 7.9 million hectares. Cocoa, rubber, coffee, and wood fibre have led to the conversion of around 2 million hectares of forest each over that time[145] Other commodities are responsible for pressure on specific natural ecosystems, for example rice and shrimp production are primary drivers of conversion of mangroves, which are being lost at a similar rate to that of tropical forests. [146,147,148,149,150,151]

[142] https://accountability-framework.org/wp-content/uploads/2022/09/AFI-LUC-and-Emissions-Guidance-09_2022.pdf

[143] Pendrill, F., Gardner, T. A., Meyfroidt, P., Persson, U. M., Adams, J., Azevedo, T., ... & West, C. (2022). Disentangling the numbers behind agriculture-driven tropical deforestation. Science, 377(6611), eabm9267.

[144] https://www.globalforestwatch.org/topics/commodities/#intro

[145] https://deforestation-free.panda.org/wp-content/uploads/2021/07/WWF-Deforestation-2021.pdf

[146] https://pure.iiasa.ac.at/id/eprint/16091/1/Deppermann%20et%20al%202019-FOLU-GR-IIASA-Supplementar-Paper_final.pdf

[147] Global Forest Watch. 2018. World Resources Institute.

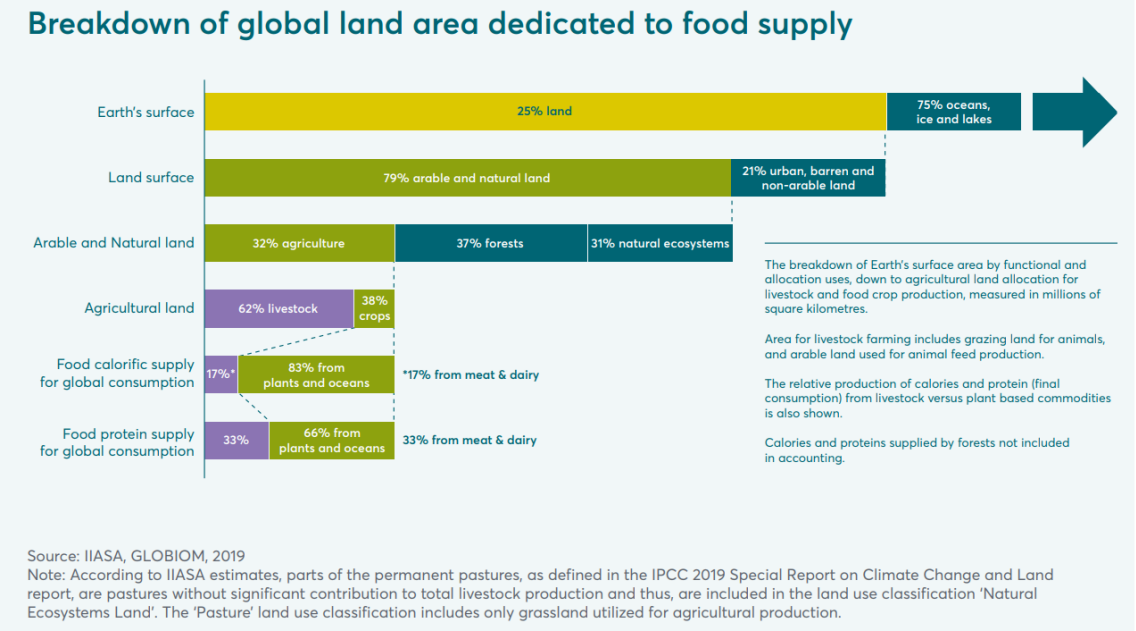
[148] Kissinger, G., Herold, M., De Sy, V. 2012. Drivers of Deforestation and Forest Degradation: A Synthesis Report for REDD+ Policymakers. Lexeme Consulting, Vancouver Canada. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/65505/6316-drivers-deforestation-report.pdf

[149] Pendrill, F., Persson, U., Godar, J., Kastner, T., Moran, D., Schmidt, S., Wood, R. 2019. 'Agricultural and forestry trade drives large share of tropical deforestation emissions'. Global Environmental Change 56:1-10; Eurostat. 2019. Available online at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Total_greenhouse_gas_emissions_by_countries,_1990-2017_(Million_tonnes_of_CO2_equivalents).png.

[150] https://www.globalforestwatch.org/blog/commodities/global-deforestation-agricultural-commodities/

[151] Hosonuma, N., Herold, M., De Sy, V., De Fries, R. S., Brockhaus, M., Verchot, L., ... & Romijn, E. (2012). An assessment of deforestation and forest degradation drivers in developing countries. Environmental Research Letters, 7(4), 044009.

Figure 16 - Global land area dedicated to food supply



Note to figure: Cropland includes all land in food, feed, and fodder crops, as well as other arable land (cultivated area). This category includes first generation non-forest bioenergy crops (e.g., corn for ethanol, sugar cane for ethanol, soybeans for biodiesel), but excludes second generation bioenergy crops. Pasture includes categories of pasture land, not only high-quality rangeland, and is based on FAO definition of 'permanent meadows and pastures'. Bioenergy cropland includes land dedicated to second generation energy crops (e.g., switchgrass, miscanthus, fast-growing wood species). Forest includes managed and unmanaged forest. Natural land includes other grassland, savannah, and shrubland. Source: IPCC, 2022[152]

Table 28 - Amount of conversion of the world ecosystems

Vegetation/Land Cover	Current (actual) Area (thousand ha)	Converted (potential) Area (thousand ha)	Conversion (%)
Forestlands	4,377,500	1,501,203	25.5
Shrublands	1,632,918	202,040	11
Grasslands	1,267,528	891,752	41.3
Sparsely or Non-vegetated	2,967,203	58,316	1.9
Snow and Ice	228,479	10	0.005

Note to figure: amount of conversion of the World Ecosystems grouped by their vegetation/land cover attribute (source: Sayre et al., 2020).The original distribution of the forestlands, shrublands, grasslands, bare areas, and snow and ice was calculated as the sum of their current distribution plus the area of those classes that have been converted into croplands and settlements.

Contribution of no conversion of natural ecosystems to other global targets

This section provides an overview of the importance of natural ecosystems and lays out the basis for supporting their conservation to achieve environmental goals such as climate change mitigation, preservation of biodiversity, preservation of freshwater, improvement of nature-contribution to people, and improvement of soil quality and net primary productivity.

[152] https://www.ipcc.ch/site/assets/uploads/sites/4/2022/11/SRCCL_Full_Report.pdf

Role of no-conversion in achieving climate targets

According to the IPCC, plausible pathways to achieving 1.5°C goals require that CO_2 emissions from the land sector reach net zero by or before 2030. This includes the near-term elimination (well before 2030) of emissions from all land use change, including deforestation as well as conversion of wetlands, peatlands, savannas, and natural grasslands. Applying these projections to corporate supply chains similarly indicates that actions required for companies to pursue a 1.5°C target must include eliminating all land use change associated with agricultural and forest commodities.

In the IPCC 2018 special report on 1.5°C, median scenarios for 1.5°C pathways with no or low overshoot have AFOLU (agriculture, forestry, and other land use) CO_2 emissions going to zero by or before 2030 and dropping to net negative emissions thereafter (see Annex 1). Because the aggregate AFOLU figure includes some sources of emissions that are more difficult to mitigate, sources that can be mitigated more rapidly – such as avoidance of emissions from land-use change linked to corporate supply chains – must be eliminated sooner to meet the overall AFOLU mitigation contribution.

The findings of the IPCC report are also reflected in the SBTi FLAG guidance and tool, which indicate corporate emissions reduction pathways that support these 1.5°C trajectories, including elimination of land use change associated with conversion of forests, wetlands and peatlands, grasslands, and savannahs (see Table 5 of the SBTi FLAG guidance).

While agricultural expansion at a global level is currently linked to greater carbon emissions from forest conversion than from conversion of other ecosystems, the opposite is true in key agricultural frontiers. In the Cerrado between 2003-2013, conversion of non-forest ecosystems accounted for more than 70%[153] of emissions from cropland expansion, with deforestation (removal of forests with 10% or more tree canopy cover) accounting for less than 30% of emissions.

Table 29 - carbon values of different ecosystems

Ecosystem	Peatland	Grasslands and Savannahs	Mangroves	Tropical rainforest
Area (HA)	423'000'000	5'250'000000	14'717'000	940'000'000
Average organic carbon stock (T C/HA)	1'450	150	856	320
Total organic carbon stock (Gt C)	613	788	13	301
Plant carbon density as a share of plant and soil carbon (%)	2%	20%	15%	68%
Soil carbon density as a share of plant and soil carbon (%)	98%	80%	85%	32%

Source: WWF, 2022

Land Use Change (LUC) is one of the primary drivers of biodiversity loss, not only directly, but also indirectly because of increased emissions which have a higher impact on climate change.

[153] Noojipady, P., Morton, C. D., Macedo, N. M., Victoria, C. D., Huang, C., Gibbs, K. H., & Bolfe, L. E. (2017). Forest carbon emissions from cropland expansion in the Brazilian Cerrado biome. Environmental Research Letters, 12(2), 025004.

WWF (2022) understands **grasslands** as a broad term with varying definitions: dominance of grasses is the unifying trait of these definitions, although it is widely acknowledged that grasslands may also include vegetation such as trees and shrubs.

Broadly speaking, **savannahs** can be considered a type of grassland with a greater presence of trees and shrubs, and they are sometimes included within the category of woodlands. Grasslands are rich in endemic, specialized biodiversity, and they have been found to store approximately the **same amount of carbon as forest ecosystems**; as much as **30% of total terrestrial carbon**. In addition, grassland ecosystems are often more stable sinks of carbon than forests, as the vast majority is **stored below ground**, meaning it is less vulnerable to disturbance by droughts and fires than forests. In addition to their importance for mitigating climate change, grasslands and savannahs are home to incredible global biodiversity and support extremely rich flora and fauna. Moreover, grasslands and savannahs are not only significant for ecological reasons; they are also home to more than one billion people around the world for whom they provide essential ecosystem services.

According to Bardgett et al. (2020)[2], there has been a global trend of grasslands transitioning towards a net warming effect on climate: grasslands in fact, according to the author, have been increasingly contributing to global warming due to increased greenhouse gas emissions which overcompensate their storage and absorption potential of carbon. . Goldstein et al. (2020)[154] highlight that natural and sparsely grazed grasslands contain **"irrecoverable carbon" that is vulnerable to land use conversion**; once lost, this carbon is not recoverable over timescales relevant to climate mitigation. Nevertheless, there is high potential for increasing soil carbon sequestration in grasslands via improved grazing and by arresting grassland conversion and degradation.

Peatlands are important natural wetland ecosystems with high value for biodiversity, climate regulation, and human welfare. Although they cover less than 3% of the Earth's surface, they store **one-third of total global soil carbon**. Peatlands are the most carbon-dense of any terrestrial ecosystem in the world, **storing twice as much carbon per hectare as forests**. Peatlands globally hold an average of approximately 1,375 tonnes of carbon per hectare. Peatlands are important for the **long-term storage of water**, globally, as **they consist of about 90% water** and thus act as vast **water reservoirs**. Worldwide, **peatlands contain 10% of global freshwater reserves**, contributing to the water security of human populations and ecosystems downstream.

Mangrove forests occur along **sheltered tropical and subtropical shorelines** including the west and east coasts of Africa, Asia, and North and Central America. The total **carbon storage potential of mangroves** (above- and below-ground) is considerable and roughly **50% higher than that of tropical rainforests** (470 tonnes C/ha compared to 320 tonnes C/ha). The majority of the carbon is held in the waterlogged, peaty soils where it can remain stored for centuries if not disturbed. Particularly in rural coastal areas with high rates of poverty, mangroves provide a critical source of livelihoods, food, construction materials and fuel for local populations, as well as providing employment and income opportunities through fishing and tourism.

Grasslands are rich in endemic, specialized biodiversity, and they have been found to store approximately the **same amount of carbon as forest ecosystems**; as much as **30% of total terrestrial carbon**. In addition, grassland ecosystems are often more stable sinks of carbon than forests, as the vast majority is **stored below ground**, meaning it is less vulnerable to disturbance by droughts and fires than forests.

