TECHNICAL GUIDANCE
Version 2

DRAFT FOR PUBLIC CONSULTATION (APRIL 2025)

STEP
3
MEASURE, SET & DISCLOSE

LAND

SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE

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Acknowledgments

This guidance was developed by the Science Based Targets Network's Land Hub as a contribution to the Science Based Targets Network (SBTN), which aims to transform economic systems and protect the global commons—our air, water, land, biodiversity, and ocean. SBTN unites experts from more than 80 non-governmental organizations (NGOs), business associations, and consultancies to collectively define what is necessary to do "enough" to stay within Earth's limits and meet society's needs.

In partnership with SBTN, the Land Hub is a collaboration between World Wildlife Fund (Craig Beatty co-lead, Cristóbal Loyola), Conservation International (Alex Zvoleff co-lead, Jordan Rogan), The Nature Conservancy (Lyndsey Dowell), World Resources Institute (Elise Mazur), and the Food and Land Use Coalition/Systemiq (Scarlett Benson, Marco Daldoss Pirri). The objective of the SBTN Land Hub is to develop and promote a methodology that will allow companies to set, track, and measure progress on quantifiable targets that are representative of the progress required in land systems to sustain nature and people. The Land Hub is responsible for developing the technical content of these targets for inclusion as part of SBTN's multi-stakeholder, multi-year initiative to provide companies with comprehensive science-based targets for nature.

Version 1.0 of this guidance was primarily funded by the in-kind contributions of the core organizations that comprise the SBTN Land Hub and the organizations with which we collaborated on this work. In addition, Rockefeller Philanthropy Advisors and SBTN provided funding to support the Food and Land Use Coalition/ Systemiq.

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The Land Hub engaged KPMG (Thomas Ball, Dr. James Fitton, Annie Donegan, Dr Stephanie Maher, Abhinav Chaturvedi) as our primary consultant partner to collaborate and lead the development of this version and the accompanying Accounting Guidelines for Impacts on Land-use and the Environment (AGILE), and continues to work with Systemiq (Scarlett Benson, Marco Daldoss Pirri) who led the development of the V1.0 targets. The Land Hub also commissioned the Norwegian University of Science and Technology (Marin Dorber, Pinar Kavak, Francesca Verones) to select the best Lifecycle Impact Assessment methods to help assess the effect of corporate activities in terrestrial land systems, which supported the development of Land Environmental Assessment Factors (LEAFs). Development and conceptualization of the ecoregion level machine learning and threshold methodology and initial processing of the models was supported through collaboration and extensive time and effort provided by research experts in the Crowther Lab at ETH Zürich and the Complutense University of Madrid (Dr. Miguel Berdugo Vega and Katharina Runge). Thank you also to Ping-Chun Lin (University of Washington) for extensive support and dedication to providing further model and code development on the machine learning and thresholds models, and processing of the models to derive global ecoregion thresholds during his internship with Conservation International.

Version 1.0 of this guidance benefited from extensive expert input and public consultation, laying the foundation for Version 2.0. We thank all individuals and organizations who contributed to its development. We convened experts from a range of organizations in support of the technical development of Version 1.0 methods, including: the Accountability Framework Initiative (Rainforest Alliance: Leah Samberg); ISEAL (Patrick Mallet); Tropical Forest Alliance (Leony Aurora); CDP (Norma Pedroza, David Kosciulek); Rainforest Alliance (Marie Vallee); and Proforest (Target 1: Jane Lino; Target 3: Tharic Galuchi, Mike Senior, Veronique Bovee), and WRI (Rich Waite). We are grateful for their time and insights.

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Finally, we acknowledge the leadership of SBTN's Executive Director, Erin Billman; the Network Hub's Technical Team led by Varsha Vijay as Technical Director; and the SBTN Council and Product Development Council including Martha Stevenson from WWF-US as a senior advisor to the SBTN Land Hub.

DISCLAIMER

Please keep the following disclaimers in mind as you interact with this content.

1. This document is a consultation draft for the SBTN Land Hub and is intended for review and feedback. Please note that this draft is subject to revisions and updates in future iterations. This document should not be considered finalized content for use.

2. The scope of this guidance is confined to SBTN Step 3: Measure, Set, & Disclose of the five-step SBTN Framework. Step 4: Act and Step 5: Track will be addressed in later versions of SBTN's guidance.

3. 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.

4. This guidance document is written in technical language; the primary audience of this document should have the technical knowledge necessary to engage with this content.

Executive summary

Land use and land use change continues to be one of the most persistent threats to nature and climate. It undermines land's contributions to people, business, economies, and societies. Version 2 of SBTN's Step 3 Land technical guidance builds on and extends the scope of Version 1 released in mid-2024. This guidance will allow companies to set science-based targets for land and to align their commitments to nature with the necessary speed and scale of action as determined by science.

The targets set forth here are an evolution of existing methods, expanding their scope and usability (see the *About this Guidance* section for further details on updates in Version 2). This guidance is a further step in voluntary corporate accountability for impacts and dependencies on land, representing the SBTN collaborative partnership, which spans business, industry associations, academia, research institutes, intergovernmental organizations, non-governmental organizations, and the breadth of diverse views and perspectives represented by these groups.

The three Land targets work together to:

- avoid the loss of nature in land systems by addressing natural ecosystem conversion, the main driver of biodiversity loss on land;
- regenerate and restore large agricultural areas and other working lands whose expansion and ongoing impact has far exceeded the resilient capacity of the natural ecosystems on which these human systems rely; and critically to reduce impacts across key measures - loss of soil organic carbon, soil erosion and terrestrial acidification;
- cast company actions into landscape contexts that will improve the ecological and social conditions of the landscapes in which companies operate and/or from where they source.

The land targets are applicable to any company that determines it has material impacts on the main pressures to nature through land from its operations or supply chain. Within land systems, the targets operationalize and define a consistent path for companies that will align their commitments and actions with what nature needs:

- **Target 1: No Conversion of Natural Ecosystems** avoids one of the primary drivers of biodiversity loss and sources of greenhouse gas emissions.
- **Target 2: Working Land Regeneration and Restoration** helps companies reduce their land-related pressures and improve ecological integrity across landscapes. It consists of two target components: Land Area targets and Land Quality targets.
- **Target 3: Landscape Engagement** puts company action and effort within the context of collaborative stakeholder groups at the landscape scale to regenerate working lands, restore degraded or converted ecosystems, and transform the ways that they act in, and source from, landscapes.

Nature does not yet have a recognized and functional global assessment framework, such as the Greenhouse Gas Protocol. Assessing company impacts on land and determining quantifiable targets for land systems and biodiversity is a scientific pursuit that is relatively new and still dynamic. In this Version 2, the SBTN Land Hub seeks to leverage the latest science to provide spatially explicit, place-based thresholds and methods for what land may need to support nature.

In developing the current targets, the organizations that represent the SBTN Land Hub (World Wildlife Fund, Conservation International, World Resources Institute, The Nature Conservancy, and the Food and Land Use Coalition) have continued to balance the ambition of science-based targets for nature, the availability of science to support Land targets, and the feasibility of companies to comply with target requirements across all sectors.

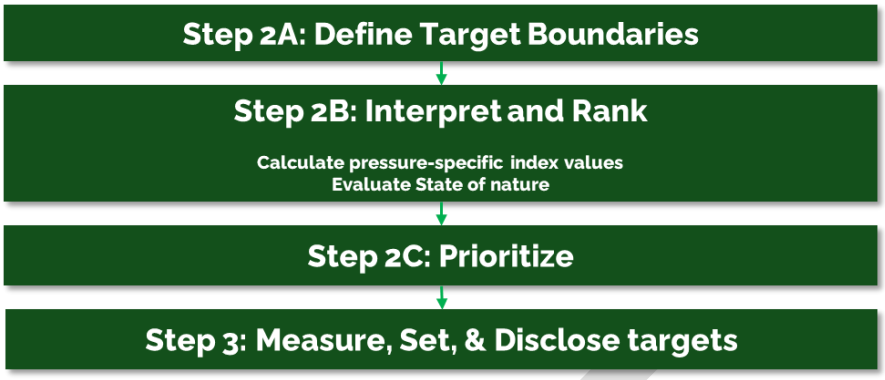
This has required a reliance on several ongoing corporate sustainability initiatives, including the long-standing work on deforestation and conversion-free commodities through the Accountability Framework Initiative as well as corporate commitments to emissions reductions under the Science Based Targets initiative for Climate, and the Greenhouse Gas Protocol, which help to anchor the SBTN Land targets in ongoing work within companies.

Land targets, as a voluntary corporate pursuit, may accelerate the ambition of these processes both by elevating nature to join the urgency of corporate climate objectives and uniting company actions across multiple landscapes, communities, and natural realms.

Setting land targets

In assessing their materiality to pressures on land, companies that identify terrestrial ecosystem use or change OR soil pollution as material during their SBTN Step 1 assessment must set Land targets. It is required that companies work on all targets for which they are responsible, simultaneously, though target dates may differ among or within the three targets.

Regardless of whether a company identifies one or both of terrestrial ecosystem use or change OR soil pollution, the Landscape Engagement target will apply. The company will need to follow the target guidance for how to engage and contribute to materially relevant landscape initiatives.



	1. No conversion of natural ecosystems	2. Working Land Regeneration & Restoration (land area and land quality)	3. Landscape Engagement
Applies to:	Conversion-driving and high land use emission companies	All large companies with material pressures on land	All companies with material pressures on land
Target Result	Conservation of natural land and ecosystems	Reduction in pressures and impacts on land from large companies	Engagement in materially relevant, co-operative landscape initiatives to improve ecological and social condition
Scope of Lands	Natural ecosystems	Working Lands (includes productive portion of production units and natural and semi-natural habitats retained)	Natural ecosystems and working lands

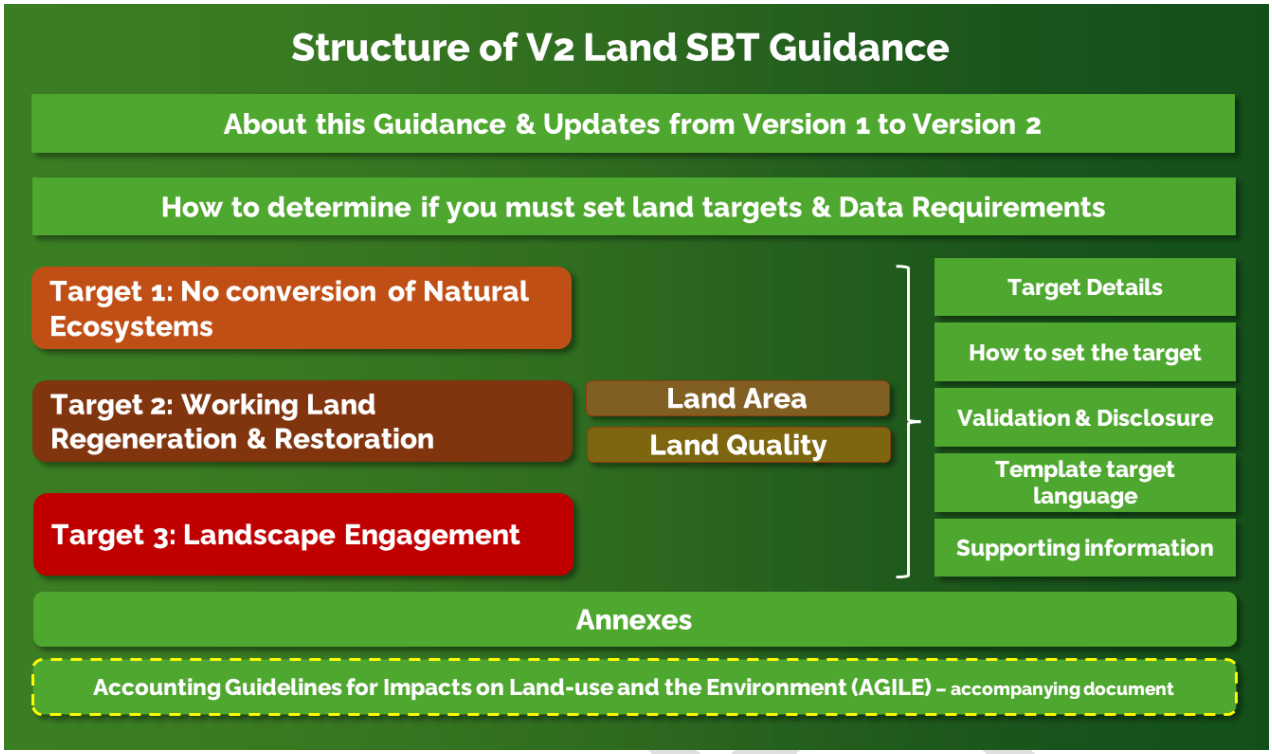
The Working Land Regeneration and Restoration target (Target 2) has been broadened beyond a land footprint reduction target for large agricultural companies. Version 2 now brings more industry sectors into scope and combines area-based targets to reduce land footprints and/or increase natural land cover, and land quality targets which will help companies build supply chain resilience due to impacts from the loss of soil organic carbon, soil erosion and acidification.

The No Conversion of Natural Ecosystems target (Target 1) affords companies the greatest degree of flexibility in setting this Land target due to its ability to differentiate the target requirements based on a commodity's value chain position and its geographic origin.

How to use this document

This guidance is structured to lead with the Land targets' conditions and data requirements. It focuses on the details that will be most relevant for companies looking to quickly understand the target requirements, data needs, and key exceptions. Readers should familiarize themselves with the detail and rationale around the targets and can find this necessary information and guidance in the target-specific annexes, associated technical documents, and supplementary materials listed throughout this guidance.

A key development in this updated Version 2 of the Land target-setting guidance is the ***Accounting Guidelines for Impacts on Land use and the Environment (AGILE)***, which should be read in parallel with this document. These guidelines provide corporate-level accounting methods for land-based impacts associated with companies' direct operations and value chain activities. They have been developed to assist companies in developing a robust and consistent approach to calculate their impacts on land associated with land use change and land management activities and will be a necessary reference during target setting.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Glossary of terms & acronyms

AFi

Accountability Framework initiative.

Agricultural land
Cropland and land under permanent meadows and pastures.

Allocation
Assignment of a given company's portion of effort toward issue/impact mitigation.

AR³T
SBTN's Action Framework is named AR³T because it covers actions to avoid future impacts, reduce current impacts, regenerate and restore ecosystems, and transform the systems in which companies are embedded.

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. An ecoregion baseline (See Annex 5a) is based off of the ecoregion level average value for each land quality category (from Target 2, Land Quality) using the most current available global datasets for each land quality category indicator variables.

Biodiversity
The variability among living organisms from all sources, including, inter alia, terrestrial, marine, and other aquatic ecosystems and the ecological complexes of which they are part; this includes diversity within species, between species, and of ecosystems. (Convention on Biological Diversity (CBD) 1992, Article 2)

CBD
Convention on Biological Diversity.

Characterization Factors
Characterization factors (CFs) are numerical factors that help translate companies' activities, including their operations, products, and services purchases, into different environmental impacts, by using the elementary flows (e.g., land use, water consumption, emissions into air, water and land) collected for the company inventory. CFs represent the unit impact for each impact category and differ by elementary flow. They are calculated through characterization models, which can differ in scope, complexity, impact pathways, data used, and unit of measurement.

Composition of an ecosystem
This 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 a 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.

Core natural lands
Places with acknowledged ecological importance that require immediate action to prevent conversion due to:

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

Cutoff dates
The cutoff 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.

Degradation
Changes within a natural ecosystem that significantly and negatively affect its species composition, structure, and/or function and reduce the ecosystem's capacity to supply products, support biodiversity, and/or deliver ecosystem services. Degradation may be considered conversion if it is large-scale and progressive or enduring; alters ecosystem composition, structure, and function to the extent that regeneration to a previous state is unlikely; or leads to a change in land use (e.g., to agriculture or other use that is not a natural forest or other natural ecosystem). (AFi)

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.

Downstream
This 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.

DPSIR Causal Framework
Describes causal relationships in social-ecological systems between driver (D), pressure (P), state (S), impact (I), and response (R) indicators.

Ecological/habitat connectivity
The degree to which the landscape facilitates the movement of organisms (animals, plant reproductive structures, pollen, pollinators, spores, etc.) and other environmentally important resources (e.g., nutrients and moisture) between similar habitats. Connectivity is hampered by fragmentation. (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), 2019)

Ecological Threshold
For the purposes of this guidance, an ecological threshold is considered the point in an ecosystem quality, property, phenomenon, or environmental driver where an often abrupt, and non-linear decline in the corresponding ecosystem state is detected. One type of an ecological threshold, known as a tipping point, may result where even small additional changes in a driver cause a sudden and disproportionately large response in the ecosystem state. When a tipping point has been passed it is possible that the ecosystem may undergo a self-perpetuating and irreversible shift known as a regime shift, whereby it is no longer able to return to its state by means of its inherent resilience (i.e., it cannot recover).