In general, more evidence is mounting (Rosen, 2021)[3] that some ecosystems can be more resilient carbon sinks than forests. For example, Bardgett et al. (2020) highlight how afforestation can cause soil carbon loss, soil acidification and nutrient-depletion, especially

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when trees are planted in natural grasslands, which can make them prone to carbon loss from fires. According to the authors, moreover, large-scale afforestation also leads to changes in surface albedo, given that forests absorb more short-wave radiation than grasslands, thereby creating a warming effect. As such, changes in albedo resulting from afforestation can reduce or even negate benefits of increased carbon capture, potentially leading to a net warming effect of tree planting.

Another issue is that policies such as REDD+ focus primarily on carbon sequestration in aboveground tree biomass, while **healthy and restored grasslands can store comparable amounts of organic carbon as forests, but mainly below ground**. Grasslands have also been shown to be more effective than forests in providing **soil erosion control** and **water protection in semi-arid ecosystems**, and in some situations the conversion of grassland to forest, either through natural regeneration or afforestation, can be highly detrimental to people who depend on grasslands for forage, game habitat, water reserves, and cultural services.

Role of no-conversion in biodiversity targets

Land Use Change (LUC) is one of the primary drivers of recent and historical biodiversity loss, not only directly, but also indirectly because of increased emissions which have a higher impact on climate change. In addition to their importance for mitigating climate change, grasslands and savannahs are home to incredible global biodiversity and support extremely rich flora and fauna.

Strassburg et al. (2020)[155] highlight how restoring 30% of lands that have been converted for farming in priority areas, whilst retaining natural ecosystems, would prevent over 70% of projected extinctions of mammals, birds and amphibians. At the same time, restoring these priority lands would put the world on track to sequester almost half of all the CO2 increase in the atmosphere since the Industrial Revolution – more than 465 billion tons. Only restoring just half of these (15% of priority areas) could avoid over 60% of expected extinctions while sequestering 30% of the total CO2 increase.

Following this study, UNEP (2020)[156] has highlighted that, while many restoration targets are focused on forests, the evidence demonstrates the importance of restoring many different types of natural ecosystem. The agency (2020) has also stated that, of the 2,870 million hectares of converted lands identified in their research, it is estimated that 54% were originally forests, 25% grasslands, 14% shrublands, 4% arid lands and 2% wetlands.

Aware of the critical need to halt, prevent and reverse ecosystem degradation, and to effectively restore degraded terrestrial, freshwater and marine ecosystems across the globe, the United Nations General Assembly declared 2021–2030 as the United Nations Decade on Ecosystem Restoration (UN Decade). To support the implementation of the UN Decade, the agency has put forward some principles for ecosystem restoration, defined as "the process of halting and reversing degradation, resulting in improved ecosystem services and recovered biodiversity. Ecosystem restoration encompasses a wide continuum of practices, depending on local conditions and societal choice" (UNEP, 2021)[157].

Biodiversity loss is also compromising the resilience of agricultural systems. The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) synthesis report, released in May 2019, found that land use change and ocean exploitation are together by far the leading drivers of the current unprecedented loss of biodiversity, posing a serious risk to global food security. The loss of agrobiodiversity (the species,

[155] https://www.nature.com/articles/s41586-020-2784-9%20

[156] https://www.unep-wcmc.org/en/news/ecosystem-restoration-could-prevent-over-70-of-extinctions

[157] United Nations Environment Programme (UNEP). 2021. Becoming #GenerationRestoration: Ecosystem restoration for people, nature and climate [online]. Nairobi. [Cited 10 August 2021]. https://wedocs.unep.org/bitstream/handle/20.500.11822/36251/ERPNC.pdf

varieties and breeds of animals, plants and micro-organisms used in agriculture to produce food) is also of high concern for the global population as it greatly increases agriculture's vulnerability to pests and local weather extremes. Crop diversity has declined by 75 percent during the 20th century, to the extent that just four crops – wheat, rice, corn and potatoes – now provide 40% percent of global calories.

Additionally, the near extinction of certain pollinators jeopardizes five to eight percent of agricultural production and $235 billion to $577 billion worth of annual output (FAO, 2016)[158]. Pollination is particularly important for the production of fruits, nuts and many vegetables. Production of these foods needs to increase by approximately 95 percent by 2050 to provide healthy diets (ibid).

Contribution to other environmental and societal goals (Freshwater, Nature-contribution to people)

As very well explained by Ellis et al. (2019)[159], land is increasingly managed to serve multiple societal demands. Beyond food, fibre, habitation, and recreation, land is now being called on to meet demands for carbon sequestration, water purification, biodiversity conservation, and many others. Meeting these multiple demands requires negotiating trade-offs among the choices and differing values placed on them by diverse stakeholders and institutions.

Recent work by the IPBES (2018)[160] and others has recognized the need to accommodate a greater diversity of values into decision-making through the framework of 'nature's contributions to people (NCP)' providing a perspective on human–nature relations that goes beyond a stock-flow, ecosystem services, decision-making framing. According to the authors of the article (ibid), NCP offers real potential to enable land system science to better integrate the many diverse value systems of stakeholders and institutions into efforts to better understand and more fairly govern the increasingly wicked trade-offs of land systems in the Anthropocene, especially under conditions of less well functioning institutions and governance.

Grasslands and savannahs are not only significant for ecological reasons; they are also home to more than one billion people around the world for whom they provide essential ecosystem services. Peatlands are important for the **long-term storage of water**, globally, as **they consist of about 90% water** and thus act as vast **water reservoirs**. Worldwide, **peatlands contain 10% of global freshwater reserves**, contributing to the water security of human populations and ecosystems downstream.

In general, as also highlighted by Williams et al. (2020)[161] , although the loss of intact ecosystems to agricultural expansion has been inevitable in certain regions, development must be strategically planned in order to avoid unnecessary impacts on biodiversity and ecosystem services. Given that the magnitude of the impacts on biodiversity and ecosystem services are driven primarily by targets for land conversion, the key policy decision is what those targets should be.

[158] https://www.fao.org/news/story/en/item/384726/icode/

[159] https://www.sciencedirect.com/science/article/pii/S1877343518301635

[160] https://www.science.org/doi/10.1126/science.aap8826?siteid=sci&keytype=ref&ijkey=%2FvA6P5O%2Fb2eSM

[161] https://iopscience.iop.org/article/10.1088/1748-9326/ab5ff7/pdf

ANNEX 5: Mapping of incentivized response options

In addition to the target setting process, this guidance will also explore some examples of Corporate response options. In this context, response options describe the actions that a company could take to improve the state of nature on land that would be reflected in the indicator used to measure progress on their targets.

This section provides a matrix of Response Options which shows actions that companies can implement to make progress towards land targets. Consulting the matrix, companies can understand which response options may have positive contributions towards multiple targets. This framing can be a useful vehicle to inform holistic strategies for the achievement of nature and support of climate goals.

These response options are derived from an original list including publications, projects, and initiatives such as:

- IPBES Global Outlook,
- IPCC Special Report of Climate Change and Land,
- Forest Landscape Restoration assessments using the Restoration Opportunities Assessment Methodology,
- FashionPACT,
- NBS Benefits Explorer,
- WBSCD (Forest Production, Processing & Manufacturing, Downstream),
- SBTN Water Hub, and
- FLAG SBTi.

The response options have been categorized into a Land response typology of corporate response options and finer resolution options.

The Response Options for Land include specific interventions and example actions for companies to take. In Annex 6 are 65 consolidated response options classified to the SBTN's ARRRT action framework.

Companies should prioritize actions which Avoid and Reduce their pressures on nature loss. Then companies can Restore and Regenerate so that the extent and integrity of nature can recover. In addition, companies should Transform underlying systems at multiple levels to address the drivers of nature loss.

The Land Response Options have been assigned direct, indirect, and unknown pathways for each Land target benefit. This includes FLAG emissions, No Conversion of Natural Ecosystems, Land Footprint Reduction, and Landscape Engagement (based on EII).

Information from SBTi FLAG guidance was used in assigning these benefits. Synergies across the different targets resulting from individual response options allow for robust company strategies with multiple benefits. This analysis provides a better understanding of the trade-offs for nature of certain actions. With this matrix of response options companies will be able to make logical and more impactful decisions for nature and their business. Co-benefits are sought after to protect nature and save resources and time for companies.

These interventions provide a foundation for companies to prioritize actions and places to make a difference for nature on the ground. These projects should include comprehensive actions to meet established targets. The Land Hub seeks to expand upon this response option matrix based on future targets and to measure progress on them in V2 of SBTN Land target-setting guidance. Additionally, response options in next iterations could include; literature, spatial scales, indicators, characterization factors, etc..

Table 30 – Mapping of incentivized response options

Transform (AR3T) classification	Response Option	SBTi Climate FLAG (Target Benefit)	No Conversion of natural ecosystems (Target Benefit)	Land occupation reduction (Target Benefit)	Landscape Engagement (Target Benefit)	Freshwater Quantity (Target Benefit)	Freshwater Quality (Target Benefit)	Key:
Avoid	Stop expanding the agricultural frontier							Direct
Avoid	Minimize deforestation and degradation							Indirect
Avoid	Avoid pollution, effluents, and runoff, including acidification							Unknown
Avoid	Reducing illegal logging through monitoring/patrolling and regulating forest use of all timber and non-timber products							
Avoid	Manage invasive alien species (IAS)/species encroachment through practice and multiple policy instruments (e.g. monitor silvicultural interventions, remove aggressive Indigenous species, remove invasives)							
Avoid	Avoid conversion of habitat, conservation zones, protection areas, no-go areas, natural habitat and ecosystems, effective and representative protected areas							
Avoid	Agricultural production is not implemented on newly converted land or forests, National Parks, Wildlife Sanctuaries, Wildlife Resource Reserves, HCV areas, Ramsar Sites (wetland), highly erodible lands, or contain primary forest							
Avoid	Protect sites and surrounding areas of high biodiversity and climate mitigation value (e.g., habitat corridors, High Carbon Stock forests, parks, reserves, and protected areas)							
Avoid	Pulp/Paper not sourced from on newly converted primary or native forestland							
Avoid	New operations, landfills, or recycling facilities are not implemented in or adjacent to newly converted land or forests, National Parks, Wildlife Sanctuaries, Wildlife Resource Reserves, HCV areas, Ramsar Sites (wetland), or contain primary forest							
Avoid	Avoid use of harmful chemicals and hazardous substances (e.g. substitution with bio-based chemicals, adhesives and coatings). Avoid chemicals listed under the Stockholm Convention on Persistent Organic Pollutants (POPs) and in the annexes of the Montreal Protocol on Substances that Deplete the Ozone Layer – e.g., endosulfan, chlordane, lindane – are NOT used, and other carcinogenic, mutagenic, or reprotoxic substances are phased out. Use of approved chemicals only							
Reduce	Supporting reduced impact logging (RIL) (e.g. reduced impact logging techniques)							
Reduce	Conservation agriculture (e.g. hedgerow plantings, crop mosaics, intercropping, windbreaks, green harvest of sugar cane, integrated pest management)							
Reduce	Increased food productivity/Closing the gap between actual and potential yield in all environments (e.g. shade-cover system, forage improvement, improve technology and tools)							
Reduce	Use land, fertilizers and pesticides more efficiently in agriculture (e.g. minimize use of chemical-based pesticides and fertilizers)							
Reduce	Reduced conversion of grassland or deforested land to source agricultural practices (e.g. cropland, grazing, agroforestry, feed production)							
Reduce	Improved/sustainable forest management (e.g. enrichment planting, acahuales, diversified vertical forest structure and age composition, seasonal planning, continuous cover forestry, high-stumps, retention trees, maintenance of decaying wood, silviculture, social forestry, sustainable woodland, mature forest, natural forest, secondary forest, improved woodlots)							
Reduce	Improved cropland management (e.g. brush control, crop residue management, contouring, cover crops, ground cover management, improved fallow, re-vegetation)							