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 CBD suggests an ecosystem can refer to any functioning unit, regardless of scale. Thus, the term is not necessarily synonymous with "biome" or "ecological zone" and is better determined by the problem that is being addressed.

Ecosystem condition
The quality of an ecosystem measured by its abiotic and biotic characteristics. Condition is assessed by an ecosystem's composition, structure, and function, which, in turn, underpins the ecological integrity of the ecosystem and supports its capacity to supply ecosystem services on an ongoing basis. (UN System of Environmental Economic Accounting (SEEA), 2021—Ecosystem Accounting: Final Draft)

Ecosystem function
The flow of energy and materials through the biotic and abiotic components of an ecosystem. This includes many processes such as biomass production, trophic transfer through plants and animals, nutrient cycling, water dynamics, and heat transfer. (IPBES, 2019)

Ecosystem integrity
Ecosystem integrity encompasses the full complexity of an ecosystem, including the physical, biological, and functional components, together with their interactions, and is measured 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.

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

FLAG
The Forest, Land and Agriculture (FLAG) Guidance of the Science Based Targets initiative.

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%, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or other land use. (Food and Agriculture Organization (FAO))

Free, prior and informed consent
Free, prior, and informed consent (FPIC) is a specific right that pertains to Indigenous peoples and is recognized in the United Nations Declaration on the Rights of Indigenous Peoples. FPIC is a mechanism that safeguards the individual and collective rights of Indigenous and tribal peoples, including their land and resource rights and their right to self-determination. The minimum conditions that are required to secure consent include that it is "free" from all forms of coercion, undue influence, or pressure, that it is provided "prior" to a decision or action being taken that affects individual and collective human rights, and that it is offered on the basis that affected peoples are "informed" of their rights and the impacts of decisions or actions on those rights. FPIC is considered to be an ongoing process of negotiation, subject to an initial consent. To obtain FPIC, "consent" must be secured through an agreed process of good faith consultation and cooperation with Indigenous and tribal peoples through their own representative institutions. The process should be grounded in a recognition that the Indigenous or tribal peoples are customary landowners. FPIC is not only a question of process, but also of outcome, and is obtained when terms are fully respectful of land, resource, and other implicated rights. (FAO (2016): Free Prior and Informed Consent - An Indigenous Peoples' Right and a good practice for local communities)

GBF
Final Kunming–Montreal Global Biodiversity Framework.

GHGP
Greenhouse Gas Protocol.

Goal
In global (e.g., UN) sustainability framings, a high-level statement of ambition, including a time frame. Example: By 2030, ensure healthy lives and promote wellbeing for all at all ages (Sustainability Development Goal (SDG) 3).

High-impact commodities
Raw and value-added materials used in economic activities that are known to have material links to the key drivers of biodiversity loss, resource depletion, and ecosystem degradation. Activities associated with high-impact commodities include: extraction of these commodities (e.g., mining, farming), clearing of lands for extraction, processing of commodities (into refined or value-added forms), manufacturing commodities into complex products (with additional inputs), distribution of commodities, and the procurement of commodities (in their raw, value-added, or final form). For more information, please see SBTN Step 1 Guidance.

IFC
International Finance Corporation.

Impacts
These can be positive or negative contributions of a company or other actor toward the state of nature, including pollution of air, water, or soil; fragmentation or disruption of ecosystems and habitats for nonhuman species; and alteration of ecosystem processes.

Impacts on nature
A change in the state of nature, which may result in changes to the capacity of nature to provide value to business and society and/or instrumental, relational, and intrinsic value. (Taskforce on Nature-Related Financial Disclosures (TNFD))

Indicator
A measurable entity related to a specific information need, such as the state of nature, change in a pressure, progress toward a target, or association between two or more variables. Example: Red List Index (SDG Target 15.5; Aichi Target 12).

ISIC
International Standard Industrial Classification of All Economic Activities.

Land cover
The observed physical and biological cover of Earth's land.

Land Environmental Assessment Factors (LEAFs)
LEAFs are numerical factors that help translate companies' activities, including their operations, products and services purchases, into different environmental indicators and impacts, by using the elementary flows (e.g., land use, water consumption, emissions into air, water and land) collected for the company inventory. LEAFs represent the state a specific land quality indicator is, in the case of SOC or soil erosion, or the unit impact of a specific category, in this case terrestrial acidification, for each of the different relevant elementary flows. They are based on Lifecycle assessment characterization factors (CFs), which are calculated through characterization models, differing in scope, complexity, impact pathways, data used, and unit of measurement.

Land footprint/land occupation
A company's land footprint, known in life cycle assessment terms as "land occupation," is defined for the Land Footprint Reduction 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.[1] For crops, land occupation is also referred to as "harvested area" in the FAO's data portal FAOSTAT.
Importantly, "land footprint" or "land occupation" for the purpose of target-setting related to Land science-based targets 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.

Land footprint intensity/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. The unit of product in the denominator of this calculation can vary (e.g., weight, kilocalories, protein).

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 in 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: Prioritize 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 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
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 the 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.

[1] Greenhouse Gas Protocol Land Sector and Removals Guidance, forthcoming.

Materiality
Significance of an entity's environmental impact.

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

Monitoring
Tracking progress toward targets.

Natural ecosystem[2]
An 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. This includes human-managed ecosystems where much of the natural species' composition, structure, and ecological function are 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.

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
The diversity of living organisms, including people, and their interactions with each other and their environment. This perspective emphasizes the deep connection between ecological and human well-being.

Nature's contributions to people (NCPs—also known as "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 (e.g., 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 are: 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) that is greater than the current state.

Pressures
A human activity that directly or indirectly degrades nature. According to 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."

[2]https://accountability-framework.org/the-framework/contents/definitions/

Primary data
Data collected specifically for the assessment being undertaken. Generally, primary data will be collected from site-level measurement on a specific issue area through the use of direct measurement (e.g., volume of freshwater used for irrigation each month).

Production unit
A plantation, farm, ranch, or forest management unit, or production site. This includes all plots used for agriculture or forestry that are under one management, located in the same general area, and share the same means of production. It also includes natural ecosystems, infrastructure, and other land within or associated with the plantation, farm, ranch, or forest management unit. (Adapted from AFi)

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

Regenerate[3]
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, food production, and increased nitrogen and phosphorus retention in regenerative agriculture). (Adapted from FOLU, 2019[4])

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

Restore[5]
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 the Society of Ecological Restoration[6])

SBTi
Science Based Targets initiative.

SBTN
Science Based Targets Network.

Science-based targets
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.

Secondary data
Data that was originally collected and published for another purpose or a different assessment, e.g., derived from modelled or proxy-level data.

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.

Stakeholder engagement
Stakeholder engagement involves interactive processes of engagement with relevant stakeholders through, for example, meetings, hearings, or consultation proceedings. Effective stakeholder engagement is characterized by two-way communication and depends on the good faith of the participants on both sides. (TNFD)

[3] https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/09/SBTN-initial-guidance-for-business.pdf
[4] https://www.foodandlandusecoalition.org/wp-content/uploads/2019/09/Regenerative-Agriculture-final.pdf
[5] https://sciencebasedtargetsnetwork.org/wp-content/uploads/2020/09/SBTN-initial-guidance-for-business.pdf
[6] https://cdn.ymaws.com/www.ser.org/resource/resmgr/docs/standards_2nd_ed_summary.pdf

Stakeholders
Stakeholders are persons or groups who are directly or indirectly affected by a project, as well as those who may have interests in a project and/or the ability to influence its outcome, either positively or negatively. (TNFD)

State of nature indicators
State of nature indicators describe the general conditions of nature in physical, chemical, or biological terms. These change in response to pressures. Throughout the target-setting methodology, SBTN utilizes the DPSIR causal framework. Important state indicators in the SBTN methods include water availability, terrestrial ecosystem intactness, net primary productivity, soil organic carbon content, water quality, and ecosystem extent or connectivity.[7]

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
This 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 boundary
The corporate scope of the target, specific to each issue area. The target boundary may be defined in terms of the value chain aspect covered, as well as the specific locations, products, brands, etc., that will be in focus in a given time period.

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

Threatened ecosystems
Ecosystems that are classified as threatened by International Union for Conservation of Nature (IUCN) Red List of Ecosystems. This includes "Vulnerable," "Endangered," and "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.

Threshold
Level of an environmental indicator representing attainment of the desired state of nature.

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 behaviors. (Adapted from the Intergovernmental Panel on Climate Change (IPCC) and IPBES 2019[8])

Upstream
This covers all activities associated with suppliers, e.g., production or cultivation, sourcing of commodities of goods, and 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
Production of "economic value" along a series of activities, sites, and entities. The value chain can be divided into three "segments": upstream, direct operations, and downstream. Each of these segments involves places where economic activities managed or relied on by the company occur. Most value chain frameworks cover a suite of

[7] Terminology notes: While SBTN uses the term "state" in alignment with the DPSIR framework, other initiatives, such as TNFD and the Capitals Coalition, use the term "changes in natural capital" to describe these same factors within the causal chain of environmental change.
[8] https://ipbes.net/sites/default/files/Initial_scoping_transformative_change_assessment_EN.pdf

activities 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.

Verification
An independent third-party confirmation of either or both of: (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 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
Human-modified lands, which can include farms, forests, rangelands, and infrastructure, that are managed to provide goods and services.

WWF
World Wildlife Fund, or World Wide Fund for Nature.

Yield
This 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 the amount produced divided by the harvested area. For livestock products, it refers to the 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).

For further definitions, please see the SBTN Glossary: https://sciencebasedtargetsnetwork.org/resources/faqs

About this guidance

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

This guidance document (Version 2) represents the contribution of the individuals and representative organizations focused on **land systems** within SBTN (hereafter referred to as "SBTN Land").[9] The document forms part of SBTN's ongoing development of a suite of comprehensive science-based targets for nature that are raising the bar of corporate ambition on nature in line with scientific evidence on what nature needs.

This document covers:

- Specific updates to Version 1 and a Version 2 of Science Based Targets for Land
- Introduction and why the world needs Land targets
- Target approach and alignment with existing initiatives
- The process for setting Land targets
- Guidance on each Land target.

Updates from Version 1 to Version 2 Land Methods

SBTN released Version 1 (V1) of the Land SBTs in July 2024 after extensive development and consultation. V1 target setting methods were the first land based SBTs for companies and were based on the science and data that was then available. In October 2024, SBTN saw the first companies publish validated targets (including Land) and has continued to work with companies across sectors and geographies to set SBTs for Nature. Further validated targets are expected to be publicly disclosed throughout 2025.

Over the last several years, SBTN Land has simultaneously been working on a comprehensive target setting methodology – Version 2 (V2) - that builds on the core intent of V1 but utilizes novel developments in land science to enable more effective target setting that responds to what nature needs at a local level while also covering a broader range of material land indicators.

A key part of defining science-based targets is understanding land system thresholds, which was not yet possible in Version 1 as the science had not yet been developed. The concept is similar to aligning climate targets with 1.5°C, which is the safer upper limit of climate change, beyond which we predict increasingly catastrophic impacts on nature and people. However, unlike climate targets, SBTN Land targets must be place-based, spatially explicit, and relevant to the landscapes where companies operate or from where they source conversion-driving commodities. This requires an understanding of spatially explicit thresholds to define what nature needs in a given location, both in terms of avoiding further ecosystem degradation and loss, as well as the regenerative and restorative actions which would provided the necessary support to maintain stable and properly functioning ecosystems, especially if a threshold has been exceeded.

To define what nature needs at a place-based level, SBTN Land targets now include terrestrial ecoregion thresholds that quantify a specific set of ecological limits in response to human modification and use of terrestrial land systems. This effort was led by the Land Hub, primarily in collaboration with scientific experts from the Crowther Lab at ETH Zürich and the Complutense University of Madrid, to quantify spatially explicit (i.e., place-based and locally relevant) thresholds for a set of four key land system indicators. These land system indicators were selected based on a thorough evaluation of the ecosystem attributes that represent terrestrial ecosystem health, and conversely, degradation. They are thus useful for measuring extent of pressure and degradation at the ecoregion level and were selected based on an extensive literature review, and based on their prevalence in major conventions of global importance, including the UN Convention to Combat Desertification: Land Degradation Neutrality (UNCCD LDN), the UN Convention on Biological Diversity's Global Biodiversity Framework and the Intergovernmental Science Policy Platform on Biodiversity and Ecosystem Services (IPBES) 2019 special report. Please refer to Annexes 3 and 5 for further details on this work and how it is integrated into Version 2.

At the same time, the Land Hub derived Land Environmental Assessment Factors (LEAFs) to help assess the effect of corporate activities in terrestrial land systems. LEAFs are derived from traditional Lifecycle Assessment Characterization Factors (LCA CFs) and impact assessment methods but have been adapted here to be directly comparable to ecoregion thresholds (see Annex 4 for further information). Underlying methods were selected with the help of LCA experts from the Norwegian University of Science and Technology (NTNU), reflecting the latest available science applicable to corporate sustainability footprinting and target-setting. A detailed explanation of each can be found in Chapter 6 of the Accounting Guidelines for Impacts on Land-use and the Environment (AGILE).

[9] 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), and the Food and Land Use Coalition (FOLU) through Systemiq.

What's changed in Version 2?

V2 retains three headline targets and all of the same foundational objectives and methods. Target 2, ***Working Land Regeneration & Restoration*** (solely Land Footprint Reduction in V1) contains the most modifications and expands its scope to include natural land cover and land quality targets based on ecoregional thresholds. Target 1 (No Conversion of Natural Ecosystems) and Target 3 (Landscape Engagement) have minor proposed updates. Another significant update is the publication of an accompanying **Accounting Guidelines for Impacts on Land-use and the Environment (AGILE)** which provides the first detailed guidelines and methods for corporates to calculate their baselines and footprints for setting SBTs for Land.

We have summarized the material changes across the three land targets in the table below.

Table 1: Summary of material changes between Version 1 and 2 of Land SBT methods

Version 1 targets (released July 2024)	**Version 2 targets** (under development)	**Summary of material updates**
Target 1 No Conversion of Natural Ecosystems	**Target 1** No Conversion of Natural Ecosystems Minor updates from V1	• The core target objective and methods remain unchanged from Version 1 • The most notable updates have been made to the guidance and expectations for corporates **setting target dates to achieve** no **conversion and deforestation** across the value chain. Companies that cannot meet a deadline of no conversion by 2025 may now identify and commit to a later target date within a defined window. • Preliminary guidance is also provided on recommendations for reporting and disclosure on progress to meet no conversion target dates. • Recommended remediation requirement
Target 2 Land Footprint Reduction	**Target 2** Working Land Regeneration & Restoration Significant updates from V1	• Target 2 has been significantly modified with added flexibility and coverage and now consists of a **Land Area** targets and **Land Quality** targets. • As part of the Land Area target, large, agricultural companies can set a **Land Footprint Reduction** target or **a Natural Land Cover** target, or both. All other companies must set a Natural Landcover Target. • For **Land Quality targets**, companies will prioritize a **Soil Organic Carbon, Soil Erosion, or Terrestrial Acidification** target or can choose to set targets across all three land quality impacts. • New guidance is provided to utilize data **on ecological thresholds and Land Environmental Assessment Factors (LEAFs)** and updated response options for upstream companies, including expanded guidance on the intersection with landscape engagement under target 3.
Target 3 Landscape Engagement	**Target 3** Landscape Engagement Minor updates from V1	• The core target objective and methods remain unchanged from Version 1 • Minor updates made to include a recommendation to include information provided by **ecological thresholds** as part of consideration criteria for landscape and initiative selection. Other minor updates to language to reflect updates since v1.
This technical guidance should be read in conjunction with the new ***Accounting Guidelines for Impacts on Land-use and the Environment*** **(AGILE),** which provides detailed guidelines on calculating baselines and footprints.		

Companies that have set or are in the process of setting Land targets with v1 methods

It is important to note that Version 1 (July 2024) remains the only published target setting methods available for setting Land SBTs. This document represents a consultative Version 2 of SBTN Land methods and will be used to test and improve the methods and to provide insights to stakeholders on the ongoing development and publication of the next version of Land SBTs.

Version 2 retains all the core elements of Version 1 target setting methods and any company that has set or is in the process of setting an SBT for Land using V1 methods will not be disadvantaged or penalized when Version 2 methods are released. SBTN does not yet have a publication date for Version 2 methods, but it will provide clear updates and timelines to the public regarding the official launch of any versions of Land target-setting methods.

In the meantime, we encourage corporates to use V1 Land methods to set Land SBTs in a 'no regrets' context and any work undertaken to set targets under V1 will remain relevant and advantageous if a company chooses to utilize V2 methods at a later date.

By definition, science-based targets for nature are ambitious, focusing on place-based action where nature needs it most. SBTN and partners are working tirelessly to scale adoption and impact, whilst also continuing to balance ambition and feasibility. Version 2 Land targets are just one component of SBTN's work to continually improve methods–with further freshwater targets, ocean targets, and additional biodiversity integration, implementation and tracking guidance expected through 2025 and 2026.

As many of the challenges are system-wide, SBTN continues to collaborate actively with partners, NGOs, academics, corporates, governments and on-the-ground stakeholders and communities to identify and develop solutions to close gaps, for instance around upstream traceability and placed-based and local models. SBTN continuously strives to respond and adapt to improve feasibility and practicality while maintaining scientific rigor and ambition.

1

2

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. [10, 11] At the same time, our society is witnessing what scientists describe as "the sixth mass extinction since the beginning of life on Earth," [12] 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 two thirds of global animal populations, including mammals, birds, fish, amphibians, and reptiles. [13L] These crises do not confine themselves to climate and environmental science and will have increasingly dramatic and devastating impacts on people, agriculture, economies, and the resilience of corporate operations and value chains.

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. [14] Land use change and direct exploitation of resources on land are the main causes of human-induced loss of nature in all terrestrial regions globally. These pressures are precursors to each of the remaining drivers, including climate change, invasive alien species, and pollution. [15]
- **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 driver of biodiversity loss with rising temperatures resulting in species and ecosystem redistributions and extinctions.
- **Solutions:** Avoiding the conversion of natural ecosystems and changing the way working lands are used, while protecting and restoring nature, can halt and reverse these damaging processes while delivering multiple wins for business, agriculture, climate mitigation, adaptation, biodiversity, and people. [16]

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

i. Introducing Land targets

The aim of SBTN is to develop a methodology for science-based targets 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. Science-based targets for nature—which currently cover land, freshwater and ocean [17] systems and key components of their biodiversity—are an important step toward achieving this goal.

This document focuses on explaining the methodology to set science-based targets for land. Throughout this document, the terms "Land science-based targets" and "Land targets" are also used to refer to the methodology.

Version 2 of the methodology for Land science-based targets comprises three distinct targets, which are shown in Table 2. 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 and impacts of the company (see section ii, "Data requirements to set Land targets"). Final validation of Land targets requires that companies must set all Land targets that are identified as material in Step 1. Companies may not omit a Land target from their commitment to SBTN if it is identified as material.

Table 2: Science-based targets for Land V2

Science-Based Targets for Land*	
Target 1	No Conversion of Natural Ecosystems
Target 2	Working Land Regeneration and Restoration (Land Area and Land Quality)
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 greenhouse gas (GHG) emissions following the SBTi FLAG methodology requirements (note: for companies required to set climate targets as per FLAG's guidance).

[10] Olhoff, A., & Christensen, J. M. (2020). Emissions gap report 2020.
[11] IPCC, 2018: Global Warming of 1. 5°C.An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. In Press.
[12] Ceballos, G., P. Ehrlich, and R. Dirzo. (2017). Population losses and the sixth mass extinction. Proceedings of the National Academy of Sciences, 114(30), E6089-E6096; DOI:10.1073/pnas.1704949114
[13] WWF (2020) Living Planet Report 2020 - Bending the curve of biodiversity loss. Almond, R.E.A., Grooten M. and Petersen, T. (Eds). WWF, Gland, Switzerland.
[14] 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
[15] Jaureguiberry, P. et al. (2022). The direct drivers of recent global anthropogenic biodiversity loss. Science Advances, 8(45), eabm9982.
[16] Vijay, V., J. R. Fisher, & P. R. Armsworth. (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.
[17] SBTN launched the first version of the ocean targets, focused on the seafood value chain, addressing impacts from both wild capture fishing and aquaculture in March 2025 Ocean targets – Science Based Targets Network

The Land targets are designed to work together to incentivize the most important actions needed to achieve nature goals in land systems: halting conversion of natural ecosystems (Target 1), regenerating and restoring working lands and the natural lands that support them (Target 2), and improving the ecological and social condition of landscapes to enhance ecosystem structure, composition, and function and the social systems that depend on such landscapes (Target 3). As such, this methodology lays out not only how to set targets (what parts of the business to manage, what metrics to use, and what changes need to be seen over what time periods) but also provides companies with prescriptive guidance at a high level on *how* to contribute toward enhancement and protection of land and terrestrial biodiversity.

In particular, the Landscape Engagement target (Target 3) works to ensure that companies appropriately balance the need to use land more efficiently while reducing impacts from unsustainable forms of land use intensification (e.g., overuse of fertilizers and chemical inputs, irrigation practices that deplete freshwater resources) and building resilience through the restoration of ecosystems and within working lands. It also provides a vehicle to guide the implementation of the other two Land targets through landscape-level engagement.

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

- Maximum coverage of pressures that are responsible for most companies' impacts on land.
- Availability of quantifiable and measurable metrics that can be feasibly impacted by company activities to make progress against the target.
- Alignment with active and relevant corporate sustainability standards and initiatives.
- Ability to incentivize action across SBTN's AR³T mitigation hierarchy.

The targets are built with the information and data that are currently available. They allow companies to set targets today that will enable 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 yet led to the transformational changes required to address climate change and nature loss at a global scale.

These targets complement climate science-based targets by addressing many of the impacts that climate targets cannot, incentivizing actions related to wider, non-GHG impacts on land. The broader set of actions these methods incentivize include the reduction and treatment of pollution and effluents, erosion control, and other actions that promote biodiversity and ecosystem integrity that may not be captured by corporate actions that prioritize carbon sequestration.

Critically, these methods expand the focus beyond forests to include all natural, terrestrial 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 many goods used by companies and consumers.

Moreover, while firmly rooted in directing companies to assess, avoid, or mitigate their impacts on nature, Land targets will go further by incentivizing companies to deliver on regenerative, restorative, and transformative actions in collaboration with multiple stakeholders within their operations and at the landscape scale—including actions that underpin broader issues of sustainable development and are in line with a nature-positive future.

Box 1: SBTN biodiversity target-setting methods.

The Land Targets broadly cover the impacts that companies have on terrestrial ecosystems and biodiversity. By addressing commodity driven conversion of natural ecosystems, which is the most acute and chronic driver of terrestrial ecosystems conversion and degradation. Additionally, by incentivizing the regeneration and restoration of working lands to reduce and revert the land management impacts that cover the main drivers of terrestrial biodiversity loss. Alternatively: The three Land targets cover a wide range of impacts that companies have on terrestrial ecosystems and biodiversity, addressing the two biggest drivers of terrestrial biodiversity loss: land conversion and land management. Target 1 tackles directly commodity-driven conversion of natural ecosystems, while Targets 2 and 3 mandate the regeneration and restoration of working lands and natural landscapes, addressing and reverting major land management impacts, and incentivize ecosystems restoration through more holistic interventions.

ii. How to determine if your company must set Land targets

Setting Land targets is part of the five-step process for setting science-based targets for nature. Before using the Step 3 Land methods, companies *must* complete Step 1: Assess and Step 2: Interpret & Prioritize.[1] These steps of the SBTN target-setting process enable companies to determine which pressures on nature they must address with targets, and which parts and locations of their business may represent the highest priority starting point.

Companies will be required to commit to the three Land targets depending on their material pressures on terrestrial ecosystem use and change or soil pollution as determined by using the Step 1 guidance from SBTN.

Table 3: Pressure categories covered by science-based targets for nature, from SBTN Step 1 Pressures in bold and marked with a * are those covered in the science-based targets for land methods. Companies that have material contributions to these, as identified in Step 1, will be required to set and validate targets to make claims about science-based targets for land. IPBES stands for the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services.

IPBES Pressure Category	SBTN Pressure Category
Ecosystem use or change	**Terrestrial ecosystem use or change***
	Freshwater ecosystem use or change
	Marine ecosystem use or 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*

Companies that meet the materiality thresholds for land pressures in SBTN Step 1: Assess can understand which Land targets are required, recommended, not required, or not applicable based on their ISIC sector(s). For cross-referencing the major sector classification systems, please refer to the crosswalk sector classification guidance in the supplementary material.

To have Land targets validated, companies will need to meet the requirements under each of the targets for which they are responsible. Companies that are unable to meet these requirements will not be able to validate or make claims on science-based targets for land.

The sector requirements in this document (Figures 1, 2 and 3) refer to the materiality screening results from Step 1. In these figures, targets are highlighted as required if this is the case for either the company's direct operations or upstream activities. Using these figures, companies can determine, based on their sector, which Land targets they are required to set. However, that determination *must* be made consistent with Steps 1 and 2, aligned with the information introduced in Step 1b and reflecting the target boundary and prioritization determined in Step 2. In their target boundary, companies must include any activities within their organizational scope (upstream and direct operations) that came out as material for terrestrial ecosystem use or change and/or soil pollution in Step 1a (materiality screening). This includes all land holdings, and all raw material included in the Step 1 high-impact commodity list and Annex 1 conversion-driving commodity list of this document. In Step 2, all these activities, qualified as material in Step 1a, will be defined as the target boundaries for terrestrial ecosystem use or change. Please keep in mind that for Target 1—No Conversion of Natural Ecosystems—the entire target boundary for terrestrial ecosystem use or change must be included. The company-specific impacts relative to each pressure category within the current scope of science-based targets for nature must be reflected in the extent of their requirements for setting and validating targets.

Please note that because the tools used for the Step 1a materiality screening are based on global sectoral performance, some companies may find that they have lower contributions to pressures than would require them to set science-based targets for land. In these cases, companies will be required to submit a rationale to SBTN to justify the exclusion of activities from the scope of their targets. In other situations, the materiality screening tool (MST) does not entirely highlight upstream materiality where it obviously exists. In these cases, the flow charts below supplement the MST assessment to identify target requirements even where the MST may indicate that a sector does not have materiality to terrestrial ecosystem use or change.

Mandatory alignment with climate targets

Climate and nature goals must be achieved holistically. As a result, SBTN *requires* companies that must set Land targets to complement those targets with a target on land-based GHG emissions and removals following the SBTi forest, land, and agriculture (FLAG) methodology requirements (see SBTi FLAG). Therefore, a company that wants to set Land targets must also be committed to emissions reductions through SBTi should they qualify based on SBTi guidance (see Box 2).

Correspondingly, companies required by SBTi to set FLAG climate targets are *required* by SBTN to set all three SBTN Land targets.

Box 2: SBTi requirements for setting a FLAG target

SBTi requirements for setting a FLAG target. Companies that meet these requirements must also set land targets under SBTN:

Companies from the following SBTi-designated sectors:

a. Forest and paper products (forestry, timber, and paper)
b. Food production (agricultural production)
c. Food production (animal source)
d. Food and beverage processing
e. Food and staples retailing
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).

a. How to determine if your company must set Target 1: No Conversion of Natural Ecosystems

The No Conversion of Natural Ecosystems target is **consistent with existing zero deforestation commitments set within the soft commodity supply chains** of companies and consistent with the Accountability Framework initiative (AFi) guidance.

There are two criteria that companies should assess to understand if they are *required* to set this target:

1. Terrestrial ecosystem use or change is material according to Step 1's materiality screening; OR
2. 20% or more of their GHG emissions come from a sector that has land sector activities (e.g., agriculture, forestry, and other land use (AFOLU) emissions).

Additionally, for specific sectors including metals, infrastructure, construction, and extractives (MICE) (see Figure 1 for full list), the No Conversion target is required but applies only to "critical habitat" or "high conservation value" areas (as per the International Financial Corporation Performance Standard 6 (IFC PS6), see Box 3) OR "key biodiversity areas" and "protected areas," as defined in the Integrated Biodiversity Assessment Tool (IBAT), with additional no conversion requirements for areas identified as "likely" critical habitat by UNEP-WCMC (2017) Global Critical Habitat screening layer (Version 1.0)[18].

Starting from the MST provided for Step 1, the decision tree below is a non-exhaustive sector guide for companies in understanding their target-setting requirements as they relate to No Conversion of Natural Ecosystems.

[18] See Cambridge (UK): UN Environment World Conservation Monitoring Centre. DOI: https://doi.org/10.34892/nc6d-0z73.

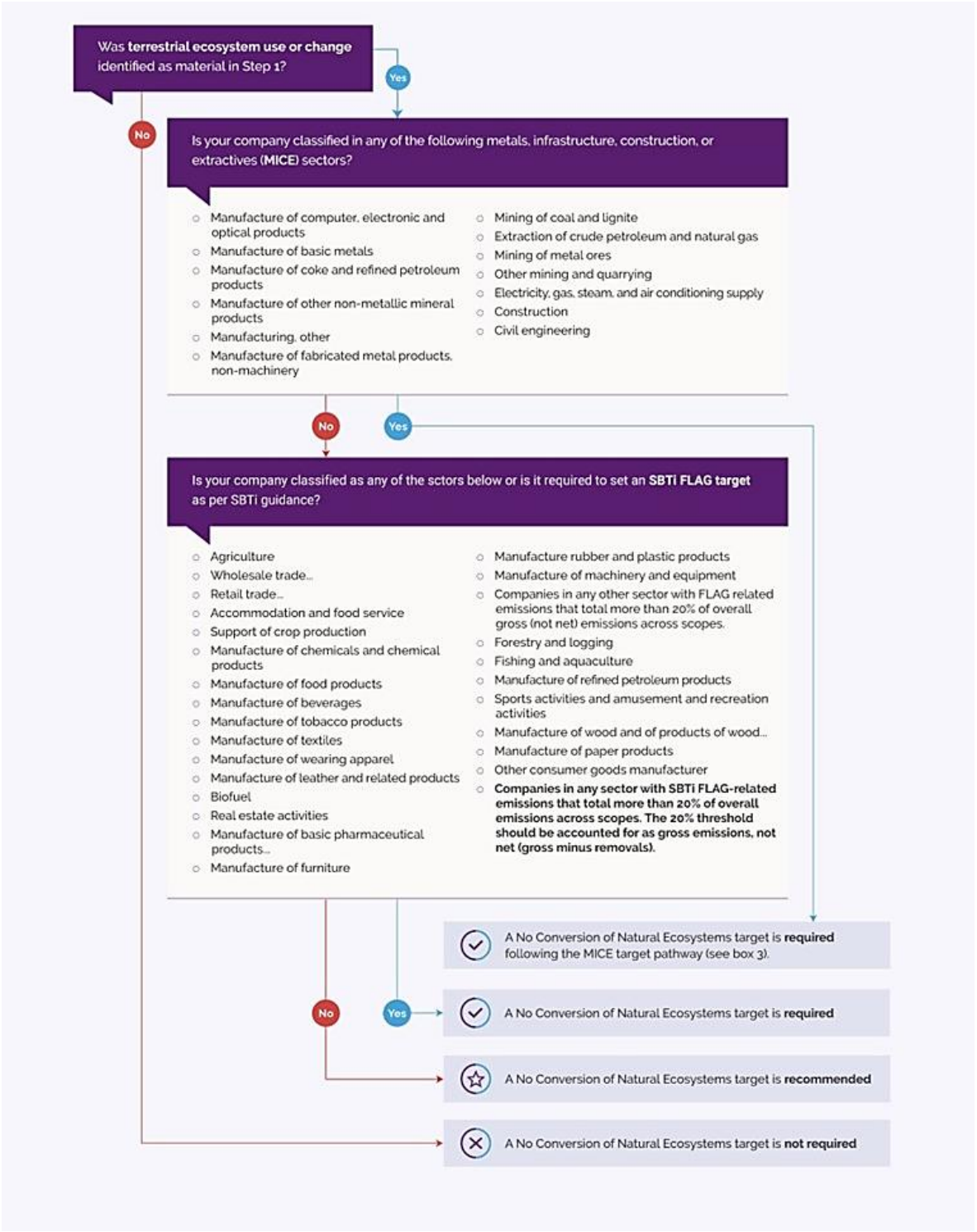

Figure 1: No Conversion of Natural Ecosystems target-setting requirement decision tree.