Reduce	Improved grazing land management (e.g. tree range plantings, prescribed grazing)						
Reduce	Improved livestock management (e.g. agropastoral, agro-silvopastoral, silvopasture, natural pasture, perennial pastures and grains, silvopasture intensification, alterative feed)						
Reduce	Reduce disturbances (e.g., light, noise, vibration) from operations on surrounding environment (e.g., installation of silencers)						
Reduce	Monitor risks in regions of resource extraction and minimize resource extraction						
Reduce	Reduce off-site impacts of food and nonfood production (e.g. minimize disposal of old products, consolidate shipments, consolidate suppliers, ensure proper waste disposal, safe disposal of hazardous waste, food storage transformation)						
Reduce	Improving distribution and transport (e.g. localizing food systems, optimizing road network to avoid pressures on areas of high biodiversity value)						
Reduce	Reducing food waste (post harvest, customer and retailer)						
Reduce	Water-efficient agricultural practices (e.g. minimize use of water-intensive species in water stressed areas, reduce water use in nurseries, upgraded irrigation system, rainwater harvesting, contour farming, terracing, managed drainage, protect groundwater and surface water, reestablish hydrologic connection)						
Reduce	Fire management (e.g., prescriped burns)						
Reduce	Reduced soil erosion (e.g. plant vegetation buffers, conservation tillage, no-till, strip tillage, progressive or radical terraces)						
Reduce	Implement agroforestry (e.g. rainfed, cereal-dominated, hinterland, shade-grown coffee, flood plain, improved Milpa, irrigation, perennial crops with trees, Quesungual system, staple grains alley farming)						
Reduce & Restore	Avoid establishing new water-intensive operations in water stressed areas. Protect, create, restore and reduce conversion of watersheds and coastal wetlands for habitat conservation, clean water supply and stormwater control (e.g. coastal green belt)						
Reduce & Restore	Reduced converstion and restoration of peatlands						
Reduce & Transform	Promoting, implementing, and improving agricultural certification schemes and/or organic agriculture (e.g. RTRS, RSPO, organic cotton standards)						
Reduce &Transform	Promoting and improving forest certification e.g. FSC, deforestation and conversion free sector, supply chains, places and comodities						
Reduce & Transform	Encourage upcycling, increase recovery rate of products, invest in local recycling infrastructure, increase material or procedural efficiencies in sourcing and supply chains, maximize recycling of waste and processing residues, consumer awareness campaigns, circular economy, recycle raw materials, switch to more sustainable materials, minimize overproduction of raw materials, reduce packaging, reduce use of fossil-based and non renewable products, increase re-use of residuals and byproducts by other industries (e.g., paper sludge for bioenergy and fertilizer producers, paper fibers and fillers for the brick industry)						
Restore	Ecosystem and/or landscape restoration (e.g. natural regeneration, habitat fragmentation, native vegetation, pollinator habitat)						
Restore	Restoration of biodiversity, forests, and/or ecosystem conservation (e.g. protective forests, trees along roads, buffer zones)						
Restore	Reforestation, commercial afforestation, and forest restoration (e.g. marginal strip, mangroves, thin coniferous forest, remnant native forest trees, active planting, assisted natural regeneration)						
Restore	Protect, restore and establish riparian buffers (e.g. streamside management, buffer zone, floodplain habitats, forest restoration)						
Restore	Restore wetlands (sensu Ramsar definition includes rivers, lakes, floodplains, coastal areas, and others)						
Restore	Rehabilitation (e.g. degraded natural forests, quarries, silvo-pastoral, grasslands, decommissioned mills and other infrastructure, edge effects, pollution and toxics remediation and treatment)						
Regenerate	Increased soil organic carbon content (e.g. organic matter input through harvesting residues, biochar)						
Regenerate	Expanding and enhancing sustainable intensification in agriculture (including crops and livestock) (e.g. mixed production models)						

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Regenerate	Prevent/reduce soil compaction and/or salinization						
Regenerate	Improve soil health (e.g. stabilize substrates, soil conservation, rice straw management, fertility management, mulching)						
Regenerate	Plantations with (e.g. annual crops, agroforests, commercial trees, bamboo, enrichment strips, open field, renewal coffee, perennial crops and trees, and timber outside of livestock areas, extended rotation system)						
Regenerate	Encouraging ecological intensification and sustainable use of multifunctional landscapes (e.g. living fences, ecological agriculture, silvo-fisheries, maintaining field margins, remove hard surfaces and barriers, border plantings)						
Regenerate	Switch emphasis of food production towards land (e.g. organic agriculture, sustainable production, sustainable rate of harvest, regenerative agriculture)						
Transform	Stewardship for the provision of multiple benefits (e.g. improved land and economic and livelihood activity management)						
Transform	Reward sustainable land management practices						
Transform	Select suppliers and/or producers with eco-certifications						
Transform	Policy and/or regulatory frameworks						
Transform	Practices are implemented using a place-based project of as part of a jurisdictional approach						
Transform	Reformation of subsidy systems						
Transform	Integrated production systems, inter-sectoral coordination and cooperation						
Transform	Land-use zoning, community mapping, spatial and environmental integrated landscape planning, decentralization and co-management of land resources						
Transform	Community forests and gardens						
Transform	Improved access to markets for inputs, outputs, and financial services						
Transform	Agricultural conservation easement						
Transform	Risk sharing and transfer mechanisms						
Transform	Empowerment of Indigenous peoples, local communities, and women (e.g. collective action pathways, respect of customary land tenure, access and ownership, and/or social protection and adaptive safety nets)						
Transform	Weather and health insurance						
Transform	Improving policies relating to Payments for Ecosystem Services and Reducing Emissions from Deforestation and Degradation, esp. to encourage multifunctional land management (e.g. payment for enrichment plantings)						
Transform	Environmental incentive structures e.g. provide financial material or in-kind support for landscape restoration						
Transform	Develop and apply methods that measure farm output in terms that are more than just yield per area, but include nutritional value and wider values in terms of both costs to the environment and society and benefits of a healthy landscape						
Transform	Encouraging dietary transformations (toward plant-based, whole-food diets)						

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ANNEX 6: Response options for land footprint reduction

Measuring agricultural land occupation associated with corporate operations and value chains, and then setting targets to reduce it, can incentivize certain response options.

Table 31 - Response options incentivized by land footprint reduction targets

Response option category	Comment
Avoiding deforestation and conversion of natural habitat and ecosystems	At the global scale, deforestation and conversion of natural habitat and ecosystems cannot be avoided until the area under productive use (e.g., agriculture, forestry, infrastructure, mining) ceases to expand.
Certifying deforestation and conversion free sector, supply chains, places, and commodities	Without freezing and reducing land occupation, the likelihood of leakage (of deforestation and conversion occurring elsewhere) remains high, even when companies have obtained certifications for their own value chains.
Providing financial, material, or in-kind support to landscape restoration	At the global scale, landscape restoration cannot happen at scale until the area under productive use is reduced.
Improving land management and other practices	Many practices to increase land-use efficiency can be net land management improvements, although productivity and efficiency must be enhanced in ways that safeguard soil, water resources, and natural ecosystems—and in ways that increase rather than undermine resilience.
Increasing material or procedural efficiencies in sourcing and supply chains	Reducing losses and wastes across supply chains, improving efficiency of wood harvests and use, and sourcing less land-intensive products (e.g., plant-based foods), can reduce the amount of land occupation needed to meet human demands for land-based products.
Increasing participation in jurisdictional land-use planning	Linking efforts to use working lands more productively and efficiently with efforts to protect and restore nearby lands in landscapes can be a powerful way to incentivize progress against both a "no conversion" target and a "land footprint reduction target" (for example, public support for agricultural improvement can increase political support for ecosystem protection in high-priority jurisdictions).

Depending on how the response options to reduce a company's agricultural land footprint (and/or land footprint intensity) are implemented, there are potential tradeoffs with other response options that must be managed and avoided wherever possible. Setting the full range of v1 SBTN targets for land and water, in addition to climate targets through SBTi FLAG, will help companies strike the correct balance.

3364 *Table 32 - Potential trade-offs with other response options*

Response option category	Comment
Improving land management and other practices	If done poorly, efforts to increase land-use efficiency can create tradeoffs with other aspects of land management and environmental protection. For example, overuse of fertilizer leads to water and air pollution and excessive GHG emissions. Large-scale irrigation expansion can deplete scarce freshwater resources and damage aquatic ecosystems. In addition, productivity gains can make farming and forestry more economical and spur new land-clearing. *Mitigation strategy:* Setting not only land footprint reduction targets, but also other land v1 targets (no conversion, landscape engagement), as well as climate and water targets, can help companies strike the correct balance. The wider suite of SBTN Land targets to come in v2 will also help ensure that productivity gains that reduce the intensity of land occupation do not undermine other land management goals.
Response options linked to SBTN Freshwater methods	See above.
Mitigating sources of environmental pollution	See above.

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ANNEX 7: Alignment of an ecosystem target to global goals

A SBTN target for ecosystems should be measurable with a clearly defined baseline (Diaz et al. 2020) and a methodology to track progress with a reasonable level of effort. The target should be clearly linked to the actions of a company or city. For a target to be useful to the SBTN process it should be measurable at the site level, but demonstrably consistent with national commitments and global planetary boundaries.

As the most important multilateral environmental agreement for biodiversity, it is important that the ecosystem target align with the CBD's post-2020 global biodiversity framework currently in development. The draft post-2020 global biodiversity framework contains goals, milestones and targets relevant to ecosystems including:

- 2050 Goal A – the area, connectivity and integrity of natural ecosystems increased by at least X% supporting healthy and resilient populations of all species while reducing the number of species that are threatened by X% and maintaining genetic diversity.
- 2030 Milestone A.1 The area, connectivity and integrity of natural ecosystems increased by at least X%.
- 2030 Action Target 1. By 2030, 50% of land and sea areas globally are under spatial planning addressing land/sea use change, retaining most of the existing intact and wilderness areas, and allow to restore X% of degraded freshwater, marine and terrestrial natural ecosystems and connectivity among them.
- 2030 Action Target 9. By 2030, support the productivity, sustainability and resilience of biodiversity in agricultural and other managed ecosystems through conservation and sustainable use of such ecosystems, reducing productivity gaps by at least 50%.

The framework therefore focusses on three elements of natural ecosystems, their area, connectivity and integrity and specifies that these should be increased. It also provides action targets which specify the maintenance of intact areas, the restoration of degraded natural ecosystems and the sustainable use of managed ecosystems.

As discussed above, ecosystem area alone is a challenging indicator. Where a particular ecosystem begins and ends is complex – the functional unit of an ecosystem will not be constant over space or time and will transform across a gradient to a neighbouring ecosystem. Climate change is constantly altering ecosystem boundaries, and humans have also been altering ecosystem boundaries for thousands of years, so it is hard to define a desirable extent of an ecosystem.

Ecosystem connectivity focusses on the internal make-up of an ecosystem, evaluating patchiness and links within the ecosystem. Connectivity requires a detailed understanding of the construction of the ecosystem down to landscape level dynamics.

Ecosystem integrity is multi-faceted and a suitable target should represent both biotic and abiotic elements of ecosystems as well as ecosystem structure and functioning. Any metric of ecosystem integrity should be sensitive to pressures imposed by cities and companies and should be able to disentangle the interaction of pressures on the various elements, and should be meaningful when calculated over time.

What makes an ecosystem target relevant to businesses?

Ecosystem health has particular relevance to businesses and cities. The loss of ecosystem integrity reduces the provision of ecosystem services upon which businesses and cities are dependent, including the provision of clean water, a regulated climate and the pollination of crops. Any target can then be directly linked to reducing risks and creating opportunities.