Sectors that must set a No Conversion target but who belong to the list of MICE sectors (see Figure 1) must commit to no conversion of areas identified through the International Financial Corporation (IFC) Performance Standard 6 (PS6) environmental assessment process as "critical habitat" or "high conservation value" areas. Alternatively, if companies representing these sectors cannot feasibly comply with the IFC PS6 pathway they may identify areas for no conversion using "Key Biodiversity Areas" and "protected areas" (available for use as part of the Integrated Biodiversity Assessment Tool (IBAT) **and** areas identified as "likely" critical habitat through UNEP-WCMC's Global Critical Habitat screening layer.

The IFC PS6 on Biodiversity Conservation and Sustainable Management of Living Natural Resources is a familiar industry standard regarding the conversion of natural ecosystems. This standard 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 the IFC's performance standards as their operations may not be contractually tied to IFC financing, this standard still provides a useful outcome for how companies that cannot avoid land conversion can avoid or minimize their impacts on natural ecosystems.

It is also likely that companies that have performed a strategic environmental assessment ahead of considering Land targets will be better placed to significantly avoid and reduce impacts on natural ecosystems. These Land targets internalize the outcomes of the IFC PS6 guidance with a notable exception on biodiversity offsets, which are not permitted. **A key requirement under SBTN is that biodiversity offsets will not be accepted as compliant with a science-based target after the target dates required** (see Table 5). This applies to all sectors. However, remediation for past conversion between the cutoff date and target validation is recommended. This differs from offsetting, as the intent is not to convert natural ecosystems and offset impacts elsewhere, but to remedy past conversion of natural land.

Companies seeking to utilize IFC's PS6 to comply with the SBTN No Conversion of Natural Ecosystems target must use PS6, and its guidance note (GN6) as implementation guidance. This applies regardless of whether PS6 requirements are officially triggered by PS1 requirements under the IFC process. Companies must complete all relevant environmental and social management system activities included in the IFC PS6 guidance, including a strategic environmental assessment and declarations on compliance with PS6 criteria, and submit their initial and ongoing results to SBTN for validation.

As PS6 is an ongoing process, this documentation will vary based on the stage of company actions (e.g., before impacts occur, for ongoing sites, following activities). This includes demonstrating, where applicable within the target boundary, that no viable alternatives to the conversion of natural land exist. Where IFC PS6 guidance conflicts with SBTN guidance (e.g., supply chain), priority will be given to SBTN guidance. SBTN will develop a standardized reporting template that can be supported by full documentation necessary to demonstrate compliance with the No Conversion of Natural Ecosystems target for the affected sectors.

Box 3: No Conversion of Natural Ecosystems target pathway for metals, infrastructure, construction, extractives (MICE), and other associated sectors.

b. How to determine if your company must set Target 2: Working Land Regeneration and Restoration

A company is *required* to set a Working Land Regeneration and Restoration target if:

- **Terrestrial ecosystem use** or change OR **soil pollution** are material according to Step 1a materiality screening.

c. How to determine if your company must set Target 3: Landscape Engagement

A company is *required* to set a Landscape Engagement target if:

- **Terrestrial ecosystem use** or change OR **soil pollution** are material according to Step 1a materiality screening.

For those companies that **are not required** to set a Landscape Engagement target, SBTN still recommends that these companies set such a target. Engaging in landscape initiatives will be a positive contribution to the transformation needed in our economic systems and the way these interact with the people and places where they operate and can generate benefits for the company.

For prioritization of locations and the selection of landscapes, which is required for setting Target 3 on Landscape Engagement, please see Step 2C and section 3.2.1.

iii. AGILE and data requirements to set Land targets

The SBTN **Land Accounting Guidelines for Impacts on Land-use and the Environment (AGILE)** provide corporate-level accounting methods for land-based impacts associated with companies' direct operations and value chain activities. They provide a robust and consistent approach to calculate corporate impacts on land associated with land use change and land management activities.

These guidelines provide a methodology that enables companies to understand and measure important components of their land impacts. Within the context of SBTN Land targets, they support the development of baselines and measurement of footprints for each target and incentivize action at the scale and speed as determined by science to protect, manage, and restore terrestrial ecosystems.

Specifically, these guidelines provide methods for companies to measure the following categories:

- Land use change
- Land footprint
- Natural land cover
- Soil organic carbon
- Soil erosion
- Terrestrial acidification
- Landscape engagement

The Accounting Guidelines are integral to this target setting guidance as they provide the detailed methodology and associated data requirements for each target.

Table 4: Version 2.0 Science Based Targets for Land, specific data requirements for target setting

Target		Requirement	Stage of the value chain relevant to requirement	Data Type	Unit	Spatial data requirements (Georeferenced polygons of production units or sourcing areas)
NO CONVERSION OF NATURAL ECOSYSTEMS		Required	Producers and site owners/operators	Location of all sites where conversion-driving commodities are produced	Hectares	Required
			Producers and site owners/operators	Areas converted after cutoff date	Hectares	Required
			Sourcing from producers or first point of aggregation	Sourcing area and volumes of conversion-driving commodities purchased	Hectares and metric tons or equivalent from each area	Recommended
			Sourcing downstream from first point of aggregation	Sourcing area and volumes of conversion-driving commodities purchased	Hectares and metric tons or equivalent from each area	Recommended
		Recommended	Sourcing from producers or first point of aggregation	Production unit	Hectares	Recommended
WORKING LAND REGENERATION & RESTORATION	**LAND AREA** • Land Footprint Reduction • Natural Land Cover	Required	Producers and site owners / operators	Volumes of agricultural commodities produced by production location (primary or statistical data)	Metric tons	Recommended
			Producers and site owners / operators	Data on operational sites where commodities are produced (spatial or statistical)	Hectares	Recommended
			Producers and site owners / operators	Location of all production units	Hectares	Required
			Sourcing from producers or first point of aggregation	Volumes of agricultural commodities purchased (primary or statistical data, differentiated to the extent possible by sourcing location)	Metric tons	Not required
			Sourcing from producers or first point of aggregation	Yield of each product purchased (statistical data, matched to the extent possible with the sourcing locations linked to the purchasing volume data above (e.g., national or subnational yield data)	Metric tons per hectare per year	Not required
			Sourcing downstream from first point of aggregation	Volumes of agricultural commodities purchased (primary or statistical data, differentiated to the extent possible by sourcing location)	Metric tons	Not required
			Sourcing downstream from first point of aggregation	Yield of each product purchased (statistical data, matched to the extent possible with the sourcing locations linked to the purchasing volume data above (e.g., national or subnational yield data)	Metric tons per hectare per year	Not required
	LAND QUALITY • Soil Organic Carbon • Soil Erosion • Terrestrial Acidification		Producers and site owners/operators	Location of all production units	Hectares	Recommended
			Producers and site owners/operators	Identified land use types within each production unit	N/A	N/A
			Producers and site owners/operators	Time period of land use per land use type	Years	N/A
			Producers and site owners/operators	Sources of ammonia, nitrogen oxides and sulfur dioxide emissions	kg	N/A
LANDSCAPE ENGAGEMENT		Required	Producers and site owners/operators	Location of all operational sites (at ecosystem level) prioritized in Step 2	Hectares	Required
			Sourcing from producers or first point of aggregation	Sourcing area and volumes of high-impact commodities purchased and volumes of high-impact commodities	Hectares and metric tons or equivalent from each area	Recommended
			Sourcing downstream from first point of aggregation	Sourcing area of high-impact commodities purchased	Hectares	Not required
			Sourcing downstream from first point of aggregation	Volumes of high-impact commodities	Metric tons (or equivalent)	Not required
		Recommended	Sourcing downstream from first point of aggregation	Production unit or sourcing areas of high-impact commodities purchased	Hectares	Recommended

Target 1:
No Conversion of Natural Ecosystems

Target 1

To set and validate science-based targets for land, companies in sectors with material land pressures on terrestrial ecosystem use or change are required to commit to No Conversion of Natural Ecosystems.

Target date requirements and recommendations for achieving conversion-free operations and supply chains have been updated for 2025 and are differentiated according to the level(s) at which a company operates along supply chains, the type of commodities sourced, and the origins of those commodities.

This chapter of the SBTN Land Guidance sets out:

- The details of the No Conversion of Natural Ecosystems target.
- How companies will set the target.
- How companies will account for and communicate about conversion. Technical annexes and supplementary material articulating the scientific bases of the target and other supporting materials.

1.1. What is a No Conversion of Natural Ecosystems target?

The intention of the No Conversion of Natural Ecosystems target is to avoid the wholesale change of a natural ecosystem to another land use or a profound change in a natural ecosystem's species composition, structure, or function.

For this method, conversion includes both severe degradation or the introduction of management practices either of which result in substantial and sustained change in the ecosystem's former composition, structure, or function or that of the species that inhabit it. Changes to natural ecosystems that meet these criteria are considered conversion within the scope of these methods regardless of whether the conversion itself is legal.

Companies in certain sectors, with material land pressures on terrestrial ecosystem use or change, will commit to No Conversion of Natural Ecosystems using a cut-off date and before a target date (see Box 4).

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). Where other cutoff dates earlier than 2020 exist, companies should use those earlier dates. Companies that have already set a cutoff date earlier than 2020 must use that earlier date or provide justification to SBTN for changing it.

Box 4: 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.[19]

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

Target dates for deforestation

The target dates for achieving the no-conversion requirements are for the combined objective of no deforestation and no conversion together. SBTN's ambition is for companies to be EUDR (European Deforestation Regulation - EUDR EU 2023/1115) compliant, to make efforts to go beyond EUDR by 2025, and to align their efforts to be in compliance by 2027 and 2030 (as indicated in Annex 1 Table 16). Companies may use the means outlined in section 1.3 of this document, including commodity certification where appropriate, to achieve their No Conversion target.

SBTN recognizes that there has been insufficient global progress in eliminating conversion of natural ecosystems and deforestation towards the target date of 2025. In response, SBTN has updated its guidance and requirements in Version 2 on how companies set and report their target dates and the underpinning data to demonstrate progress. Below is a summary of a revised approach that seeks to recognize the importance of halting deforestation and conversion as much as possible in 2025, but also recognizing that many companies will be unable to comply with this target date. We provide further detail on No Conversion target dates and the underpinning data requirements in Table 5.

Companies setting a No Conversion of Natural Ecosystems target are expected to:

1. Commit and publish the specific date by when the company commits to be deforestation and conversion free. Examples: companies are expected to be deforestation and conversion free in their direct operations by 2025. If companies cannot meet this target date, they will disclose the date by when they will be able to achieve the target requirements (SBTN recommends no later than 2027).

   Companies sourcing from producers or the first point of aggregation, the target date of the combined requirements of no deforestation and no conversion of natural ecosystems is set at 2027. If the company cannot achieve the target date, SBTN recommends that the company achieves DCF status by at the latest 2030.

2. Disclose the portion of their direct operations and the portion of sourced volumes of conversion driving commodities that are deforestation and conversion free, explain the rationale underpinning their target

[19] AFI list common cut off dates here: https://accountability-framework.org/fileadmin/uploads/afi/Documents/Common_Cutoff_Dates_Sept_2023.pdf

date (including justification for the selection of later target dates) and must demonstrate the pathway and actions they will take to meet the target date.

3. Publish quantitative annual interim milestones indicating year-on-year-progress until that is achieved, communicating steps toward full achievement. SBTN recommends the publication of quantities of non-DCF compliant (see Annex 1a) commodities as part of this annual report.

4. Disclose information regarding the performance relative to the achievement of the target requirements by following the guidance provided later in section 1.5.

A: For direct operations

SBTN expect companies will have no conversion of natural ecosystems in its direct operations by 2025 compared with a 2020* cutoff year. If the company cannot meet the 2025 date it will disclose the earliest date it can achieve no conversion. [SBTN recommends 2027 at the latest][20]

B. Upstream: For sourcing from producers or first point of aggregation

For companies sourcing from producers or first point of aggregation, they will achieve 100% of volumes [*sourced from specific geographies or marketed in the European Union*] of soy, cattle, oil palm, wood, cocoa, coffee and rubber from areas known to be **deforestation-free** by [*EUDR Target Date*] compared to a 2020* cutoff year [*as well as achieving partial deforestation- and conversion-free volumes of EUDR commodities outside the EU market and in conversion hotspots*].

Companies shall achieve 100% volumes of Annex 1a: conversion-driving commodities from areas known to be **conversion-free** by 2027 (or earliest post-2027 date), compared to a 2020* cutoff year.

Note: The text in [brackets] may be modified by companies to reflect the specifics of their company and wishing to go beyond minimum requirements to align with EUDR. Companies are responsible for determining what commodities are covered by EUDR regulation. Note that when companies are creating their target language using sourcing geographies, this information must be provided for each of the EUDR commodities. If companies cannot fully address deforestation and conversion for the EUDR commodities by 2025 they should address these within their 2027 target.

C: Upstream: For sourcing from companies downstream of the first point of aggregation

For a company sourcing from companies downstream of the first point of aggregation, the target setting company will achieve 100% of volumes [*sourced from specific geographies or marketed in the European Union*] of soy, cattle, oil palm, wood, cocoa, coffee and rubber from areas known to be **deforestation-free** by [EUDR Target Date], compared to a 2020* cutoff year [as well as achieving partial deforestation-free volumes of EUDR commodities outside the EU market]. See details in Table 5.

Companies will achieve 100% of volumes of soy, cattle, oil palm, wood, cocoa, coffee and rubber from areas known to be conversion-free in SBTN-defined Conversion Hotspots by 2027.

Companies shall achieve 100% of volumes of Annex 1a: conversion-driving commodities from areas known to be conversion-free by 2030, compared to a 2020* cutoff year.

In addition to the guidance above, companies who are sourcing highly transformed and embedded commodities may include these volumes in their 2030 target. They are encouraged to set milestones and take action for these commodities within the 2027 target, particularly for conversion hotspots, but are not required to do so.

In addition, the company will provide a justification for the exclusion of any EUDR commodities (listed in Annex 1 Table 16 of the SBTN land methods) and provide detailed recommendations for the conditions that would allow them to bring each commodity volume into compliance with the commodity-defined SBTN target dates. Where the proposed targets are inconsistent with the companies' publicly stated goals or strategies for nature, the rationale must include an explanation for the differences if the proposed SBT for Land is less comprehensive or ambitious than previous wording.

Materiality threshold for high-impact commodities of conversion-driving commodities

Companies sourcing high-impact commodities must set targets to manage all impacts associated with these within their target boundary. For the No Conversion target, companies should focus on the commodities that are major drivers of conversion. These can be found in the Step 1 High Impact Commodity List, which covers commodities relevant for all pressures, and in Annex 1a of this document for conversion-driving commodities.

[20] While the cutoff date of 2020 and the goal of no conversion is aligned both to science and international commitments and policies, the target date may differ based on implementation hurdles and local context.

Table 5: No-conversion targets: stages of the value chain and their defined target dates. "Conversion-driving commodities" are outlined in Annex 1a.

No Conversion of Natural Ecosystems: Target requirements		
Direct operations	Location of operation	Deforestation- and Conversion- free (DCF) target* Cut-off dates must not be later than 2020
Site owners/operators	All natural lands**	2025: 100% DCF across all sites
Producers	All natural lands	2025: 100% DCF across all conversion-driving commodities (Annex 1a)
Upstream	Origin of commodities	Deforestation- and conversion free (DCF) target* Cut-off dates must not be later than 2020
Sourcing from producers and from first point of aggregation	Natural forests and conversion hotspots	2025: 100% Deforestation-free and DCF in conversion hotspots for soy, cattle, oil palm, wood, cocoa, coffee, and rubber
	All natural lands	2027: 100% DCF in all natural lands for all other conversion-driving commodities (Annex 1a).
Sourcing from stages downstream of first point of aggregation	Natural forests	2025: 100% Deforestation-free for soy, cattle, oil palm, wood, cocoa, coffee, and rubber
	Conversion hotspots	2027: 100% DCF in conversion hotpots for soy, cattle, oil palm, wood, cocoa, coffee, and rubber.
	All natural lands	2030: 100% DCF in all natural lands for all other conversion-driving commodities (Annex 1a)

***Notes:**
1. Companies should aim to meet no-deforestation by 2025 for all stages of the value chain, in alignment with AFi and the SBTi FLAG requirements. If companies cannot meet this target date, they will disclose the date by when they will be able to achieve the target requirements (SBTN recommends no later than 2027).
2. Companies can and should define target dates that are more ambitious than those required, should they be able to meet the requirements in less time, if a regional or place-based initiative has a more ambitious target date, or should global progress on conversion-free commitments for a specific commodity exceed these target requirements. For example, if a company has an existing zero-deforestation commitment and/or are working in support of the Accountability Framework initiative's 2025 target date ambition for high-risk commodities.
3. Target dates refer to end of calendar year.
4. For full list of derivative products included for soy, cattle, oil palm, wood, cocoa, coffee, and rubber see Annex 1 of Regulation (EU) 2023/1115.

** For conversion that is not linked to commodity production (e.g., facilities, retail locations, offices, etc.) site owners and operators may follow the alternative no conversion pathway described for Metals, Infrastructure, Construction, and Extractives (MICE) sectors.

Target dates for Metals, Infrastructure, Construction, and Extractives (MICE) sectors

Sectors that must set a No Conversion target but who belong to the list of MICE sectors in Figure 1 must commit to No Conversion of areas identified through the IFC PS6 environmental assessment process as "Critical Habitat" or "High Conservation Value" areas. Alternatively, these companies may identify Core Natural Lands for no conversion based on Key Biodiversity Areas and Protected Areas (all classes) found within the Integrated Biodiversity Assessment Tool (IBAT) and areas identified as Critical Habitat in the UNEP-WCMC (2017) Global Critical Habitat screening layer to identify areas for no conversion. Areas identified as Protected Areas or Key Biodiversity Areas in IBAT and "Likely" critical habitat in the UNEP-WCMC Critical Habitat map shall be included as no-conversion areas whether or not they are identified as Natural Land in the SBTN Natural Lands Map.

MICE sectors should aim to achieve no conversion in these areas by 2025. If the company cannot achieve 2025, the company must disclose the earliest possible date this target can be achieved and explain the rationale for missing the date and the actions that will be put in place to achieve the chosen target date.

SBTN recommends companies contribute to the remediation of post-cut-off date(s) conversion (see section 1.3). In addition, these sectors must clearly demonstrate through established IFC PS6 processes that in areas identified as "natural land" that there are no viable alternatives before conversion—as defined by the SBTN Natural Lands Map.

Companies sourcing commodities extracted and produced by these sectors must comply with the following requirements:

- sourcing from producers/extractors must ensure no conversion of Critical Habitat and High Conservation Value areas by 2025 or the earliest date possible post-2025.
- sourcing from further downstream must ensure compliance by 2027.

Inclusion of waste and residues in the scope of the no conversion target

To identify whether waste and residues from the inputs to, processing, or manufacturing of conversion-driving commodities must be included in the scope of the No Conversion target, companies must follow the following hierarchy. Volumes of waste and residues used in such processes will be included within the scope of the No Conversion target based on:

- Compliance with existing national or relevant jurisdictional legislation defining what constitute waste and residues;
- Alignment with sectoral best practices on the inclusion of waste and residues;

If either option is not clear or available, waste and residue must be included when the product classified as waste and/or residue and has an economic value.

General disclaimer – Consideration of local rights and needs when setting conversion targets.

Comprehensive guidance for companies on where to avoid the conversion of natural ecosystems is incomplete without a consideration of natural ecosystems that have cultural or social importance for people. In any guidance on decisions regarding the conversion of natural ecosystems are made, companies should ensure that they have understood and respected the rights of Indigenous People, particularly the right to Free, Prior and Informed Consent (FPIC), and have engaged in collaborative land use planning processes with local stakeholders for that conversion, and that their actions during the tenure of their operations and beyond ensures respect for the land and human rights of those communities.

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 adverse impacts of conversion on the human and land rights of affected stakeholders as part of a landscape initiative, especially as it relates to their Landscape Engagement targets and following SBTN Stakeholder Engagement Guidance. Additional guidance is available through the United Nations General comment No. 26 (2022) on Land and Economic, Social and Cultural Rights and the United Nations Guiding Principles on Business and Human Rights.

1.2. How to set a No Conversion of Natural Ecosystems target

All companies required to set a No Conversion of Natural Ecosystems target according to section i, "How to determine if your company must set Land targets," must follow the procedure below to identify target requirements and prepare all required materials to be submitted to SBTN for target validation.

Target dates and requirements differ according to the ability of the company to achieve DCF in their direct operations and the level at which a company operates along supply chains, the type of commodities sourced, and the origins of those commodities. See Table 4 for the target requirements and section 1.2.2 for the definition of conversion hotspots and core natural lands for the No Conversion target.

Note on Step 2—Interpret & Prioritize. ***All locations and activities within the target boundaries (for direct operations and upstream target boundary A) must be included to avoid leakage between locations.*** Companies may follow the prioritization approach in Step 2, but all locations must be included within the scope in the first year that targets are set.

1. **Understand target dates and requirements**
   - There are multiple pathways companies may need to follow to be compliant with the No Conversion method. For example, a company may follow requirements for volumes of conversion-driving commodities that are sourced directly from producers or from the first point of aggregation and follow a different approach for their No Conversion target regarding sourcing from companies further downstream in the value chain.

2. **Prepare baseline data**
   - Use the accompanying SBTN Accounting Guidelines for Impacts on Land-use and the Environment (AGILE) to calculate land use change.
   - Pinpoint direct operations sites and upstream activities on the Natural Lands Map.
   - Assess 2020 natural land baselines against target-setting date (Year 0) conversion.

3. **Prioritize locations**
   - Use natural lands and conversion hotspots to determine the required and phased approach to no conversion target setting.

4. **Set targets**
   - Use requirements specific to operational locations, value chain position, and commodities sourced to set targets.

5. **Submit for validation**
   - Once a company is ready to submit its data for target validation (see section 1.6) and the target is officially validated, a company can make a public statement as outlined in the SBTN claims guidance.

The process and conditions around measuring the 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
- methods for targets on *upstream sourcing* of goods or services that lead to natural ecosystem conversion.

How to prepare baseline data

Chapter 5 of the SBTN Accounting Guidelines for Impacts on Land-Use and the Environment (AGILE) outlines the methods for companies to prepare baseline data on conversion of natural ecosystems. A high-level summary of the key steps are provided below.

Producers, site owners, and site operators *must*:

a. Map production units (and other operational areas) and locate them within the SBTN Natural Lands Map (see section 1.2.1 below).
b. Identify any conversion of natural ecosystems at the level of production unit that occurred after the cutoff date(s), using land cover change data from the cutoff year to target-setting date (Year 0), consulting the Natural Lands Map to see if land cover change occurred on natural lands.
c. Set a No Conversion target for all production units and operational areas.

Those engaged in sourcing conversion-driving commodities *must*:

a. Map the value chain and identify the origin of volumes of all material conversion-driving commodities (see Annex 1a) to the production unit or sourcing area (see traceability requirements in Step 2 and Annex 1c).
b. Account for the percentage of commodity volumes in compliance with deforestation- and conversion-free requirements.
c. Calculate the percentage of commodity volumes in compliance with deforestation- and conversion-free requirements.
d. For volumes that are not yet traceable to production unit or sourcing area, engage the supply chain to enhance traceability and increase the percentage of volumes in compliance with deforestation- and conversion-free requirements in line with traceability requirements and target dates (Table 5).

1.2.1. Using the SBTN Natural Lands Map

In this process, preventing the conversion of natural ecosystems starts with defining natural lands and estimating where they exist by delineating them on a map.

For all companies setting No Conversion targets, the SBTN Natural Lands Map can be used to:

- Estimate natural ecosystem conversion since 2020 that is associated with the company's operations or commodity volumes in its supply chains, with additional change date;
- Provide the data necessary for companies to operationalize a 2020 cutoff for no-conversion calculations.

Details on how to access and use the Natural Lands Map are provided in Chapter 5 of the SBTN Land Accounting Guidelines for Impacts on Land-Use and the Environment.

During the target-setting process, if it becomes clear that the representation of natural or non-natural land indicated by the SBTN Natural Lands Map is inconsistent with local realities, SBTN will accept petitions for categorical exemptions on a case-by-case basis. The guidelines for submitting such exemptions can be found in this document's supplementary information.

1.2.2. Conversion hotspots and core natural lands

The guidance outlining how a company sets a No Conversion of Natural Ecosystems target will require a phased approach. While immediate action is intended to eliminate the conversion of ecosystems, many companies contend with the realities of complex operations and supply chains. In many supply chains, the degree of traceability needed to set a science-based target is currently lacking. To stop ecosystem conversion and set a validated science-based target for land, companies will be required to make investments in traceability in key supply chains where it is lacking.

The phased approach of the No Conversion of Natural Ecosystems target requires companies to undertake a spatial prioritization of natural land, focusing no-conversion efforts on the most immediate needs. For many companies that have deforestation-free commitments, this process will be familiar, and all natural forests are a key component of their commitments to no conversion. However, for this target, deforestation is included as one of many types of natural ecosystem conversion, which includes all natural, terrestrial ecosystems.

To provide guidance to companies regarding places that have accelerated timelines for demonstrating No Conversion, SBTN has included "conversion hotspots." 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 that may not be entirely covered by the prioritization approach in Step 2.

Conversion hotspots refer to places with pressures that have resulted in the conversion of natural land classes to non-natural land classes between 2000 and 2020. Based on this historical conversion these areas require immediate action to prevent further conversion from commodity production and sourcing.

To set a No Conversion target companies must provide conversion-driving commodity sourcing to at least subnational jurisdiction. To calculate jurisdictional conversion hotspots, SBTN has used data from University of Maryland's GLAD land cover data (2000, 2010, 2020) and WRI's Land and Carbon Lab Global Pasture Watch to identify conversion by identifying areas that have changed from either short vegetation or tree cover to cropland or cultivated short vegetation. We calculated the change from 2000 to 2010 and 2010 to 2020 and aggregated these changes across ecoregions. To define hotspots the top 10% of ecoregions were selected based on three separate rankings:

1) total hectares converted within the ecoregion since 2000,

2) the ratio of vegetation conversion from 2000-2020 and the total natural vegetated area in 2000, and

3) the percentage of total ecoregional area converted.

This provided three ranked lists of ecoregional priority based on remotely observed conversion. 23 ecoregions appeared in all three rankings, and these were selected as conversion hotspot ecoregions. Jurisdictions with more than a 10% overlap with these ecoregions are selected as SBTN No Conversion of Natural Ecosystem target Conversion Hotspots (Figure 3).

Figure 2: Conversion hotspots are defined at the subnational jurisdiction level where they overlap with ecoregions that have experienced significant conversion of natural land since 2000.

Similarly, for companies included in the list of MICE sectors (Figure 1), they must either identify high conservation value areas or critical habitat using the process outlined in IFC PS6 or they may use what SBTN defines as core natural lands to satisfy the conditions around the No Conversion target. Core natural lands compile several relevant datasets to highlight areas of natural land that exhibit exceptional ecological importance. These include key biodiversity areas, protected areas, and "likely" critical habitat defined by the UNEP-WCMC Critical Habitat Screening layer.

Conversion hotspots and core natural lands prioritization does not apply to producers, site owners, or site operators (except for operational sites where conversion-driving commodities are not produced, which may follow the MICE pathway). 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 conversion-driving commodities listed in Annex 1a must eliminate conversion of natural ecosystems, including forests, by 2025. Site owners and site operators of other business sectors that are required to set a No Conversion target will similarly be required to eliminate natural ecosystem conversion by 2025 across all sites and all conversion-driving commodities.

A conversion hotspots prioritization applies to the sourcing of commodities listed in the conversion-driving commodity/activity list in Annex 1a. For companies sourcing any of these commodities, a Conversion Hotspot prioritization must be applied to the No Conversion of Natural Ecosystems target. Please note that this prioritization step is separate from and additional to the spatial prioritization that companies complete in SBTN Step 2.

Sourcing from producers and from first point of aggregation of soy, cattle, oil palm, wood, cocoa, coffee, and rubber should require 100% conversion-free of all natural forests and Conversion Hotspot geographies by 2025 or earliest post-2025 date possible and all natural lands for all other Annex 1a commodities by 2027 or earliest post 2027 date possible.

For sourcing from downstream of the first point of aggregation, companies should eliminate ecosystem conversion from 100% of soy, cattle, oil palm, wood, cocoa, coffee, and rubber volumes associated with natural forests by 2025 or earliest post-2025 date possible, 100% of these volumes in conversion hotspots by 2027 or earliest post-2027 date possible, and 100% of all other conversion-driving commodities across all natural lands 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 AFi definition of natural ecosystems. 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. Conversion hotspots and core natural lands highlight that existing natural land cover, and its representative ecological productivity should remain intact. However, as better data become available, and degradation can be better defined as part of landscape initiatives in the Landscape Engagement target, the natural land classification will become more refined, adding greater clarity to the natural/non-natural designation—especially for non-forest ecosystems.

Of direct relevance to the No Conversion target 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 forest that is converted to plantation forests is considered as conversion for the purpose of this guidance, aligning with the GHGP Land Sector and Removals Guidance.

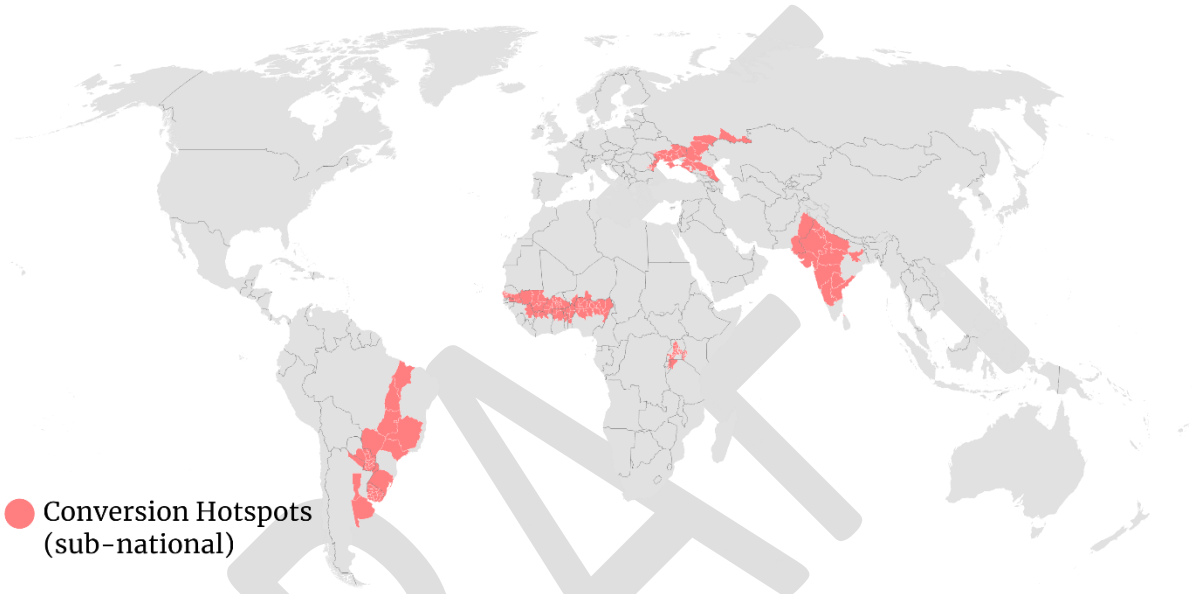

Figure 3: Delineation of the areas representing conversion hotspots for use in the No Conversion of Natural Ecosystems target. These hotspots cover subnational jurisdictions across all or part of the following countries: Argentina, Burundi, Benin, Burkina Faso, Brazil, Côte d'Ivoire, Ghana, Guinea, Gambia, India, Kenya, Sri Lanka, Moldova, Mali, Niger, Nigeria, Pakistan, Paraguay, Romania, Russia, Rwanda, Senegal, Togo, Tanzania, Uganda, Ukraine, and Uruguay. For the complete list of subnational jurisdictions classified as Conversion Hotspots, please see the supplementary information document

1.3. Accounting for conversion of natural ecosystems

The accompanying Accounting Guidelines (AGILE) Chapter 5 outlines the guidance on how companies must or should account for conversion. The accounting guidelines are informed by AFi's guidance and adapted to the scope of SBTN Land target-setting methodology.

The term "land use change" (LUC) in the accounting guidelines is kept in alignment with the GHGP's accounting guidance but is synonymous with "conversion" and "terrestrial ecosystem change".

To effectively progress toward the achievement of targets to end deforestation and conversion from operations and supply chains, companies ***must*** measure and account for LUC in credible and consistent ways. This process is also key to accounting for LUC emissions in setting SBTi FLAG targets. After completing the accounting exercise, companies will then use the SBTN Natural Lands Map to understand which portion of LUC constitutes conversion of natural ecosystems.