Table 33 - Metrics commonly used in screening ecosystem components (provided as a comparison to EII – Section 3.1)

Indicator metric/approach	Overall ecosystem or component?	Biodiversity focus	Scope of pressures included	Usability by companies and cities
The Living Planet Index	Component: Biotic integrity	Vertebrate populations	Disaggregation to specific pressures not possible	Not applicable
The Biodiversity Intactness Index	Component: Biotic integrity	Local community intactness	Land use focus but responses to a wider range of pressures are estimated	Applicable by businesses and used in financial portfolio impact methods
Multi-dimensional Biodiversity Index	Ecosystem	Quantitative and qualitative measures of biodiversity	Metric still in development	Metric still in development
Mean Species Abundance	Component: Biotic integrity	Relative abundance of species within a community	Based on the GLOBIO model- 5 key drivers of biodiversity change	Applicable by businesses and used in financial portfolio impact methods
Global Biodiversity Score	Component: Biotic integrity	Changes to relative abundances estimated within an area	Based on the GLOBIO model- 5 key drivers of biodiversity change	Method specifically developed for corporate biodiversity foot printing
The Healthy Ecosystem Metric	Component: Biotic integrity	Alpha diversity impacted within an area	Land use focus	Specifically designed for corporate use
BILBI	Ecosystem	Beta-diversity patterns and compositional turnover	Measures impact of changing habitat condition and climate change	Challenging to apply models to corporate level impacts
Forest Landscape Integrity Index	Component: Structural integrity	Habitat condition	Both inferred and observed pressures are assessed	Challenging to understand corporate/sectoral impact on index
Ecosystem Area Index (EAI)	Ecosystem	Spatial extent of ecosystem	State indicator responsive to a wide range of pressures	Metric still in development
Ecosystem Health Index (EHI)	Ecosystem	Ecosystem functioning	State indicator responsive to a wide range of pressures	Metric still in development. Challenging to understand corporate/sectoral impact on index

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ANNEX 8: Details of GHGP, AFI, SBTi FLAG

Here below is a more detailed overview of the three frameworks:

- Greenhouse Gas (GHG) Protocol Land Sectors and Removals Guidance
  - The Greenhouse Gas (GHG) Protocol Land Sectors and Removals Guidance will provide guidance for companies on **how to account for emissions and removals in the land-system**. Land SBTs v1 align with the scope and boundaries developed within the GHG Protocol as much as possible to make data collection and management easier for companies.

- SBTi and SBTi Forest, Land and Agriculture Guidance (SBTi FLAG)
  - The SBTi Forest, Land and Agriculture Guidance (SBTi FLAG), led by WWF, provides climate ambition pathways, tools and guidance for companies in land-intensive sectors (e.g. forest products, food production, processing, retailing and food service sectors) which fully incorporate land-related greenhouse gas emissions and removals (such as those related to deforestation).
  - SBTi FLAG addresses the lack of an **internationally recognised methodology for accounting and reporting on land sectors' emissions and removals**. WWF's technical staff are the leaders of the SBTi FLAG initiative and play key technical roles in SBTN Network Hub and Land Hub. The FLAG project is developing SBTi-compliant pathways for land intensive sectors for 1.5 degree pathways.
  - FLAG brings forward lessons from this experience to inform how SBTi and SBTN can align on a target setting method that contributes toward improvements for climate and nature in unison, and will develop specific guidance on restoration and regeneration actions.
  - The FLAG methodology provides two approaches to target-setting:
    - a sector approach for companies with diversified FLAG emissions, and
    - a commodity approach that includes 11 commodity pathways: beef, chicken, dairy, corn/maize, leather, palm oil, pork, rice, soy, wheat, and timber and wood fibre.
  - Both sector-based and commodity-based FLAG targets are consistent with scenarios that limit global temperature increase to 1.5°C. A company's overall target classification (1.5°C or well below 2°C) will be determined based on the ambition of its non-FLAG scope 1, 2 & 3 target. Companies may combine multiple commodity pathways and the sector pathway as appropriate for target setting.
  - The mitigation activities that companies will have to introduce in their operations and supply chains to meet their FLAG target can be seen as a sub-set of response options to reduce and revert impacts on land that will be necessary to meet SBTN land transformation and land occupation targets.

- Accountability Framework Initiative
  - The Accountability Framework Initiative (AFi) is a globally recognised framework with guiding principles and definitions for supply chains free from deforestation and conversion of other natural ecosystems. It sets **2025 as end date for stopping deforestation** and **conversion in alignment with IPCC evidence that loss of forests and natural ecosystems should end well before 2030**, to have nature on the path of recovery by 2030, which are key conditions for keeping global warming below 1.5 degrees.
  - Protecting remaining forests and stopping the conversion of other natural ecosystems will be fundamental conditions for meeting SBTN land transformation and land occupation targets, hence the **Land Hub**

developed a target setting methodology to operationalize zero-deforestation and no-conversion commitments in accordance with AFi's guiding principles and definitions (e.g., cut-off dates, target dates).

ANNEX 9: Alignment with the Global Biodiversity Framework

An Annotated guide to the relevance of SBTN Land Version 1 Science-Based Targets to the Convention on Biological Diversity's Montreal-Kunming Global Biodiversity Framework

Bolded language indicates passages that are more relevant to SBTN Land Targets. When necessary, a description of their relevance is included as boxed text below each goal/target.

Text as it appears in the Montreal-Kunming Global Biodiversity Framework.

The Kunming-Montreal global biodiversity framework has four long-term goals for 2050 related to the 2050 Vision for Biodiversity.

GOAL A

The integrity, connectivity and resilience of all ecosystems are maintained, enhanced, or restored, substantially increasing the area of natural ecosystems by 2050;

Human induced extinction of known threatened species is halted, and, by 2050, the extinction rate and risk of all species are reduced tenfold and the abundance of native wild species is increased to healthy and resilient levels;

The genetic diversity within populations of wild and domesticated species, is maintained, safeguarding their adaptive potential.

> No conversion of natural ecosystems
> Reduction in land occupation
> Improvement in ecological integrity
>
> GOAL A is broadly supported by all three version 1 SBTN Land Targets. Land use change is identified as the most substantial cause of human induced extinction and a *no conversion* target supports the maintenance of ecosystem integrity, existing connectivity, and ultimately resilience. The *land occupation reduction* and *ecosystem integrity* targets also help to enhance and restore degraded ecosystems, with the *ecosystem integrity* target specifically addressing the restoration of ecosystem structure, composition, and function at the sourcing area or landscape scale.

GOAL B

Biodiversity is sustainably used and managed and nature's contributions to people, including ecosystem functions and services, are valued, maintained and enhanced, with those currently in decline **being restored**, supporting the achievement of sustainable development for the benefit of present and future generations by 2050.

> Reduction in land occupation
> Improvement in ecological integrity
>
> While this goal, as written, most supports company efforts to sustainably manage areas and the ecosystems they represent through reductions in area under production, for those areas identified for landscape interventions under the *ecosystem integrity* target, they will likely also contribute to the restoration of ecosystem functions and services in decline.

GOAL C

The monetary and non-monetary benefits from the utilization of genetic resources, and digital sequence information on genetic resources, and of traditional knowledge associated

with genetic resources, as applicable, are shared fairly and equitably, including, as appropriate with indigenous peoples and local communities, and substantially increased by 2050, while ensuring traditional knowledge associated with genetic resources is appropriately protected, thereby contributing to the conservation and sustainable use of biodiversity, in accordance with internationally agreed access and benefit-sharing instruments.

GOAL D

Adequate means of implementation, including financial resources, capacity-building, technical and scientific cooperation, and access to and transfer of technology to fully implement the Kunming-Montreal global biodiversity framework are secured and equitably accessible to all Parties, especially developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, progressively closing the biodiversity finance gap of 700 billion dollars per year, and **aligning financial flows with the Kunming-Montreal Global Biodiversity Framework and the 2050 Vision for Biodiversity**.

> The focus of SBTN is to provide a vehicle for the alignment of corporate financial flows and effort towards the 2050 Vision for Biodiversity. Through the target setting and implementation steps of SBTN companies will deploy financial and technical resources, cooperate with scientists, and build capacity within the conservation community regarding the challenges that companies face, both short and long term, through becoming faithful actors and stakeholders in nature.

Global Targets for 2030

The framework has 23 action-oriented global targets for urgent action over the decade to 2030. The actions set out in each target need to be **initiated immediately** and completed by 2030. Together, the results will enable achievement towards the outcome-oriented goals for 2050. Actions to reach these targets should be implemented consistently and in harmony with the Convention on Biological Diversity and its Protocols and other relevant international obligations, taking into account national circumstances, priorities and socioeconomic conditions.

1. Reducing threats to biodiversity

TARGET 1

Ensure that all areas are under participatory, integrated and biodiversity inclusive spatial planning and/or effective management processes **addressing land and sea use change, to bring the loss of areas of high biodiversity importance, including ecosystems of high ecological integrity, close to zero by 2030, while respecting the rights of indigenous peoples and local communities.**

No conversion of natural ecosystems

As a voluntary corporate framework, SBTN can meet the ambition of this target and provide sector specific guidance on the appropriate level of ambition in addressing land use change. While it is recommended that those sectors that are unable to satisfy a no conversion target (e.g., metals and mining, infrastructure development) still work to achieve this target – they are still held to the standard indicated in Target 1. However, for most sectors Land SBTs require no conversion of natural forests by 2025 and no conversion of any natural ecosystems for all required sectors by 2030. Integrated and biodiversity inclusive spatial planning will also be relevant for determining where a company's *land occupation reduction* target is most beneficial as well as in the identification of areas that would benefit an *ecosystem integrity* target.

TARGET 2

Ensure that by 2030 at least **30 per cent of areas of degraded terrestrial, inland water, and coastal and marine ecosystems are under effective restoration**, in order to enhance biodiversity and ecosystem functions and services, ecological integrity and connectivity.

ALL LAND SBTs

An important caveat of this target is the "under effective restoration" clause. Here the GBF relies on a broader definition of restoration than it might seem at first glance. This target does not mean that 30% of degraded areas are restored by 2030, it means that by 2030, 30% of degraded ecosystems are covered under and active restoration plan. At a landscape scale this will necessitate that natural ecosystems covered in the *no conversion* target will be critical in providing locally adapted native species for restoration, even if they are degraded. It will also likely require that existing agricultural land, especially degraded land, be liberated and restored – both of these actions are directly relevant to the SBTN *land occupation reduction* and *ecosystem integrity targets*.

TARGET 3

Ensure and enable that by 2030 at least 30 per cent of terrestrial and inland water, and of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem functions and services, are effectively conserved and managed through ecologically representative, well-connected and equitably governed systems of protected areas and **other effective area-based conservation measures**, recognizing indigenous and traditional territories, where applicable, and **integrated into wider landscapes**, seascapes and the ocean, while **ensuring that any sustainable use, where appropriate in such areas, is fully consistent with conservation outcomes, recognizing and respecting the rights of indigenous peoples and local communities, including over their traditional territories**.

ALL LAND SBTs

The inclusion of other effective area-based conservation measures in this target opens the door for the relevance of Land SBTs in this protected area target. OECMs are places not within a protected area, that deliver long-term biodiversity conservation under equitable governance and management. In both a *no conversion* and *land occupation reduction* context, this target is relevant. Companies that comply with a no conversion target indirectly help ensure that areas of particular importance for biodiversity and ecosystem functions and services remain intact. This is crucial for the perpetuity of the 30x30 GBF target. Additionally, areas that are under current production that are liberated may have the capacity to support the reclamation of traditional territories and or support the landscape contexts within which protected area systems operate. Finally, the regeneration or restoration of ecosystem integrity may provide additional areas for consideration as part of the 30% area in national protected area/oecm accounting systems.

TARGET 4

Ensure urgent management actions to halt **human induced extinction** of known threatened species and for the **recovery and conservation of species**, in particular threatened species, to significantly reduce extinction risk, as well as to maintain and restore the genetic diversity within and between populations of native, wild and **domesticated species** to maintain their adaptive potential, including through in situ and ex situ conservation and sustainable management practices, and effectively manage human-wildlife interactions to minimize human-wildlife conflict for coexistence.

Version 1 Land SBTs do not include species targets. However, the three land targets, if implemented effectively would likely support the recovery and conservation of species in specific landscape contexts through an elimination of conversion of natural ecosystems, a reduction in land occupation pressures, and improvements in ecosystem integrity.

TARGET

Ensure that the use, harvesting and trade of wild species is sustainable, safe and legal, preventing overexploitation, minimizing impacts on non-target species and ecosystems, and reducing the risk of pathogen spill-over, applying the ecosystem approach, while respecting and protecting customary sustainable use by indigenous peoples and local communities.

TARGET 6

Eliminate, minimize, reduce and or mitigate the impacts of invasive alien species on biodiversity and ecosystem services by identifying and managing pathways of the introduction of alien species, preventing the introduction and establishment of priority invasive alien species, reducing the rates of introduction and establishment of other known or potential invasive alien species by at least 50 per cent by 2030, and eradicating or controlling invasive alien species especially in priority sites, such as islands.

TARGET 7

Reduce pollution risks and the negative impact of pollution from all sources by 2030, to levels that are not harmful to biodiversity and ecosystem functions and services, considering cumulative effects, including: reducing excess nutrients lost to the environment by at least half including through more efficient nutrient cycling and use; reducing the overall risk from

pesticides and highly hazardous chemicals by at least half including through integrated pest management, based on science, taking into account food security and livelihoods; and also preventing, reducing, and working towards eliminating plastic pollution.

TARGET 8

Minimize the impact of climate change and ocean acidification on biodiversity and increase its resilience through mitigation, adaptation, and disaster risk reduction actions, including through **nature-based solution and/or ecosystem-based approaches**, while minimizing negative and fostering positive impacts of climate action on biodiversity.

2. Meeting people's needs through sustainable use and benefit-sharing

TARGET 9

Ensure that the management and use of wild species are sustainable, thereby providing social, economic and environmental benefits for people, especially those in vulnerable situations and those most dependent on biodiversity, including through sustainable biodiversity-based activities, products and services that enhance biodiversity, and protecting and encouraging customary sustainable use by indigenous peoples and local communities.

TARGET 10

Ensure that areas under agriculture, aquaculture, fisheries and forestry are managed sustainably, in particular through the sustainable use of biodiversity, including through a substantial increase of the application of biodiversity friendly practices, such **as sustainable intensification, agroecological and other innovative approaches, contributing to the resilience and long-term efficiency and productivity of these production systems and to food security, conserving and restoring biodiversity and maintaining nature's contributions to people, including ecosystem functions and services**.

ALL LAND SBTs

Squarely aligned with version 1 Land SBTs, Target 10 highlights sustainable management required by several specific sectors covered by the Land SBTs. SBTN contents that *no conversion of natural ecosystems* is a necessary condition of sustainable management for these sectors. Furthermore, the *land occupation reduction* target, always paired with an *ecosystem integrity* target specifically incentivizes companies to adopt sustainable intensification, agroecological approaches, and other innovative solutions to increase production efficiency and improve ecosystem structure, composition, and function. This target will be a significant focus of Land SBTs in version 2 as well.

TARGET 11

Restore, maintain and enhance nature's contributions to people, including ecosystem functions and services, such as regulation of air, water, and climate, soil health, pollination and reduction of disease risk, as well as protection from natural hazards and disasters, **through nature-based solutions and/or ecosystem-based approaches** for the benefit of all people and nature.

> No conversion of natural ecosystems
> Improvement in ecological integrity
>
> For existing contributions to people from nature, the *no conversion* target provides continuity of these existing services. However, in many places land degradation has weakened these contributions. Within the implementation of Land SBTs on improving ecosystem integrity companies will likely deploy nature-based solutions and/or ecosystem-based approaches to both restore and enhance these contributions – with benefits flowing both to a company's dependencies within a landscape as well as people and nature.

TARGET 12

Significantly increase the area and quality and connectivity of, access to, and benefits from green and blue spaces in urban and densely populated areas sustainably, by mainstreaming the conservation and sustainable use of biodiversity, and ensure biodiversity-inclusive urban planning, enhancing native biodiversity, **ecological connectivity and integrity**, and improving human health and well-being and connection to nature and contributing to inclusive and sustainable urbanization and the provision of ecosystem functions and services.

TARGET 13

Take effective legal, policy, administrative and capacity-building measures at all levels, as appropriate, to ensure the fair and equitable sharing of benefits that arise from the utilization of genetic resources and from digital sequence information on genetic resources, as well as traditional knowledge associated with genetic resources, and facilitating appropriate access to genetic resources, and by 2030 facilitating a significant increase of the benefits shared, in accordance with applicable international access and benefit-sharing instruments.

3. Tools and solutions for implementation and mainstreaming

TARGET 14

Ensure the full integration of biodiversity and its multiple values into policies, regulations, planning and development processes, poverty eradication strategies, strategic environmental assessments, environmental impact assessments and, as appropriate, national accounting, within and across all levels of government and across all sectors, in particular **those with significant impacts on biodiversity, progressively aligning all**

relevant public and private activities, fiscal and financial flows with the goals and targets of this framework.

ALL LAND SBTs

While not a specific target, the SBTN target setting process will deliver on the transformational integration of companies as biodiversity actors and stakeholders. In addition, the spatial nature of Land SBTs will require companies to understand their impacts in specific places, providing context and stakeholder engagement around their Land SBTs. During this action it may not be possible, and would not be advisable for companies to act outside of alignment with public institutions, policies, regulations, processes, strategies and assessments.

TARGET 15

Take legal, **administrative or policy measures to encourage and enable business, and in particular to ensure that large and transnational companies and financial institutions:**

(a) Regularly **monitor, assess, and transparently disclose** their risks, dependencies and impacts on biodiversity, including with requirements for all large as well as transnational companies and financial institutions **along their operations, supply and value chains and portfolios**;

(b) Provide information needed to consumers to promote sustainable consumption patterns;

(c) Report on compliance with access and benefit-sharing regulations and measures, as applicable;

in order to **progressively reduce negative impacts on biodiversity, increase positive impacts, reduce biodiversity-related risks to business and financial institutions, and promote actions to ensure sustainable patterns of production**.

ALL LAND SBTs

This target outlines the role of corporate disclosure and transparency, but also communicates that the outcome of these processes is to avoid and reduce impacts on biodiversity and take action to regenerate and restore moving forward. Paired with target 14 on transformation these targets outline SBTN's mitigation hierarchy and the framework upon which Land SBTs were selected. *No conversion* (avoid), (reduce) land occupation, and improve ecosystem integrity (through regeneration and restoration).

TARGET 16

Ensure that people are encouraged and enabled to make sustainable consumption choices, including by establishing supportive policy, legislative or regulatory frameworks, improving

No conversion of natural ecosystems
Improvement in ecological integrity

Since the conversion of natural ecosystems is primarily driven my increasing agricultural land, a *no conversion* target prevents the expansion of this footprint. Paired with a *land occupation reduction* target, this Land SBT quantifies the reduction in global footprint that is required by 2030 (500 million hectares) and asks large agricultural companies to commit to those reductions – directly in line with this GBF target.

education and access to relevant and accurate information and alternatives, and by 2030 **reduce the global footprint of consumption in an equitable manner**, including through halving global food waste, significantly reducing overconsumption and substantially reducing waste generation, in order for all people to live well in harmony with Mother Earth.

TARGET 17

Establish, strengthen capacity for, and implement in all countries, biosafety measures as set out in Article 8(g) of the Convention on Biological Diversity and measures for the handling of biotechnology and distribution of its benefits as set out in Article 19 of the Convention.

TARGET 18

Identify by 2025, and eliminate, phase out or reform incentives, including subsidies, harmful for biodiversity, in a proportionate, just, fair, effective and equitable way, while substantially and progressively reducing them by at least 500 billion United States dollars per year by 2030, starting with the most harmful incentives, and **scale up positive incentives for the conservation and sustainable use of biodiversity**.

TARGET 19

Substantially and progressively increase the level of financial resources from all sources, in an effective, timely and easily accessible manner, including domestic, international, public and private resources, in accordance with Article 20 of the Convention, to implement national biodiversity strategies and action plans, by 2030 mobilizing at least 200 billion United States dollars per year, including by:

(a) Increasing total biodiversity related international financial resources from developed countries, including official development assistance, and from countries that voluntarily assume obligations of developed country Parties, to developing countries, in particular the least developed countries and small island developing States, as well as countries with economies in transition, to at least US$ 20 billion per year by 2025, and to at least US$ 30 billion per year by 2030;

(b) Significantly increasing domestic resource mobilization, facilitated by the preparation and implementation of national biodiversity finance plans or similar instruments according to national needs, priorities and circumstances;

(c) Leveraging private finance, promoting blended finance, implementing strategies for raising new and additional resources, and **encouraging the private sector to invest in biodiversity, including through impact funds and other instruments**;

(d) Stimulating innovative schemes such as payment for ecosystem services, green bonds, biodiversity offsets and credits, and benefit-sharing mechanisms, with environmental and social safeguards;

(e) Optimizing co-benefits and synergies of finance targeting the biodiversity and climate crises;

(f) **Enhancing the role of collective actions**, including by indigenous peoples and local communities, Mother Earth centric actions[162] and non-market-based approaches including community based natural resource management and civil society cooperation and solidarity aimed at the conservation of biodiversity;

[162] Mother Earth Centric Actions: Ecocentric and rights-based approach enabling the implementation of actions towards harmonic and complementary relationships between peoples and nature, promoting the continuity of all living beings and their communities and ensuring the non-commodification of environmental functions of Mother Earth.

(g) Enhancing the effectiveness, efficiency and transparency of resource provision and use;

ALL LAND SBTs

Land SBTs form one of the types of positive incentives and "other instruments" for the conservation, sustainable use, and restoration of biodiversity. Moreover, they ask companies to avoid and reduce their impacts and then contribute to collective action pathways as part of the target on *ecosystem integrity*.

TARGET 20

Strengthen capacity-building and development, access to and transfer of technology, and promote development of and access to innovation and technical and scientific cooperation, including through South-South, North-South and triangular cooperation, to meet the needs for effective implementation, particularly in developing countries, fostering joint technology development and joint scientific research programmes for the conservation and sustainable use of biodiversity and strengthening scientific research and monitoring capacities, commensurate with the ambition of the goals and targets of the framework.

TARGET 21

Ensure that the best available data, information and knowledge, are accessible to decision makers, practitioners and the public to guide effective and equitable governance, integrated and participatory management of biodiversity, and to strengthen

ALL LAND SBTs

The development of version 1 Land SBTs has already led to breakthroughs in data, research, analysis and knowledge on how to engage the corporate sector in setting targets for nature and supporting biodiversity. The structure of SBTN provides a platform for this transparency and will continue to evolve to be more useful in quantifying what nature needs and the responsibility of companies in delivering their contribution to solutions. Land SBT methods are built on freely and publicly available data sources. Through the target setting process it is likely that companies acting as stakeholders and actors in the biodiversity space will drive innovation and respond to the ambition of the biodiversity crisis, aligned with, but beyond the scope of the GBF.

communication, awareness-raising, education, monitoring, research and knowledge management and, also in this context, traditional knowledge, innovations, practices and technologies of indigenous peoples and local communities should only be accessed with their free, prior and informed consent,[163] in accordance with national legislation.

TARGET 22

Ensure the full, equitable, inclusive, effective and gender-responsive representation and participation in decision-making, and access to justice and information related to biodiversity by indigenous peoples and local communities, respecting their cultures and their rights over lands, territories, resources, and traditional knowledge, as well as by women

[163] Free, prior and informed consent refers to the tripartite terminology of "prior and informed consent" or "free, prior and informed consent" or "approval and involvement.

and girls, children and youth, and persons with disabilities and ensure the full protection of environmental human rights defenders.

TARGET 23

Ensure gender equality in the implementation of the framework through a gender-responsive approach where all women and girls have equal opportunity and capacity to contribute to the three objectives of the Convention, including by recognizing their equal rights and access to land and natural resources and their full, equitable, meaningful and informed participation and leadership at all levels of action, engagement, policy and decision-making related to biodiversity.

ANNEX 10: Deep dive information for Landscape Engagement

Target setting at the landscape scale

A landscape constitutes a "socio-ecological system that consists of natural and/or human-modified ecosystems, and which is influenced by distinct ecological, historical, economic and socio-cultural processes and activities." (Pacheco, 2022)[164]

Landscapes, for planning purposes, refer to an **area of broadly similar ecosystems** that are shaped by a range of cultural, historical, and socioeconomic links. The boundaries of these landscapes can be:

- environmental (e.g., ecosystem or watershed), or
- administrative jurisdictional (e.g., district, province, or state). (Pacheco, 2022)

A landscape scale requires therefore a landscape approach, which is a holistic approach to inclusive spatial planning and effective management that includes the ecological, social, and economic aspects of a given area.