SBTN recommends that companies account for conversion on an annual basis to demonstrate either compliance with target requirements or to understand the exposure to conversion or conversion risk associated with their sourcing from a given area. Companies should not allocate conversion from a year for which the company does not yet have supply chain data. For instance, if the company has supply chain information on sourced volumes up to 2021, then only conversion between 2020 and 2021 should be allocated to those volumes if the company has used 2020 as the cutoff date. Further guidance on accounting for conversion is provided in section 5.6 of the Accounting Guidelines for companies that do not have sufficient data to calculate conversion associated with sourcing on an annual basis.

The Accounting Guidelines provide methods for companies to account for conversion using two approaches:

- Assessment of conversion at the production unit level, which requires full traceability and spatial data.
- Assessment of conversion at the sourcing area level, which requires traceability at least at the subnational level.

Limited or no current traceability. This means that products can currently only be traced to a country of origin or that the origin of products is unknown, should be placed in target boundary B.

The requirements for assessing conversion and the date by which the assessment must cover all volumes included in the target boundaries A and B are summarized in Table 6.

Note on remediation

As companies assess and track conversion in their value chains, SBTN strongly recommends companies to remediate and restore converted natural ecosystems that result from their operations or supply chain. Remediation is one of the strongest commitments a company can make to acknowledging and reversing the loss of natural land. Different options are available to companies for doing so (e.g., working with suppliers that own or manage land or contributing to restoration efforts through collective action in landscape initiatives). SBTN recommends companies follow AFi's Operational Guidance on Environmental Restoration and Compensation.[21]

[21] AFi's Operational Guidance on Environmental Restoration and Compensation. https://accountability-framework.org/fileadmin/uploads/afi/Documents/Operational_Guidance/OG_Environmental_Restoration_Compensation-2020-52.pdf

Table 6: Requirements for the assessment of post-cutoff date conversion.

No Conversion of Natural Ecosystems: Assessment of post-cutoff date conversion			
Direct operations	**Location of operation**	**Deforestation- and Conversion- free (DCF) target* Cut-off dates must not be later than 2020**	**Assessment of post-cutoff date conversion**
Site owners/operators	All natural lands**	2025: 100% DCF across all sites	Before target validation all volumes of all conversion-driving commodities in scope must be traceable at least to subnational level and the assessment of conversion performed using one of the available approaches
Producers	All natural lands	2025: 100% DCF across all conversion-driving commodities (Annex 1a)	
Upstream	**Origin of commodities**	**Deforestation- and conversion free (DCF) target* Cut-off dates must not be later than 2020**	**Assessment of post-cutoff date conversion**
Sourcing from producers and from first point of aggregation	Natural forests and conversion hotspots	2025 date: 100% Deforestation-free and DCF in conversion hotspots for soy, cattle, oil palm, wood, cocoa, coffee, and rubber	End of 2025* all volumes of soy, cattle, oil palm, wood, cocoa, coffee, and rubber in scope must be traceable at least to subnational level and the assessment of conversion performed using one of the available approaches
	All natural lands	2027: 100% DCF in all natural lands for all other conversion-driving commodities (Annex 1a	Before 2027* all volumes of all conversion-driving commodities in scope must be traceable at least to subnational level and the assessment of conversion performed using one of the available approaches
Sourcing from stages downstream of first point of aggregation	Natural forests	2025: 100% Deforestation-free for soy, cattle, oil palm, wood, cocoa, coffee, and rubber	End of 2025* all volumes of soy, cattle, oil palm, wood, cocoa, coffee, and rubber in scope must be traceable at least to subnational level and the assessment of conversion performed using one of the available approaches
	Conversion hotspots	2027: 100% DCF in conversion hotpots for soy, cattle, oil palm, wood, cocoa, coffee, and rubber.	
	All natural lands	2030: 100% DCF in all natural lands for all other conversion-driving commodities (Annex 1a)	Before 2030 all volumes of all conversion-driving commodities in scope must be traceable at least to subnational level and the assessment of conversion performed using one of the available approaches

*or the end of the year of the newly determined target date (in alignment with requirements outlined in section 1.1)

1.4. How to assess compliance with target requirements

Detailed guidance on the implementation of actions to achieve targets will be released by SBTN as guidance on Step 4: Act and Step 5: Track. This section provides a brief anticipation of how companies can assess their progress toward deforestation- and conversion-free status of sourced commodities.

Building on AFi's Operational Guidance on Supply Chain Management, companies can assess the deforestation- and conversion-free status of the commodities they source by:

1. Tracing commodities back to the production or processing units of origin and ensuring that conversion events did not occur after the relevant cutoff date.
2. Tracing commodities back to an intermediate supplier that itself has effective control mechanisms in place and can demonstrate the ability to trace its supplier to the production or processing units of origin and can demonstrate compliance with target requirements.
3. Utilizing credible assurance systems (e.g., credible certification systems based on physical chain of custody systems) capable of linking raw material supplies with production units in compliance with target requirements.
4. Tracing materials to jurisdictions or landscapes where it has been demonstrated that conversion did not occur after the relevant cutoff date.

1.5. Target validation and disclosure

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

- ISIC sector classification(s) describing their direct operations and upstream activities.
- Data required in section ii, "Data requirements to set Land targets".

SBTN is working with the Accountability Accelerator to assess the reporting requirements for companies that will set a No Conversion of Natural Ecosystems target, which will be defined in the SBTN Step 5 upcoming guidance.

In the interim, SBTN expects companies to publish annual reporting on progress to achieve no conversion by the published target date.

Required reporting disclosures include:

- List of conversion driving commodities that the company sources
- Conversion free target date (including rationale and explanation for target dates later than 2025)
- Deforestation conversion date (including rationale and explanation for target dates later than 2025)
- Cut-off date (no later than 2020)
- Percentage of volumes conversion free in conversion hotspots
- Percentage of volumes deforestation free (outside EUDR)
- Methods of compliance (e.g. spatial data and data source; sourcing from DCF jurisdiction; certifications)

Plus, the following **recommended disclosures**:

- Volume / weight of non-DCF compliant commodities
- Traceability (volumes must be disaggregated per level of traceability: production unit, sourcing area, jurisdiction, subnational level, country of origin, not yet traceable)
- Conversion hotspots (sub national; regional; local jurisdiction)
- Value chain position
- CDP Forest Survey Scores
- Rationale and explanation for data gaps and actions to close them etc.

See Annex 1c for an illustrative reporting template with a breakdown of required and recommended annual disclosures. SBTN recognizes the importance of appropriate transparency to accompany No Conversion targets and will work to define appropriate Monitoring Reporting and Verification (MRV) approaches (SBTN Step 5) in collaboration with the Accountability Accelerator, SBTN's independent validation body, and other system actors.

For companies following the MICE pathway for no conversion (see Box 3), reporting will include their completed and ongoing IFC PS6 assessment and progress (as outlined in section ii) or their assessment of core natural lands for no conversion as described in Box 3.

1.6. Template statement for No Conversion of Natural Ecosystems target

No Conversion of Natural Ecosystems targets will be stated in the format illustrated in Box 5.

Box 5: Formulation of No Conversion of Natural Ecosystems target

For direct operations

[Company name] will have zero conversion of natural ecosystems in its direct operations by [2025, or earliest post-2025 date], compared with a 2020 cutoff year.*

For sourcing from producers or first point of aggregation

For [Company name] sourcing from producers or first point of aggregation, [Company name] will achieve 100% of volumes [sourced from specific geographies or marketed in the European Union] of soy, cattle, oil palm, wood, cocoa, coffee and rubber from areas known to be deforestation-free by [EUDR Target Date] compared to a 2020 cutoff year [as well as achieving partial deforestation- and conversion-free volumes of EUDR commodities outside the EU market and in conversion hotspots].*

[Company name] shall achieve 100% volumes of Annex 1a: conversion-driving commodities from areas known to be conversion-free by [2027 (or earliest post-2027 date)] compared to a 2020 cutoff year.*

Language in brackets may be modified by companies to reflect the specifics of their company and wishing to go beyond minimum requirements to align with EUDR. Note that when companies are creating their target language using sourcing geographies, this information must be provided for each of the EUDR commodities. If companies cannot fully address deforestation and conversion for the EUDR commodities by 2025 they should address these within their 2027 (or earliest post-2027 date) target.

For sourcing from companies downstream of the first point of aggregation

For [Company name] sourcing from companies downstream of the first point of aggregation, [Company name] will achieve 100% of volumes [sourced from specific geographies or marketed in the European Union] of soy, cattle, oil palm, wood, cocoa, coffee and rubber from areas known to be deforestation-free by [EUDR Target Date], compared to a 2020 cutoff year [as well as achieving partial deforestation-free volumes of EUDR commodities outside the EU market.* (See details in Table 1).]

[Company name] will achieve 100% of volumes of soy, cattle, oil palm, wood, cocoa, coffee and rubber from areas known to be conversion-free in SBTN-defined Conversion Hotspots by 2027 (or earliest post-2027 date).

[Company name] shall achieve 100% of volumes of Annex 1a: conversion-driving commodities from areas known to be conversion-free by 2030 (or earliest post-2030 date), compared to a 2020 cutoff year.*

In addition to the guidance above, companies who are sourcing highly transformed and embedded commodities may include these volumes in their 2030 target. They are encouraged to set milestones and take action for these commodities within the 2027 target, particularly for conversion hotspots, but are not required to do so.

1.7. Why is the No Conversion 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, local communities, and many others.[22, 23] 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.[24]

Yet humans have converted between one third and one half of habitable land for crop and livestock production, undermining these critical ecosystem services on which we rely.[25] Deforestation and land degradation cost as much as US$6.3 trillion a year through their impact on forest and agricultural productivity.[26] 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.[27]

[22] Beatty, C. R. et al. (2022). The Vitality of Forests: Illustrating the Evidence Connecting Forests and Human Health. World Wildlife Fund, Washington, DC, United States.
[23] Chaplin-Kramer, R. et al. (2023). Mapping the Planet's Critical Natural Assets. Nature Ecology & Evolution, 7: 51–61. https://doi.org/10.1038/s41559-022-01934-5.
[24] FAO. 2022. The State of the World's Forests 2022. Forest pathways for green recovery and building inclusive, resilient and sustainable economies. Rome, FAO
[25] https://www.fao.org/food-agriculture-statistics/en/
[26] Sutton, P. C. et al. (2016). The Ecological Economics of Land Degradation: Impacts on Ecosystem Service Values. Ecological Economics, 129: 182–192.
[27] UNEP. (2015). The Economics of Land Degradation in Africa. Bonn: ELD Initiative. Available online at: https://www.eld-initiative.org/fileadmin/ELD_Filter_Tool/Publication_The_Economics_of_Land_Degradation_in_Africa___Reviewed_/ELD-unep-report_07_spec_72dpi.pdf

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 centuries, and the problem has drastically increased in the tropics over the past 50 years [28, 29].

Since 2010, the global net loss of forests is estimated to be 4.7 Mha per year. [30] The rates of tropical deforestation are now particularly dire: they are estimated to account for more than 97% of global deforestation in the past century and more than 90% of global deforestation between 2000 and 2018. [31, 32] Across the tropics, 90% of recent deforestation has been driven by agriculture, the majority of which is caused by seven commodities: cattle, oil palm, soy, cocoa, rubber, coffee, and plantation wood fiber, with cattle having by far the largest impact. [33]

Less attention has been given to the loss of non-forest natural ecosystems, although they too are critically important. Non-forest ecosystems are suffering conversion rates as high or higher than those of forests. [34]

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 most threatened ecosystems in the world. [35] Efforts toward avoiding the conversion of forests should be broadened to incorporate the conservation of non-forest natural ecosystems, [36] and this guidance walks that path.

Table 7: Amount of conversion of global ecosystems, grouped by their vegetation/land cover attribute. [37]

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 supplementary material.

[28] Hansen, M.C., Potapov, P.V., Moore, R., Hancher, M., Turubanova, S.A., Tyukavina, A., Thau, D., Stehman, S.V., Goetz, S.J., Loveland, T.R., Kommareddy, A., Egorov, A., Chini, L., Justice, C.O. and Townshend, J.R.G. (2013). High-Resolution Global Maps of 21st-Century Forest Cover Change. *Science*, 342(6160), pp.850–853. doi: https://doi.org/10.1126/science.1244693.
[29] Haddad, N.M., Brudvig, L.A., Clobert, J., Davies, K.F., Gonzalez, A., Holt, R.D., Lovejoy, T.E., Sexton, J.O., Austin, M.P., Collins, C.D., Cook, W.M., Damschen, E.I., Ewers, R.M., Foster, B.L., Jenkins, C.N., King, A.J., Laurance, W.F., Levey, D.J., Margules, C.R. and Melbourne, B.A. (2015). Habitat fragmentation and its lasting impact on Earth's ecosystems. *Science Advances*, 1(2). doi: https://doi.org/10.1126/sciadv.1500052.
[30] FAO and UNEP. 2020. The State of the World's Forests 2020. Forests, biodiversity and people. Rome.
[31] https://research.wri.org/gfr/latest-analysis-deforestation-trends
[32] FAO. 2022. The State of the World's Forests 2022. Forest pathways for green recovery and building inclusive, resilient and Sustainable economies. Rome, FAO.
[33] Pendrill, F. et al. (2022). Disentangling the numbers behind agriculture-driven tropical deforestation. Science, 377(6611), abm9267.
[34] Sayre, R., Karagulle, D., Frye, C., Boucher, T., Wolff, N. H., Breyer, S., ... & Possingham, H. (2020). An assessment of the representation of ecosystems in global protected areas using new maps of World Climate Regions and World Ecosystems. Global Ecology and Conservation, 21, e00860.
[35] Lark, T. J. (2020). Protecting our prairies: Research and policy actions for conserving America's grasslands. Land Use Policy, 97, 104727.
[36] Gonçalves-Souza, D., P. H. Verburg, & R. Dobrovolski. (2020). Habitat loss, extinction predictability and conservation efforts in the terrestrial ecoregions. Biological Conservation, 246, 108579.
[37] Sayre, R., Karagulle, D., Frye, C., Boucher, T., Wolff, N. H., Breyer, S., ... & Possingham, H. (2020). An assessment of the representation of ecosystems in global protected areas using new maps of World Climate Regions and World Ecosystems. Global Ecology and Conservation, 21, e00860.

Target 2:
Working Land Regeneration & Restoration

Target 2: Working Land Regeneration & Restoration

This chapter of the SBTN Land Guidance sets out:

1. The details of the Working Land Regeneration & Restoration target
2. How companies will set the Working Land Regeneration & Restoration target
3. How companies will account for and communicate about the Working Land Regeneration & Restoration target

2.1. What is a Working Land Regeneration and Restoration target?

Target 2: Working Land Regeneration and Restoration helps companies reduce their land-related pressures and improve ecological integrity across landscapes. It consists of between two and five individual targets grouped under two components: a Land *Area* target and impact-based *Land Quality* targets (Figure 4). A company is required to set Working Land Regeneration and Restoration targets if terrestrial ecosystem use or change OR soil pollution is material according to Step 1a materiality screening. It is also required that a company set at least one Land Area target and at least one Land Quality target.

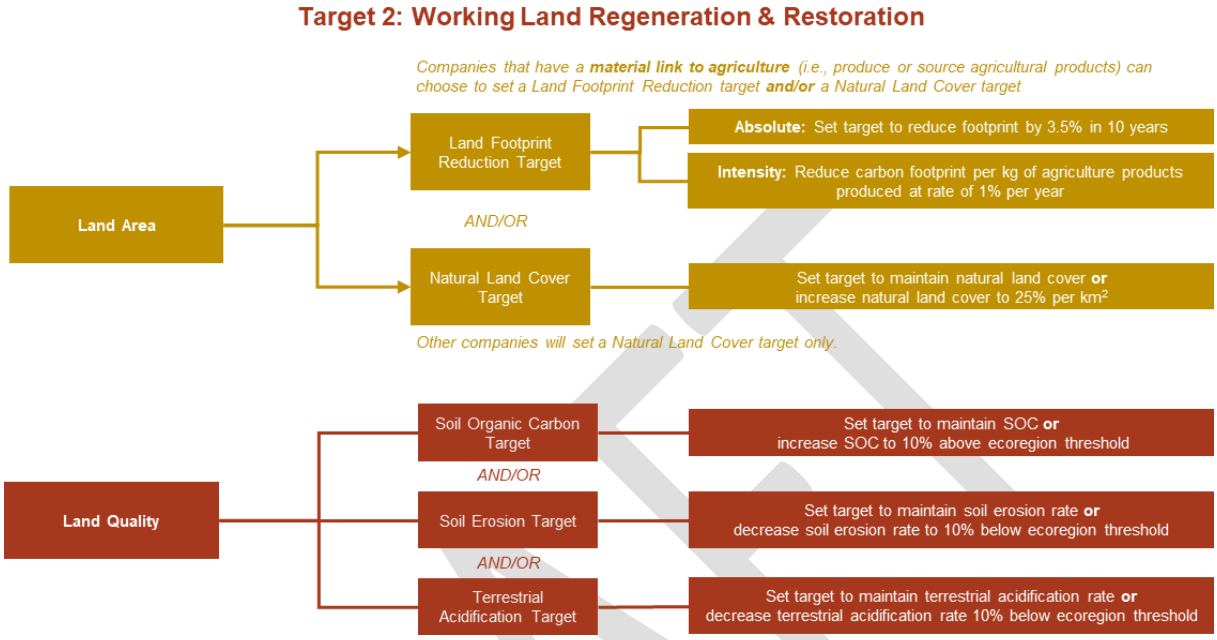

Figure 4: *The Structure of Target 2* - Working Land Regeneration and Restoration *for direct operations.*

Together, the Land Area and Land Quality targets under Target 2 form a coherent theory of change. Companies are supported to:

- Reduce total land demand through more efficient use of agricultural land (Land Footprint Reduction target);
- Integrate nature into working lands to maintain and increase biodiversity and ecosystem services (Natural Land Cover target), and;
- Improve land management practices to protect ecosystem health (Land Quality targets).

This framework provides flexibility for companies to tailor their approach, while ensuring that actions are science-based, credible, and collectively aligned with global goals for climate and nature. It also ensures companies manage key trade-offs between the productive uses of land, its condition (including biodiversity), and long-term resilience of landscapes.

2.1.1. Land Area

Under the Land Area target, companies must set at least one of the following two area-based targets and are encouraged to set both:

- **Land Footprint Reduction** aims to reduce the total area of agricultural land (e.g., for food, animal feed, fibres, bioenergy feedstocks) required in a company's value chain by improving efficiency. This can be achieved through yield improvements, reducing food loss and waste, and, for downstream companies, shifting product portfolios away from land-intensive goods. It aligns with a land sparing approach, which concentrates agricultural production to free up land for restoration or conservation elsewhere.
- **Natural Land Cover** aims to increase or maintain semi-natural habitat within working landscapes. This reflects a land sharing approach – one that integrates biodiversity, Nature's Contributions to People (NCP), ecological processes, and carbon stocks into working lands.

These two targets reflect different but complementary strategies for reconciling production processes in land systems with nature protection and restoration. In a land sparing model, production is intensified in some areas to "spare" other land for nature. In land sharing, nature is embedded within farmland or other production units, reducing the separation between production and conservation zones, and enhancing the ecological integrity in production units and across landscapes.

Land Footprint Reduction Target

The Land Footprint Reduction target is specifically designed for companies with material links to agriculture, either through direct production or sourcing of agricultural commodities. Global models indicate that agricultural land footprint reduction of the scale required to achieve global nature goals is possible through a combination of sustainable crop and livestock productivity gains where there are yield gaps, reduced food loss and waste across value chains, more circular use of natural resources, and, in high-income countries, shift toward healthier, more sustainable, and less-land-intensive diets. As such, the target does not apply to other land-using sectors such as forestry. The scientific basis of this target, including the focus specifically on agricultural land, is articulated in the SBTN Land supplementary materials.

SBTN Land recognizes that companies that set Land Footprint Reduction targets according to this methodology will need to carefully manage potential trade-offs and avoid unintended consequences that can arise as a result of efforts to reduce the global agricultural land footprint. Companies setting this target are recommended to set accompanying Land Quality targets on the same production units to avoid unsustainable intensification.

"Land footprint"[38] for the purpose of this target refers to the amount of agricultural land required per year to produce the products that the company itself produces or which it sources (reported in hectares per year). It does not necessarily include all land owned or controlled by companies. Agricultural lands that are not attributable to direct operations or upstream value chain activities should not be counted within the Land Footprint Reduction target and thus reductions cannot be applied to extensive land holdings held in reserve.

There are two methods for setting a Land Footprint Reduction target: the absolute reduction approach and the intensity reduction approach. SBTN provides supplementary information in Annex 2a to support companies in choosing which approach to follow.

Given the fact that companies will not necessarily have ownership rights over any land freed up through their Land Footprint Reduction target, SBTN does not require companies to necessarily restore that land. Instead, companies are encouraged to consider modalities through which collective action in the Landscape Engagement target (see Chapter 3) can contribute to the restoration of land freed up under the Land Footprint Reduction target.[39]

Natural Land Cover Target

Nature and biodiversity contribute to human well-being and economic prosperity. These contributions include services such as climate regulation, food production and clean air and water, but also less tangible benefits such as recreation, tourism, and culture. A Natural Land Cover target works to increase the quantity of natural and semi-natural lands across landscapes to support delivery of these contributions. The scientific basis for this target comes from a body of evidence demonstrating that increasing natural and semi-natural land increases the delivery of Nature's Contributions to People (NCP). It specifically draws on work demonstrating that in highly human-modified landscapes the provision of NCP significantly declines when the quantity of (semi-)natural habitat cover per km^2 falls below 20-25%[40].

2.1.2. Land Quality

The Land Quality targets complement the area-based target by regenerating or restoring working lands. It aims to act as a safeguard, ensuring that land footprint reduction or intensification strategies do not undermine long-term ecosystem function and resilience. It includes three land quality targets:

1) **Soil Organic Carbon** – soil organic carbon is carbon stored in soil organic matter and can act as a proxy indicator for a variety of ecosystem services. Soil organic carbon is also a key indicator of soil quality [41, 42]). The Status of the World's Soil Resources Report[43] notes that soil organic carbon loss is one of the ten major soil threats. Land use change and land management are two key drivers of soil organic carbon loss. The scope of this target is to address soil organic carbon depletion within a companies' land footprint – land impacts associated with land use change are covered under the No Conversion target.

2) **Soil Erosion** - erosion can be defined as the wearing away of the land surface by physical forces such as rainfall that abrade, detach, and remove soil or geological material from one point on the earth's surface

[38] We use "land footprint" interchangeably with agricultural "land occupation" as defined by life cycle assessment approaches. The land footprint refers to the portions of a company's "terrestrial ecosystem use" (as per the SBTN Technical Guidance for Steps 1 and 2) that are working agricultural lands.
[39] Similarly, SBTN encourages companies to consider how Landscape Engagement can contribute to the achievement of the NCL target and the remediation of converted natural ecosystems
[40] Mohamed, A., DeClerck, F., Verburg, P.H., Obura, D., Abrams, J.F., Zafra-Calvo, N., Rocha, J., Estrada-Carmona, N., Fremier, A., Jones, S.K., Meier, I.C., & Stewart-Koster, B. (2024). Securing Nature's Contributions to People requires at least 20%–25% (semi-)natural habitat in human-modified landscapes. Journal Name, 7(1), pp. 59-71.
[41] Kibblewhite, M.G., Ritz, K. and Swift, M.J. (2007). Soil Health in Agricultural Systems. Philosophical Transactions of the Royal Society B: Biological Sciences, 363(1492), pp.685–701. doi: https://doi.org/10.1098/rstb.2007.2178.
[42] De Laurentiis, V., Maier, S., Horn, R., Uusitalo, V., Hiederer, R., Chéron-Bessou, C., Morais, T., Grant, T., Milà i Canals, L. and Sala, S. (2024). Soil organic carbon as an indicator of land use impacts in life cycle assessment. *The International Journal of Life Cycle Assessment*, [online] 29(7), pp.1190–1208. doi: https://doi.org/10.1007/s11367-024-02307-9.
[43] FAO (2015). *Status of the World's Soil Resources: Main Report*. Available at: https://openknowledge.fao.org/items/f16010ce-1874-4108-bd03-a6a592e2e53a.

to be deposited elsewhere.[44] One of the principle agents responsible for soil erosion is water and this erosion pathway can be accelerated by a range of human activities, such as tillage practice.[45,46] The loss of soil through erosion has a range of adverse impacts including declines in organic matter and nutrient content, the breakdown of soil structure, and severe impacts on species sensitive to freshwater or marine sedimentation. Soil erosion can also lead to a reduction in the available soil water stored, which can result in an increased risk of flooding and landslides in adjacent areas. Nutrient and carbon cycling can be altered as eroded soil may lose 75-80% of its carbon content, with consequent release of carbon. To mitigate the effects of soil erosion, soil and water conservation strategies are required[47]. The focus of this target is to reduce soil erosion focusing on water as the mechanical force.

3) **Terrestrial Acidification** - the process by which soil becomes more acidic. It is a change in soil chemical properties (e.g. decrease in soil pH) caused by the inputs and dissociation of compounds with acid-base chemistry, such as oxides of sulfur or nitrogen. Terrestrial acidification can reduce soil fertility, and significantly impact plant diversity, species richness and the occurrence of native plant species.[48] The primary pollutants that lead to terrestrial acidification are nitrogen (NH_3 and NO_X) and sulfur (SO_2) emissions.[49] The largest contributors to acidifying pollutants include fossil fuel combustion and agricultural activities. The focus of this target is on reducing terrestrial acidification through the reduction of its key contributing pollutants – nitrogen and sulfur emissions. Although the target thresholds consider the influence of nitrogen deposition on terrestrial eutrophication, which was previously identified as another key soil pollution category, the target only includes terrestrial acidification due to the absence of robust methods to measure terrestrial **eutrophication** at a corporate level; moreover, managing the driving forces of terrestrial acidification should also lead to **mitigation of impacts on** terrestrial eutrophication **through remediation of sulfur and nitrogen emissions, the causal factors in both processes.**

Companies must set at least one of these impact reduction targets and are encouraged to address all three where relevant. This component acts as a safeguard, ensuring that land footprint reduction or intensification strategies do not undermine long-term ecosystem function and resilience.

2.1.3. Direct Operations and Upstream Activities

The Working Land target as outlined below is relevant for companies with knowledge of their direct operations only, as there is an increased requirement for data at the production unit level that is potentially not readily available for upstream activities in a company's value chain. Nevertheless, for many companies, a significant part of their environmental impacts occurs upstream in their supply chain and need to be addressed to return or maintain ecosystems within safe operating conditions. To address this, companies sourcing products from the ISIC Categories identified in Table 8 are required to incorporate the land quality indicators in their Landscape Engagement target and address the main drivers of the land quality categories identified as material.

Companies are encouraged to select landscapes that have been traditionally linked to supply chains of their largest inputs indicated by their land footprint or purchasing volumes, as well as to incorporate ecoregion thresholds as part of the selection process on top of other state of nature indicators considered. There are two approaches companies may use to prioritize landscapes. Approach 1 allows for the selection of landscapes for engagement in connection with SBTN Steps 1 & 2 and in connection with Target 2: Working Land Regeneration and Restoration target. [Prioritization approaches for this target will be further described in Version 2 of SBTN STEP 1 & 2]. Approach 2 allows for the selection of landscapes for engagement in connection with a No Conversion of Natural Ecosystems targets which is suitable for companies with significant amounts of conversion within their operations or supply chain. More information is provided in Section 3.2.1.

If a company has a sufficient level of data available for their upstream activities (see the SBTN Land Accounting Guidelines for Impacts on Land-use and the Environment (AGILE) for more information on data requirements), targets may be set for upstream activities using the same approach for direct operations as outlined below.

[44] European Commission (2020). *Agri-environmental indicator - soil erosion*. [online] ec.europa.eu. Available at: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Agri-environmental_indicator_-_soil_erosion.
[45] Parsons, A.J. (2019). How reliable are our methods for estimating soil erosion by water? *Science of The Total Environment*, 676, pp.215–221. doi: https://doi.org/10.1016/j.scitotenv.2019.04.307.
[46] Williams, J.D., H.T. Gollany, M.C. Siemens, S.B. Wuest, and D.S. Long. 2009. Comparison of runoff, soil erosion, and winter wheat yields from no-till and inversion tillage production systems in northeastern Oregon. Journal of Soil and Water Conservation 64(1):43-52
[47] Morgan R.P.C. 2005. Soil Erosion and Conservation, 3rd edn. Blackwell Publ., Oxford.
[48] Yadav, D.S., Jaiswal, B., Gautam, M. and Agrawal, M. (2020). Soil Acidification and its Impact on Plants. *Plant Responses to Soil Pollution*, pp.1–26. doi: https://doi.org/10.1007/978-981-15-4964-9_1.
[49] European Environmental Agency (2008). *Impacts of Europe's changing climate - 2008 indicator-based assessment*. Europa.eu. Available at : https://www.eea.europa.eu/en/analysis/publications/eea_report_2008_4.

Table 8: The land quality categories that should be of focus to a company depending on the sector(s) of relevance to upstream activities. (Note: n.e.c – not elsewhere classified)

ISIC Code		Land Quality Indicator Upstream Materiality		
Revision 4	Revision 3	Soil Erosion	SOC Depletion	Terrestrial Acidification
A01.11 – Growing of cereals (except rice)	0111 – Growing of cereals	✓	✓	✓
A01.12 – Growing of oil seeds	0115 – Growing of other crops	✓	✓	
A01.13 – Growing of rice	0112 – Growing of rice		✓	
A01.14 – Growing of fiber crops	0115 – Growing of other crops			✓
A01.15 – Growing of sugar cane	0115 – Growing of other crops	✓		
A01.19 – Growing of other non-perennial crops	0115 – Growing of other crops	✓		
A01.2 – Raising of poultry	0126 – Raising of poultry			✓
A01.21 – Growing of vegetables and melons	0113 – Growing of vegetables	✓	✓	
A01.3 – Raising of pigs	0125 – Raising of swine			✓
A01.4 – Raising of cattle and buffaloes	0123 – Raising of other cattle and buffaloes	✓	✓	✓
A01.41 – Raising of dairy cattle	0122 – Raising of dairy cattle	✓	✓	✓
A01.5 – Raising of other animals	0129 – Raising of other animals		✓	✓
A02 – Forestry and logging	0210 – Forestry and logging		✓	
B07.29 – Mining of other non-ferrous metal ores	2720 – Mining of non-ferrous metal ores			✓
C10.1 – Processing and preserving of meat	1511 – Processing and preserving of meat		✓	✓
C10.4 – Manufacture of vegetable and animal oils and fats	1515 – Manufacture of vegetable and animal oils and fats	✓	✓	
C10.5 – Manufacture of dairy products	1516 – Manufacture of dairy products		✓	✓
C10.8 – Manufacture of other food products	1518 – Manufacture of other food products	✓	✓	✓
C11 – Manufacture of beverages	1530 – Manufacture of beverages	✓		
C13 – Manufacture of textiles	1711 – Spinning, weaving and finishing of textiles			✓
C16 – Sawmilling and planning of wood; manufacture of wood products, cork, straw and plaiting materials	2010 – Sawmilling and planning of wood		✓	
C17 – Manufacture of paper and paper products	2100 – Manufacture of pulp, paper and paperboard		✓	✓
C19.2 – Manufacture of refined petroleum products	2320 – Manufacture of refined petroleum products			✓
C20.59 – Manufacture of other chemical products n.e.c.	2419 – Manufacture of other chemical products n.e.c.	✓	✓	✓
C22 – Manufacture of rubber and plastics products	2520 – Manufacture of plastics products	✓	✓	✓
C23.51 – Manufacture of cement, lime and plaster	2691 – Manufacture of cement, lime and plaster			✓
C24.10 – Manufacture of basic iron and steel	2711 – Manufacture of basic iron and steel			✓
C25.7 – Manufacture of fabricated metal products, except machinery and equipment	2819 – Manufacture of other fabricated metal products			✓
C27.90 – Manufacture of other electrical equipment	3119 – Manufacture of electrical machinery and apparatus n.e.c.			✓
C28.9 – Manufacture of other machinery and equipment n.e.c.	2910 – Manufacture of machinery and equipment n.e.c.			✓
C29.1 – Manufacture of motor vehicles	3410 – Manufacture of motor vehicles and trailers			✓
D35.1 – Electric power generation, transmission and distribution	4010 – Production, collection and distribution of electricity			✓
D35.1 – Electric power generation, transmission and distribution	4010 – Production, collection and distribution of electricity			✓
D35.3 – Steam and air conditioning supply	4030 – Steam and hot water supply			✓
F45 – Construction	45 – Construction	✓	✓	✓
H50.2 – Sea and coastal water transport	6110 – Sea and coastal water transport			✓

ISIC Code		Land Quality Indicator Upstream Materiality		
Revision 4	Revision 3	Soil Erosion	SOC Depletion	Terrestrial Acidification
I55–56 – Accommodation and food service activities	5510 – Hotels and restaurants	✓	✓	✓
M69–M75 – Professional, scientific and technical activities	7490 – Other business activities n.e.c.			
O84 – Public administration and defence; compulsory social security	75 – Public administration and defence; compulsory social security		✓	✓
Q86–Q88 – Human health activities; residential care; social work without accommodation	85 – Health and social work	✓	✓	✓

1

2.2. How to set Working Land Regeneration and Restoration targets

The approaches to setting the various Working Land Regeneration and Restoration targets for direct operations[50] are outlined below. For the approach for upstream activities see Section 2.1.3. and Target 3 Landscape Engagement.