This approach aims to **balance competing demands on land resources**, such as:

- agriculture,
- forestry,
- urban development, and
- nature conservation,

in order to achieve **multiple objectives**, among others:

- **food security**,
- **biodiversity conservation**, and
- **climate change mitigation**.

Since a landscape approach emphasizes the integration of different sectors and stakeholders in decision-making, and the use of an ecosystem-based approach to management, this usually involves the use of spatial planning tools and methods, such as landscape assessments: these are used to identify priority areas for conservation and sustainable use, as well as monitoring and adaptive management to track progress and adjust management strategies as needed.

[164] https://www.researchgate.net/publication/361384805_Corporate_guidance_for_place-based_engagement_in_setting_and_achieving_science-based_targets_for_nature

Landscape approaches that define their boundaries based on administrative jurisdictions have some systems of authority embedded with clear roles, responsibilities, and budgets regulated by statutory laws.

In these landscapes and/or jurisdictions different social processes are taking place:

- social processes, such as
  - social interactions,
  - economic transactions, and
  - livelihood activities
- ecological processes, such as
  - nutrient cycling,
  - species interactions, and
  - evolution

These processes are mediated by:

- institutions and governance systems, including
  - rules,
  - norms,
  - regulations, and
  - rights
- power relationships

which all have an influence on the delivery of nature contributions to people (or ecosystem goods and services). (Pacheco, 2022)

A landscape approach **helps stakeholders manage land, water and other natural resources** while also considering the complexity of interactions between social, economic and ecological systems, across administrative and jurisdictional boundaries, aiming at balancing multiple objectives such as conservation, production and human well-being.

CDP (2022)[165] gives a clear definition both of **landscape approaches** and **jurisdictional approaches**.

When is the landscape approach a jurisdictional approach? When the landscape area is defined by administrative boundaries, like, for example, a subnational state and government is highly involved in implementation, then the landscape approach is considered a jurisdictional one.

These approaches leverage partnerships between actors involved in each landscape, including companies, financial institutions, governments, associations, local communities, and indigenous peoples, to mitigate risks and maximize impacts.

Carmenta et al. (2020)[166] show how Integrated Landscape Initiatives (ILIs) try to reconcile conservation and development objectives by achieving multiple outcomes within a given landscape through diverse strategies and integration across sectors. The scholars assessed more than 100 ILIs in Latin America, and they developed a typology that identifies the core attributes, and the distinctions, across landscape approaches. The typology is based on analysis of the motivations that led to the creation of the landscape initiative and the actions implemented. They also assess the comparative performance of the distinct types of ILIs by

[165] https://cdn.cdp.net/cdp-production/cms/reports/documents/000/005/971/original/CDP_Global_Corporate_Report_on_Forest___Jurisdictional_Approaches.pdf?1638207724

[166] https://www.sciencedirect.com/science/article/pii/S2590332220300427

using survey data provided by ILI proponents and found that integration underscores performance.

Figure 17 - Examples of integrated landscape initiatives in Latin America

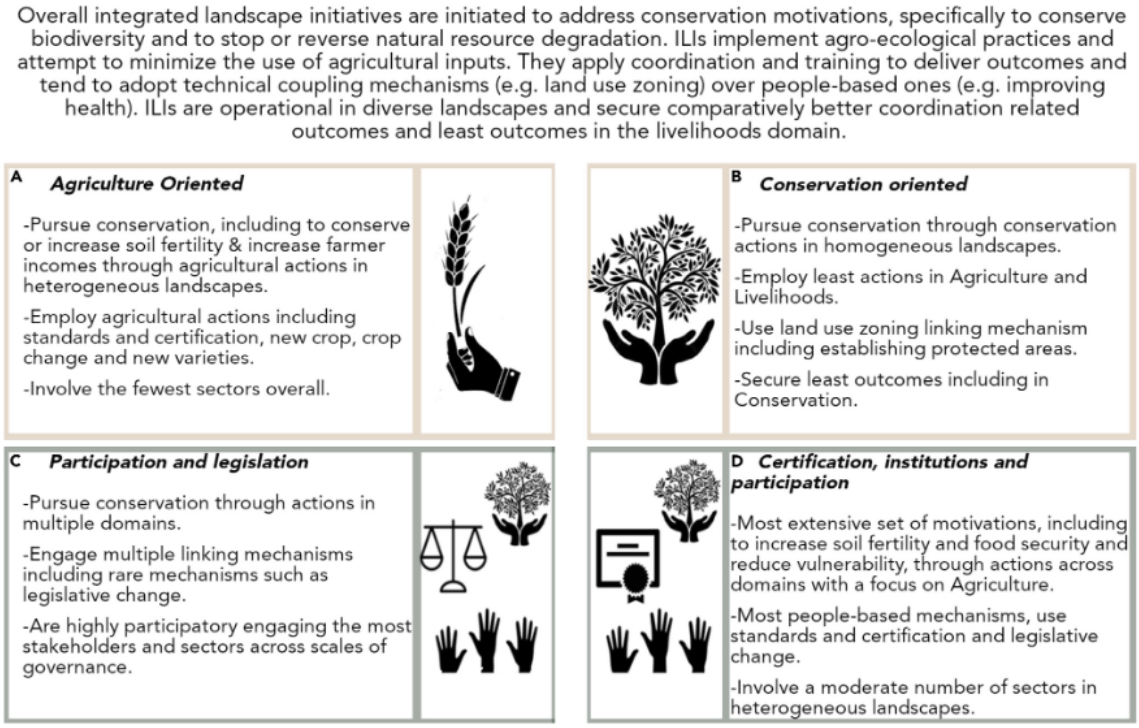
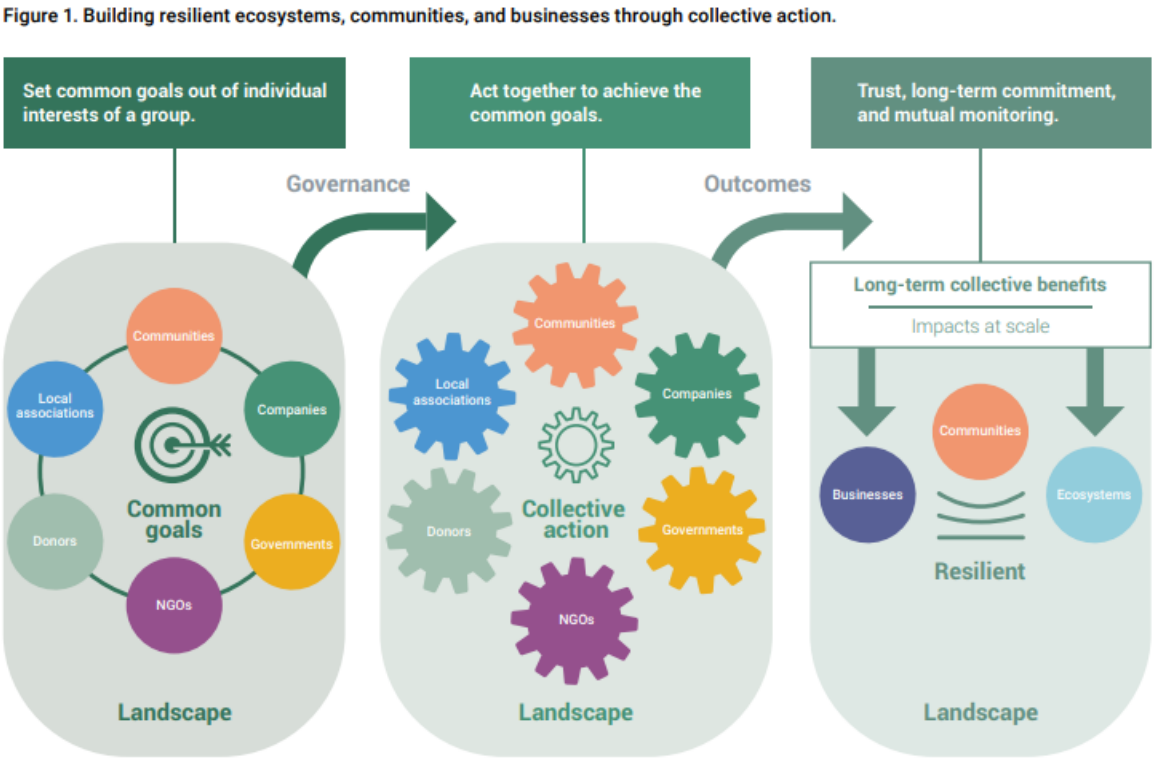


Figure 1. Four Types of Integrated Landscape Initiatives in Latin America
Integrated landscape initiative (ILI) types were distinguished by multi-factor analysis of data reported by project proponents. ILIs have common traits (top panel) and characterizations along the spectrum of integration from partial (A and B) to strong integration (C and D).

Note: source for figure[167]

[167] https://www.sciencedirect.com/science/article/pii/S2590332220300427

3805 *Figure 18 - collective action for successful landscape initiatives*



3806

3807 Figure from CDP[168]

3808 It is important to understand values of and requirements for ecosystem integrity at this scale
3809 and ensure that companies consider the needs of local communities when they undertake
3810 actions.

3811 Target setting across a company's holdings within an ecosystem allows the company
3812 freedom to allocate responses where they choose. This may result in the selection, for
3813 instance, of areas for restoration where the company will most benefit from the increase in
3814 ecosystem service provision. Multi-stakeholder approaches at the landscape level ensure
3815 that the social, economic, and cultural needs of local communities are taken into account
3816 when defining which actions should be implemented for achieving environmental goals.

3817 Besides, corporate actions can be amplified and become more effective when implemented
3818 collectively and at a wider scale, as showed in the increasingly growing number of active
3819 landscape initiatives (Proforest 2020).

3820 **How to establish a landscape initiative**

[168] https://cdn.cdp.net/cdp-production/cms/reports/documents/000/005/971/original/CDP_Global_Corporate_Report_on_Forest___Jurisdictional_Approaches.pdf?1638207724

For successful landscape approaches, companies should make sure that **solid stakeholder engagement**, **sufficient institutional support** and **effective structure of governance** are in place (Reed et al. 2016[169]; Riggs et al., 2021[170]).

A large body of academic work has in fact highlighted how **collective decision-making** is a key characteristic in landscape approaches (Fischer et al. 2019[171]; Opdam et al. 2016[172]). Whether through village committees, multi-stakeholder forums, or cross-sectoral collaboration, integrated landscape approaches therefore depend on the capacity of people within the landscape to agree to and organize collective action (Kusters et al. 2020[173]; Riggs et al., 2021).

Several institutions and bodies have set out frameworks for the set-up, verification and monitoring of initiatives to, e.g., reduce emissions from deforestation and forest degradation.

As an example, Proforest (2020)[174] sets out the following **steps before establishing a landscape/jurisdictional initiative**:

1. Understand the **supply base**
    a. through supply base mapping, understand where the commodities are produced
2. Identify **priority landscapes** and underlying problems
3. Identify **initiatives**, understand local motivation, governance and decision making
4. Decide on specific initiatives and approach which are right for the area
5. Clarify **resources available** and scope of engagement
    a. level of funds and commitment over timescale
    b. scope of engagement
    c. decide timeframe
6. Build **trust** across stakeholders
7. Plan and implement interventions
8. Communicate and coordinate across partners
9. Monitor and evaluate

The assessment of a landscape initiative can then be done by applying the following framework:

- **Goals**
    - clear goals and milestones
    - coverage of important issues for the sector
    - tangible benefits at scale
    - safeguards in place to protect and advance human rights and protect vulnerable groups from harm
- **Governance and transparency**
    - clear governance process
    - appropriate incentives and sanctions
    - system to monitor process
    - transparency on finance

[169] https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.13284
[170] https://link.springer.com/article/10.1007/s11625-021-01035-5
[171] https://journals.sagepub.com/doi/pdf/10.1177/1940082919872634
[172] https://www.sciencedirect.com/science/article/abs/pii/S187734351530018X
[173] https://www.mdpi.com/2073-445X/9/4/128
[174] https://www.proforest.net/fileadmin/uploads/proforest/Documents/Publications/Engaging_with_landscape_initiatives_Indonesia.pdf

- **Mandate and inclusiveness**
  - engagement with relevant stakeholders
  - respect and recognition of local people's rights and interests
  - willingness to collaborate with the private sector
  - clear expectations on company's contribution

Also, scholars have attempted to define the key steps and characteristics of integrated landscape approaches. Reed et al. (2016) highlight that, due to the dynamic nature of living landscapes, there should be no defined end point to a landscape approach but rather it should be an iterative process of negotiation, trial and adaptation.

The scholar lists the key aspects of an effective landscape approach:

- **Evaluation of progress**
  - Right balance between participatory engagement and scientific rigor.
  - Metrics must be specific to the landscape context, including social, environmental, production and governance aspects.
- **Establishment of good governance**
  - Adapt structures across landscapes.
  - Constant ri-evaluation of governance structures across time.
- **Evolvement from panacea solutions**
  - Contextualization is key to success
  - Align specific framework to specific goals
- **Engagement of multiple stakeholders**
  - Need for ongoing, inclusive, participatory negotiation processes.
  - Stakeholders should be able to identify objectives, develop synergies and account for trade-offs.
  - Align local socio-cultural and global environmental concerns.
- **Embracing of dynamic processes**
  - Implementation of dynamic frameworks.
  - Built-in mechanisms to deal with unpredictability.

Sayer et al. (2017)[175] show that the scope of situations where landscape approaches have been used includes landscapes or seascapes where land claims are contested, where objectives diverge and where there is a need to optimize production and minimize environmental degradation and the loss of biodiversity.

The spectrum of situations where landscape approaches can be used is varied: transitions occur when management intensity might increase and infrastructure expand across different development gradients, from remote hinterlands to more developed regions (Sayer et al., 2017).

Different key participants and objectives might be pursued in different landscapes:

- In **hinterlands** where logging and/or smallholder agriculture happen, the key aspects might be to deal with international conservation NGOs, industrial land conversion consequences, and REDD+ activities.
- In a **landscape transition area**, where agricultural intensification persists with estate crops and agroforestry, the key participants might be development NGOs and industrial corporations, while the key aspects to consider might be infrastructure expansion and conflicts over land rights.
- In an area where **agricultural consolidation and/or urbanization** is happening, different aspects might need to be considered, from industrial crops, to tree planting,

[175] https://link.springer.com/article/10.1007/s11625-016-0415-z

going all the way to recreation and amenity. This situation might include aspects such as consolidation of land rights and infrastructure development. (Sayer et al., 2017)

Unlike traditional projects, landscape approaches are **long-term evolving activities**, so attempting to assess their impact at a single end-point is problematic. Stakeholders will continuously alter their views on desirable outcomes and the goal posts will continually move (Kutter and Westby 2014)[176].

CDP (2022)[177] gives two examples of a landscape approach applied at local level to protect habitats and ecosystems at scale, but also to protect assets in relation to supply chains.

- The Coalition for Sustainable Livelihoods (CSL) is an initiative focused on **improving collaboration and collective action** to achieve shared goals for strengthening smallholder livelihoods, sustainable production, and natural resources management in the Indonesian provinces of North Sumatra and Aceh.
    - By **aligning landscape and supply chain efforts** with existing national and regional platforms and policies, CSL aims to create a needed pathway to scale sustainable production on the ground while also generating lasting social, economic, and environmental benefits in the two provinces. The initiative demonstrates collective action on sustainable shared goals, long-term engagements, action plans aligned with development policies, social inclusion, and systems to monitor progress.
- The Produce, Conserve, and Include Institute (PCI), a jurisdictional approach established by Mato Grosso State in Brazil. The aim is to fill an estimated funding gap of US$30 billion to finance its strategy by 2030—80% of which needs to be filled by the private sector for activities like **pasture restoration and planted forests**. CDP has worked with the PCI Institute to present the key factors needed to implement a jurisdictional approach that engages with private sector investments and REDD+. CDP is therefore presenting four main learnings for a successful jurisdictional approach:
    - **Establishing a decentralized governance structure** – such as the PCI Institute – has been key to guaranteeing the medium and long-term Jurisdictional Approach (JA) goals from political cycles changes.
    - **Multiple funding streams** from public and private sector investments, including international cooperation, can enable the establishment and implementation of these initiatives. Moreover, blended finance for JA's allows different interest and objectives to be harmonized and help guarantee the long-term stability of the JA.
    - **An open and recurrent multi-stakeholder dialogue** with the government, producers, and traders has been key to ensuring government targets and the production of deforestation-free commodities and supply chains. In the case of the PCI Institute, the establishment of the Corporate Working Group has provided a safe space for the concertation of those collective goals.
    - **Tracking and transparently disclosing information on progress** towards the collective goals is essential to the credibility of JA. Therefore, the PCI Institute has established monitoring tools and partnered with several worldwide organizations, such as CDP, to improve and adapt its monitoring systems.

[176] https://www.tandfonline.com/doi/abs/10.1080/09614524.2014.907241
[177] https://jaresourcehub.org/wp-content/uploads/2023/01/CDP_CM_Factsheet_2022.pdf

For CDP (2022)[178], moreover, a robust JA requires a monitoring & evaluation system. Both time (to agree with all stakeholders) and investment (to fund the platform and data analysis needed) need to be considered when developing a comprehensive monitoring & evaluation system. Tracking information is critical to learn and understand what areas are progressing and what areas need more attention.

[178] https://cdn.cdp.net/cdp-production/cms/reports/documents/000/006/134/original/CDP_Brazil_PCI_Case_Study_Jurisdictional_Approaches_Final_Version.pdf?1646824791

Box 14 - Example of ART using TREES

Example: On the national or subnational government level the Architecture for REDD+ Transactions (ART) is a global voluntary initiative that seeks to incentivize governments to reduce emissions from deforestation and forest degradation (REDD), as well as restore forests and protect intact forests (+) and through TREES (The REDD+ Environmental Excellence Standard), ART is attempting to quantify emissions reductions and removals from REDD+ activities at a jurisdictional scale and provide a comprehensive process to transparently register, verify and issue serialized credits.

The process to enter ART using TREES requires approval of a TREES Concept, a successful initial Validation and Verification, and TREES Registration. An applicant shall be a national government entity, subnational governments no more than one level down from national level, or recognized indigenous communities.

The following is the process for initial registration, validation, verification and issuance of credits (Architecture for REDD+ Transactions Program, 2021). For ART, each participant has to complete the following steps prior to receiving credits:

1. Submission of TREES Concept
2. Review of TREES Concept from the ART Secretariat
3. Approval of inclusion of the Participant in ART.
4. Reference of the TREES Concept in the ART Registry
5. Submission of the Registration Document and the initial monitoring report covering the initial calendar year
6. Review of the registration document
7. Selection of a validation and verification body
8. The validation and verification body conducts the validation of the TREES Registration Document and the verification of the TREES monitoring report
9. The Secretariat submits the Participant's final package and a recommendation to the ART Board for approval.
10. Following Board approval, the Participant's TREES Registration Document and Monitoring Report are referenced in the ART Registry as Registered and TREES credits are issued based on the initial verification.

The ongoing process for validation, verification and issuance of credits is the following:

1. Submission of a TREES Monitoring Report to the ART Secretariat for review following calendar years 1, 3, and 5 of each crediting period. The Report may optionally be submitted following calendar years 2 and 4.
2. Similar steps from 6 to 11 as above

How to monitor a landscape initiative?

To apply the EII target at the landscape level, companies must have identified 2-3 initial priority landscapes following SBTN's Step 2: Prioritize guidance.

Once landscapes have been selected, companies will contribute a baseline assessment of the landscape's ecological integrity using the Ecosystem Integrity Index included in this guidance as well as an estimate of any land conversion using that Natural Lands map from their assessment for the *No Conversion of Natural Ecosystems* Target..

As a new metric it is unlikely that any landscape initiatives have utilized EII and this information can be an initial offering for inclusion in the inclusive spatial planning of the landscape initiative.

Stakeholder consultations are likely already a part of ongoing landscape initiatives, but renewed or initial corporate engagement in these initiatives, each company setting Land SBTs must assess and understand the needs of the local community, where actions will have the most benefit, and who should be held responsible for undertaking the actions. Information that should be considered includes:

- mean EII across the landscape,
- counterfactual assessment of a company's impacts on EII within that landscape,
- baseline levels of NCP across the landscape and contributions of NCPs at different scales (local to global),
- an understanding of the contributions of other actors in the landscape,
- the needs and values of local communities.

This step will result in a negotiated written agreement at the landscape level as to how ecosystem integrity will be enhanced, what actions will be undertaken by whom, and the appropriate timescales.

Interlinked targets should be set for priority landscapes, where no conversion is a priority, where land footprint reduction is a priority, and then where restoration can be applied to achieve targets for increase in EII.

Two different pathways will be considered:

- Companies **can join existing landscape initiatives** when present in sourcing areas material to their businesses or when companies are not able to trace the origin of products containing high-impact commodities.
    - A list of active and recognized landscape initiatives will be provided by SBTN Land Hub and partners.
- Companies can **establish new landscape initiatives** when their production unit and sourcing areas are not yet covered by other initiatives.

Select metrics for monitoring progress and potential alignment of the assessment framework with components of the Ecological Integrity Index (EII) and building on existing frameworks and metrics where they exist and are relevant, e.g.:

- HCV RN approach at landscape level[179],

[179] https://www.hcvnetwork.org/posts/new-guidance-for-using-the-hcv-approach-at-landscape-and-jurisdictional-scales

- Forest Positive Coalition's Landscape Reporting Framework[180],
- LandScale framework[181],
- OP2B framework for restoration and guidance[182].

Define reporting requirements for companies with validated targets (e.g., starting from the CGF assessment framework and amending it as necessary).

Proforest: Landscape Reporting Framework

The framework has been built on existing landscape-level assessments and reporting frameworks as much as possible, to incorporate the work that has already been done and applied on the ground. ISEAL reviewed 11 existing frameworks, including global as well as regional and country-specific frameworks.

The benchmarking exercise and analysis of existing frameworks showed that the current frameworks largely provide outcomes-based metric and indicators, which can take years to reach in landscape initiatives. There is therefore a gap and a need for indicators and outcomes that companies can use to show step-wise progress based on activities. To address this the framework is structured around four main phases that are typically followed to deliver outcomes. This idea of using a phased approach resonated with the more than 15 existing landscape initiatives that were consulted on this idea.

The working group should identify a pool of metrics for the use of existing and new landscape initiative to comply with monitoring and reporting requirements.

The working group may define the minimum set of required metrics, or mandatory metrics, and a set of recommended metrics.

Examples of potential metrics:

A. # ha natural ecosystem conserved
B. # ha of ecosystems under restoration
C. # ha and % reduction in conversion

D. # people and HA with more secure land title, usufruct rights or resource access
E. Percentage of landscape with formalized land tenure right
F. Increased perceived land tenure security

G. Increase in productivity (yield/ha) of target crop(s)
H. # ha managed under improved agricultural practices .
I. # Farmers realizing additional benefits and income streams
J. Average or median household income
K. % population living below the poverty line
L. Increase in food security
M. Increase in HH assets

Example of LandScale Framework v1.0.

Goal 1.1 Conserve and restore natural ecosystems

- 1.1.1 Effective conservation and protection of natural ecosystems

[180] https://www.theconsumergoodsforum.com/environmental-sustainability/forest-positive/
[181] https://www.landscale.org/assessment-framework/
[182] https://www.wbcsd.org/Projects/OP2B/Resources/OP2B-s-Framework-for-Restoration-Actions

- 1.1.1.1 Total area (ha) & percentage (%) of the landscape in designated protected areas 2 disaggregated by natural ecosystem type (required)
- 1.1.1.2 Percentage (%) of the total area of designated protected areas with effective management 3 (recommended)
- 1.1.1.3 Total area (ha) & percentage (%) of the landscape that is effectively conserved in other ways 4 disaggregated by natural ecosystem type (recommended)

- 1.1.2 Natural ecosystem conversion
  - 1.1.2.1 Total area (ha) & percentage (%) of area of natural ecosystems in the landscape that has been recently converted (required)
  - 1.1.2.2 Natural ecosystem conversion rate (average area [ha] & percentage [%] conversion per yr) (required)
  - 1.1.2.3 User-defined metric for ecosystem category (e.g., forest ecosystem types) of area (ha) & percentage (%) of area in the landscape that has been recently converted (recommended)
  - 1.1.2.4 User-defined metric for ecosystem category (e.g., forest ecosystem types) of conversion rate (average area [ha] & percentage [%] conversion per yr) (recommended
- 1.1.3 Natural ecosystem degradation
  - 1.1.3.1 Total area (ha) & percentage (%) of natural ecosystems in the landscape that are currently degraded (required)
  - 1.1.3.2 Natural ecosystem degradation rate (required)
  - 1.1.3.3 User-defined metric for ecosystem category (e.g., forest ecosystem types) of area (ha) & percentage (%) of area in the landscape that is currently degraded (recommended)
  - 1.1.3.4 User-defined metric for ecosystem category (e.g., forest ecosystem types) of degradation rate (recommended)
- 1.1.4 Ecosystem restoration
  - 1.1.4.1 Total area (ha) under restoration 6 (required)
  - 1.1.4.2 Rate of increase (ha/yr) in total area under restoration (recommended)
- 1.1.5 Natural ecosystem connectivity
  - 1.1.5.1 User-defined metrics of connectivity and/or fragmentation appropriate to the types and patterns of natural ecosystems (recommended)

Goal 1.2 Protect and restore genetic

- 1.2.1 Threats to species
  - 1.2.1.1 Changes in threats to threatened species (required)
  - 1.2.1.2 Changes in threats to populations of indicator species or other species identified as important in the landscape (required, alternate, or recommended, depending on context)
- 1.2.2 Biodiversity habitat conversion
  - 1.2.2.1 Area (ha) of natural ecosystem conversion within areas identified as important for biodiversity & percentage (%) of such areas that this represents (required)
- 1.2.3 Biodiversity habitat degradation
  - 1.2.3.1 Area (ha) & percentage (%) of lands identified as important for biodiversity that are degraded (recommended)
- 1.2.4 Biodiversity habitat restoration
  - 1.2.4.1 Area (ha) & percentage (%) of land under restoration within areas identified as important for biodiversity (recommended)
- 1.2.5 Biodiversity habitat protection
  - 1.2.5.1 Area (ha) & percentage (%) of the area of important biodiversity areas that are designated and managed for long-term protection (required)

- 1.2.5.2 Area (ha) & percentage (%) of the area of important biodiversity areas that are under conservation through OECMs (required)

Goal 1.3 Maintain and enhance ecosystem services

- 1.3.1 Water quantity
  - 1.3.1.1 Trend of seasonal water quantity or flow rate of key water bodies that serve human uses (e.g., total volume, depth, or volume flow /time) (required)
  - 1.3.1.2 Water withdrawals from surface or groundwater versus recharge (ratio) (required)
  - 1.3.1.3 Frequency of interruption or shortage in water supply for agriculture, domestic & industrial sectors (average number of days per year with interruption or shortage of water availability) (recommended)
- 1.3.2 Water quality
  - 1.3.2.1 Total suspended solids in key water bodies (average mg/l) (required)
  - 1.3.2.2 Biochemical oxygen demand & chemical oxygen demand (mg/l) or nutrients (nitrogen and phosphorus) (load/volume) in key water bodies (required)
  - 1.3.2.3 Diversity of aquatic macroinvertebrates in key water bodies (Biological Monitoring Working Party or another index when appropriate) (recommended)
  - 1.3.2.4 Concentration of metals or other toxins (load/volume) in key water bodies (recommended)
- 1.3.3 Agriculture, forestry & other land use (AFOLU) sector GHG sources and sinks

Forests & other natural ecosystems

  - 1.3.3.1 (Sinks) Rate of terrestrial carbon sequestration (tCO2e/ha/yr) in aboveground and belowground biomass (litter, dead wood, harvested wood products and soil are optional) (required)
  - 1.3.3.2 (Sources) Rate of GHG emissions (tCO2e/yr) from deforestation and (optionally) forest degradation (required)

Production areas

  - 1.3.3.3 (Sinks) Rate of C sequestration in above and below ground biomass in woody perennials in forest plantations, agroforestry & lands under restoration (tCO2e/yr) (recommended)
  - 1.3.3.4 (Sinks) Rate of C sequestration in soil organic carbon pool within agriculture, forest plantations, and other production land uses (such as agroforestry) & lands under restoration (tCO2e/yr) (recommended)
  - 1.3.3.5 (Sources) Rate of GHG emissions (tCO2e/yr) from agricultural production & primary processing per unit of production (including crops and livestock) (recommended)
- 1.3.4 Other ecosystem services
  - 1.3.4.1 User-defined metric(s) (recommended)

PILLAR 2: HUMAN WELL-BEING

Goal 2.1 Improve standard of living, especially for vulnerable and/or marginalized groups

- 2.1.1 Household income & assets
  - 2.1.1.1 Percentage (%) of female and male population living below the local poverty line (or, if this is not specified, earning <$1.90/day) (required)

    - 2.1.1.2 Percentage (%) of households owning or lacking context-appropriate asset(s). Examples include radio, TV, telephone, computer, animal cart, bicycle, motorbike, refrigerator, car, or truck (recommended)
- 2.1.2 Health & nutrition
    - 2.1.2.1 Percentage (%) of girls and boys that are undernourished (required)
    - 2.1.2.2 Percentage (%) of female and male population without access to health services (required)
    - 2.1.2.3 Mortality rate of girls and boys under 18 years (averaged over the past five years) (required)
- 2.1.3 Education
    - 2.1.3.1 Percentage (%) of school-aged girls and boys that are not attending school (required)
    - 2.1.3.2 Percentage (%) of female and male adults that have not completed primary education (required)
- 2.1.4 Water, sanitation & hygiene
    - 2.1.4.1 Percentage (%) of households without access to safe drinking water within a 15-minute walk from home (required)
    - 2.1.4.2 Percentage (%) of households without a safely managed sanitation facility exclusive to the household (required)
- 2.1.5 Basic infrastructure
    - 2.1.5.1 Percentage (%) of households without electricity (required)
    - 2.1.5.2 Percentage (%) of households where the roof, walls and/or floor are composed predominantly of rudimentary materials (required)
    - 2.1.5.3 Percentage (%) of households that use dung, wood, charcoal or coal as fuel for cooking or heating (required)
- 2.1.6 Vulnerability
    - 2.1.6.1 Percentage (%) of households that have experienced a severe shock (i.e., a significant loss of income or property) in the past 12 months due to a natural disaster or human-caused events (recommended)
    - 2.1.6.2 Percentage (%) of households that have been subject to crime in the previous 12 months (recommended)
    - 2.1.6.3 User-defined metric(s) to assess the impact of severe shocks and/or crimes on women and youth (recommended)

Goal 2.2 Respect, protect, and fulfill human rights

- 2.2.1 Child labor
    - 2.2.1.1 User-defined metrics based on identified enabling conditions following LandScale's human rights assessment guidelines available on the platform (required)
    - 2.2.1.2 Estimated number of girls and boys laborers in economic activities of interest (recommended)
- 2.2.2 Women's rights
    - 2.2.2.1 User-defined metrics based on identified enabling conditions following LandScale's human rights assessment guidelines available on the platform (required)
- 2.2.3 Indigenous peoples' and other marginalized groups' rights

- 2.2.3.1 User-defined metrics based on identified enabling conditions following LandScale's human rights assessment guidelines available on the platform (required)
- 2.2.4 Forced labor
  - 2.2.4.1 User-defined metrics following LandScale's human rights assessment guidelines available on the platform (required)
  - 2.2.4.2 Estimated number of forced laborers in economic activities of interest (recommended)
- 2.2.5 Workers' rights
  - 2.2.5.1 User-defined metrics following LandScale's human rights assessment guidelines available on the platform (required)
- 2.2.6 Other human rights
  - 2.2.6.1 User-defined metrics following LandScale's human rights assessment guidelines available on the platform (required)

LandScale also includes a Governance pillar and a Production pillar with indicators and metrics. LandScale full framework is accessible here.

Table 34 - Monitoring indicators for the PCI institute

Table 1. Monitoring indicators for the PCI Institute

PCI	Number	Goal	Indicator
Produce	1	Recover 2.5 Mha of low-productivity pasture areas by 2030	Hectares
	2	Increase livestock productivity to 116 kg/ha/ year by 2030	kg/ha/year
	3	Expand the grain area in degraded pasture areas to 14.69 million hectares by 2030	Grain area (soybean) Agricultural area of the reference year that overlaps the pasture area of the previous year
	4	Increase grain production to 125 Mton by 2030	Mton/year
	5	Expand the area under sustainable forest management to 6 Mha by 2030	Area under Sustainable Forest Management Plan (PMFS)
	6	Increase planted timber production to 11.75 Mm^3 by 2030	Volume of forestry production
	7	Expand the area of planted forests in areas already open to 800,000 ha by 2030	Planted forest area Area planted with eucalyptus and teak in areas already open
	8	Expand the area under sustainable forest management to 6 Mha by 2030	Biodiesel production from beef tallow, cottonseed oil, others (thousand cubic meters) Corn ethanol production (thousand cubic meters) Sugarcane ethanol production(thousand cubic meters)

Conserve	9	Conserve 60% of the native vegetation coverage from the State of Mato Grosso	◥ Proportion of the state area covered by natural vegetation ◥ Secondary vegetation area
	10	Reduce deforestation in the forest by 90% by 2030, being 84% by 2024 having as a reference the baseline: 2001-2010 (PRODES) of 5,714 km², reaching 571 km²/year by 2030	◥ Area of deforested vegetation mapped by Prodes Floresta ◥ Reduction percentage from baseline
	11	Reduce deforestation in the Brazilian Cerrado by 95% by 2030, being 83% by 2024 based on the baseline of 3,016 km² (SEMA), reaching 150 km²/year by 2030	◥ Area of deforested vegetation mapped by Prodes Cerrado ◥ Reduction percentage from baseline

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PCI	Number	Goal	Indicator
Conserve	12	Eliminate illegal deforestation by 2030	◥ Area of Amazon deforested without authorization from the state ◥ Cerrado area deforested without authorization from the state ◥ % of unauthorized deforestation over the total
	13	Reduce spots with heating alerts by 30% compared to the reference period from 2010 to 2019 (28,300 hotspots) by 2030	◥ Spots with heat alerts
	14	Eliminate illegal logging by 2030	◥ Percentage of illegal logging/year without authorization in the state
	15	Conserve 1 million ha of area that can potentially be in the legal deforestation criteria	◥ Preserved area subject to legal deforestation ◥ Area subject to legal deforestation receiving some economic incentive (in hectares)
	16	Register 90% of rural properties (CAR in its Portuguese acronym) by 2024	◥ Registered CAR area in relation to registerable area
	17	Validate 90% of CARs by 2024	◥ CAR area validated in relation to demanders
	18	Regularize 1 million ha (100%) of permanently degraded protection areas (APP in its Portuguese acronym) by 2030	◥ Degraded Permanent Preservation Area with agreement signed
	19	Regularize 5.8 million ha (100%) of Legal Reserve, with 1.9 million ha for recomposition, by 2030	◥ Degraded Legal Reserve Area with agreement

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Include	20	100% adhesion of municipalities in SEIAF by 2030	◥ Proportion of adhesion of municipalities
	21	Increase the Gross Value of Family Farming Production from 1.2 billion to R$2 billion by 2030	◥ Gross Value in Brazilian Real per year
	22	Increase participation of family farming products in the National School Feeding Program (PNEAE) to 30% by 2030	◥ Share (%) of Family Farming products sold in the PNAE / total ◥ Total value of family farming products sold in the PNAE (R$)
	23	Increase access to credit to Pronaf from R$882 million to R$1.3 billion/year by 2030	◥ Amount of financing accessed by family farming in the state ◥ Number of PRONAF contracts ◥ Proportion of active DAP over the family farming population
	24	Carry out land regularization of 70% of family farming lots by 2030	◥ Proportion of titled lots in federal settlements ◥ Proportion of titled lots in state settlements

Figure from CDP[183]

[183] https://cdn.cdp.net/cdp-production/cms/reports/documents/000/006/134/original/CDP_Brazil_PCI_Case_Study_Jurisdictional_Approaches_Final_Version.pdf?1646824791