Selecting the relevant Land Area Target

SBTN provides flexibility for companies to choose between the two Land Area targets depending on their land use profile and operational realities. For example, companies operating in extensive, rain-fed, or low-yield systems (e.g., pastoralism, rangelands, or extensive livestock systems like cashmere in Mongolia) may find it difficult to reduce land footprint without significant ecological or social risks.

Companies that have material links to agriculture, i.e., produce or source agricultural products, (see List A in Figure 5) may choose to set a Land Footprint Reduction target *or* a Natural Land Cover target *or* both. Companies that do not meet these criteria will set a Natural Land Cover target only.

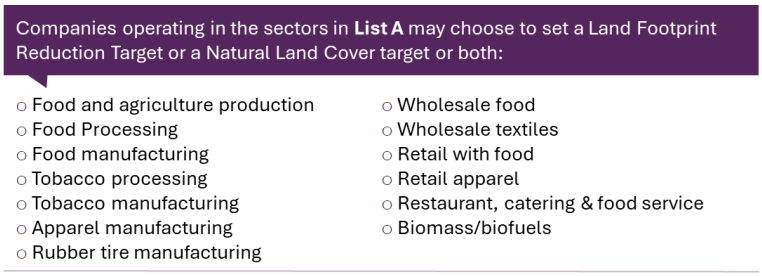

Figure 5: Sectors that can choose between a to set a Land Footprint Reduction target or a Natural Land Cover target or both (List A).

However, we strongly recommend that companies pursue both of the Land Area targets where feasible. Each target addresses a different dimension of land-related impacts and pursuing only one may lead to unintended consequences or trade-offs. For example, regenerative or agroecological practices aligned with land sharing can improve biodiversity and soil health but may reduce yields if not carefully managed. Without a parallel focus on productivity, this can result in increased land demand elsewhere in the supply chain, putting additional pressure on natural ecosystems. Conversely, land sparing through intensification alone – without integrating nature into production landscapes – can degrade soils, increase pollution, and erode long-term ecosystem services. By combining land sparing and land sharing approaches, companies can reduce their total land footprint and enhance the health and resilience of the land that remains under production.

All participants are expected to establish Land Area targets for direct operations. However, if the physical characteristics of the production units in a company's direct operations makes setting such targets unfeasible, they may focus solely on upstream targets. For instance, a retailer with only urban stores and warehouses may find it impractical to increase Natural Land Cover and can therefore set upstream targets alone. Furthermore, in cases where a participant has a mixture of production unit types in their direct operations, they may focus on those units where increasing Natural Land Cover is feasible. Each case will be assessed on an individual basis during target validation.

2.2.1. Setting the Land Footprint Reduction Target

All companies that set a Land Footprint Reduction target must follow the procedure below to identify target requirements and prepare all required materials to be submitted for target validation.

Note on Step 2:[51] Interpret & Prioritize—All locations and activities within the target boundary must be included to avoid leakage among locations. It is recommended that companies follow the prioritization approach of Step 2 to guide the implementation and achievement of the target, but all locations must be included within the scope in the first year that targets are set.

1. **Calculate baseline agricultural land footprint:** Using the SBTN Accounting Guidelines for Land-Use and the Environment (the Accounting Guidelines), the company calculates its baseline agricultural land footprint. To supplement these guidelines, companies can review the process explained in the SBTN Technical Guidance for Steps 1 and 2 (sections 3.1- 3.2), and in the GHG Protocol Land Sector and Removals Guidance (in the draft version for pilot testing and review, this can be found in sections 7.3 and 17.3 on "land occupation").

2. **Select a method for the allocation of land footprint reduction:** The company determines which of two target-setting approaches to use (see Table 9):
    - Absolute land footprint reduction approach
    - Intensity land footprint reduction approach.

[50] 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.
[51] SBTN Step 2 - https://sciencebasedtargetsnetwork.org/companies/take-action/prioritize

3. **Calculate the Land Footprint Reduction target**: The company uses the following information to calculate its percentage reduction target:
    - Preferred reduction approach (absolute or intensity)
    - Base year and target year.

4. **Target validation:** The company submits its data for target validation. Once the target is approved, the company can make a public statement as per the SBTN claims guidance.

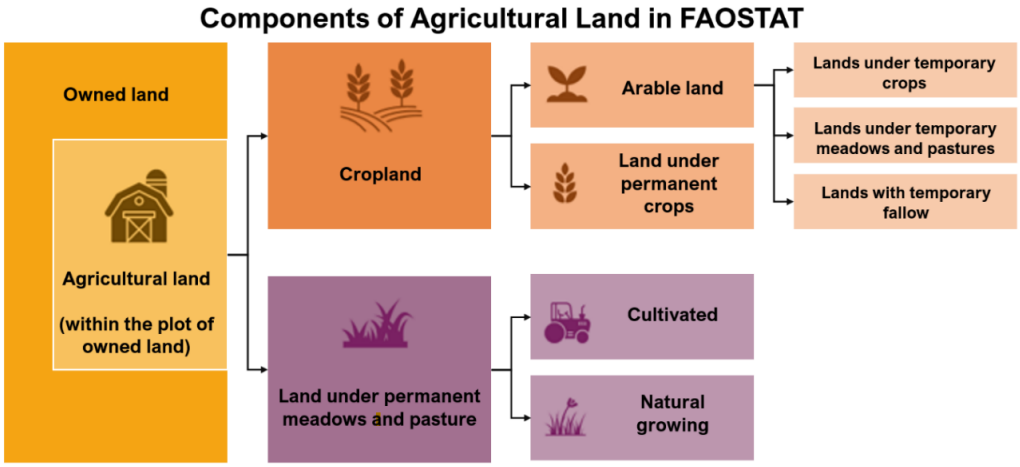

Figure 6: Components of agricultural land in FAOSTAT. Source: Land statistics and indicators: Global, regional and country trends, 2000–2020. FAO 2022.

Calculate baseline agricultural land footprint

This target applies to all agricultural land (cropland and land under permanent meadows and pastures) used to produce the products produced or sourced by a company (Figure 6).

The process to calculate a company's agricultural land footprint (whether to set a baseline or an updated annual inventory) is outlined in Chapter 6 of the accompanying Accounting Guidelines (AGILE). A high-level summary is provided below.

To calculate baseline agricultural land footprint, companies may collect spatial or statistical data as follows:

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.

Eligibility for excluding land from the Land Footprint Reduction target boundary: SBTN recognizes the complex web of social and environmental issues and trade-offs inherent in land management and land use planning. As such, if a company has a reasonable explanation for excluding areas of agricultural land from the Land Footprint Reduction target boundary due to efforts to preserve traditional livelihoods, these will be considered by SBTN on a case-by-case basis in the target validation phase

Companies proposing an exclusion of agricultural land for this reason will need to provide information on the following for these to be considered by SBTN: numbers of hectares to be excluded; location; land-use classification as per FAOSTAT; agricultural products produced on that land; production methods used on the land; and information about the landowner(s) and land manager(s). The company should also provide a justification for how exclusion of these lands from the target boundary will be beneficial for preserving traditional livelihoods.

Note on waste and residual products: If a company purchases residual products (i.e. by-products from other value chains) then the company should use an allocation method (e.g. by mass or by economic value) to estimate the land footprint of the purchased residual product. If a company sources (and does not purchase) a product that is truly a waste product (i.e. a product with no market value) it can be excluded from the land footprint.

Note on non-timber forest products: Where a company produces or sources non-timber forest products in land classified in FAOSTAT as forest then those volumes can be excluded from the land footprint calculation. This is in recognition of the role that low impact harvesting of non-timber forest products can have in bringing economic value to standing forests.

Select a method for the allocation of a Land Footprint Reduction

There are two methods for setting a Land Footprint Reduction target: the absolute reduction approach and the intensity reduction approach (Table 9). Absolute and intensity targets each have advantages and disadvantages.

Table 9: Absolute and intensity approaches to Land Footprint Reduction

Absolute land footprint reduction target	Intensity land footprint reduction target
Companies reduce their absolute land footprint at a linear rate of 0.35% per year compared with the base year	Companies reduce the land footprint per kg of agricultural products produced at a linear rate of 1% per year compared with the base year.

Absolute targets can be simpler to calculate and communicate and are more likely to result in global absolute agricultural footprint reductions at the scale required. However, they can limit smaller companies that produce or purchase land-efficient products gaining market share by constricting their ability to grow.

Intensity targets, on the other hand, can be more complex to calculate and communicate, and do not guarantee that total agricultural land use will decline even if companies hit the targets. That said, intensity targets can be appropriate for companies that produce food by helping them set a clear target for sustainable productivity gains, and intensity targets can also be appropriate for the smaller companies mentioned above.

For both types of Land Footprint Reduction targets, there is a risk that they incentivize unsustainable types of agricultural intensification, and/or that these targets incentivize consumer companies to shift their sourcing from lower- to higher-yielding areas. Annex 2a helps companies manage trade-offs and unintended consequences through response option planning, the setting of complementary environmental targets, and social safeguards.

Given the benefits and challenges with both approaches, for this version of Land targets, SBTN has left open the option for producer and consumer companies to set either an intensity or absolute land footprint reduction target. However, absolute targets are recommended for large consumer companies such as retailers given their greater ability to reduce land footprint through demand-side measures such as shifting their portfolios to less-land-intensive products. Companies should consult Annex 2a to better weigh the pros and cons of each target-setting approach for their specific context. They may also consult Table 3 in the SBTi FLAG guidance;[52] the "sector approach" in SBTi FLAG corresponds to the absolute approach for this target, and the "commodity approach" corresponds to the intensity approach for this target.

Calculate the Land Footprint Reduction target

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

- The choice of base year *must* be no earlier than 2015. (The base year does not need to align with the cutoff date(s) used as the reference for assessing conversion of natural ecosystems in the No Conversion of Natural Ecosystems target.)
- 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 five years and a maximum of ten years from the date the target is submitted to SBTN for an official validation.

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

The formula for calculating the targets depending on the approach selected is shown in Table 10. See Annex 2a for the scientific justification for the reductions needed for both target approaches.

As shown in Table 10, companies setting absolute Land Footprint Reduction targets would reduce their absolute land footprint at a linear rate of 0.35% per year, or by 3.5% by 2030, from a 2020 base year, and by 10.6% by 2050 from a 2020 base year.

Table 10: Formula for calculating the Land Footprint Reduction target

Absolute land footprint reduction target	Intensity land footprint reduction target
Number of years between base year and target year * 0.35% per year	Number of years between base year and target year * 1% per year

If a company uses the intensity approach using a 1% intensity reduction per year, it must also express the target in absolute terms. For example, if a company has a target to reduce its agricultural land footprint intensity by 8% by 2030 from a 2022 base year, if it projects 5% growth during that time, then its absolute land footprint reduction by 2030 would be 3.4%, because 0.92 * 1.05 = 0.966 or a 3.4% reduction from a 2022 base year.

Recalculation of baseline land footprint

Companies *should* seek to improve the quality of the data they collect over time, especially due to changes within the company. Based on such internal changes (outlined below and mirroring the GHGP), a recalculation of the baseline land footprint shall take place (even while keeping the base year and target year constant). Recalculations must also take place based on any new versions of the Land targets that makes changes to this target – if so, this

[52] https://sciencebasedtargets.org/resources/files/SBTiFLAGGuidance.pdf

would be communicated promptly to companies that have set this target. See the Accounting Guidelines (AGILE) for further information on recalculation.

Following the GHG Protocol, recalculation is required when the following changes occur and have a significant impact on the total land footprint 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 land footprint "inventory".

Target Template Statement

The Land Footprint Reduction target will be stated in the following forms:

- **Absolute Target:** *[Company name]* commits to reduce absolute land footprint from direct operations *[and upstream impacts]*, [*percent reduction]* % by [*target year]* from the [*base year]* base year.
- **Intensity Target:** [*Company name*] commits to reduce agricultural land footprint intensity, from direct operations [*reduction*] per [*unit*] by [*target year*] from a [base year] base year. This corresponds to a [% change] in absolute land footprint by [*target year*] from the [*base year*] base year.

Target validation and disclosure

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 (FTE).
- Disclosure of agricultural land footprint (from direct operations and/or 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 footprint (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 (e.g., 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).
- A rationale for the choice of absolute or intensity target.
- A narrative description of their strategy and potential response options for achieving their Land Footprint Reduction target, including the proposed approach to addressing potential risks associated with unsustainable intensification (e.g., focusing on areas with opportunities to sustainably improve agricultural productivity, reducing food loss and waste, shifting toward less land-intensive agricultural products), and avoiding unintended social consequences (e.g., prioritizing work with existing suppliers—including smallholders—to improve yields and productivity rather than shifting away to higher-yielding suppliers). This description should specify the strategy and potential response options across the company's value chain as well as in specific landscapes where these trade-offs are likely to exist.
- Companies submitting both Land Footprint Reduction targets and Landscape Engagement targets are required to submit information to the SBTN Target Validation Team that specifies whether and how locations and/or commodities prioritized for Land Footprint Reduction overlap with landscapes selected for the Landscape Engagement target. As noted above, given the fact that companies will not always have ownership rights over any land freed up through the Land Footprint Reduction target, SBTN has not established requirements for companies to restore that land. Instead, the mechanism for driving restoration is through the Landscape Engagement target.

In alignment with the draft GHGP Land Sector and Removals Guidance, SBTN recommends the below list of disclosure requirements for companies tracking their agricultural land footprint (called "land occupation" in the GHGP Land Sector and Removals Guidance) over time:

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

2.2.2. Setting the Natural Land Cover target

All companies required to set a Natural Land Cover target must follow the procedure below to identify target requirements and prepare all required materials to be submitted for target validation.

For this target, companies will require either point or polygon spatial data of each production unit in their direct operations. If this is not immediately available, companies need to collect these data to set this target.

Calculate Baseline Natural Land Cover

The process to calculate a company's baseline natural land cover is outlined in Chapter 6 of the accompanying Accounting Guidelines (AGILE). A high-level summary is provided in Figure 7. Note that the SBTN Natural Lands Map's definition of "natural land" includes "semi-natural land" [53]. As such, calculations of the percentage of natural land using the SBTN Natural Lands Map will inherently calculate the percentage of natural and semi-natural land.

***Figure 7:** An overview of the process to calculate baseline natural land cover.*

If a company possesses spatial natural land cover data of higher resolution or higher accuracy than the SBTN Natural Lands Map (30-meter resolution) and is more recent than 2020 (baseline of the Natural Lands Map), these data may be used instead of the Natural Lands Map to calculate baseline natural land cover. However, if the Natural Lands Map is used companies *should* seek to improve the quality of the land cover data, they collect over time.

Calculate the Natural Land Cover target

The company uses the following information to calculate the type of target to be set for each production unit:

- Natural Land Cover percentage
- Base year and target year.

The choice of base year *must* be no earlier than 2020, as this is the base year of the Natural Lands Map. (The base year does not need to align with the cutoff date(s) used as the reference for assessing conversion of natural ecosystems in the No Conversion of Natural Ecosystems target.)

The Natural Land Cover target *must* cover a minimum of five years and a maximum of ten years from the date the target is submitted to SBTN for official validation. However, companies are *encouraged* to develop long-term targets (e.g., to 2050) in addition to near-term targets.

For production units with less than 25% natural land cover per km², a target must be set to **increase** natural and semi-natural land cover to above 25% per km².

For production units with greater than 25% natural land cover per km², a target must be set to **maintain** natural or semi-natural land cover at the existing level, however companies are *encouraged* to set a target to increase natural and semi-natural land cover in these production units.

Target Template Statement

The Natural Land Cover target will be stated in the following forms:

- For companies that have natural land cover **below** 25% per km² within **a production unit**: [*Company name*] commits to increase natural land cover to 25% per km² by [*target year*] within [*production unit*] from the [*base year*] base year.
- For companies that have natural land cover **above** 25% per km² within **a production unit**: [*Company name*] commits to maintain natural land cover to at least [*baseline natural land cover value*] per km² within [*production unit*].

Target Validation and Disclosure

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

- ISIC sector classification(s) for activities within their direct operations.
- Disclosure of production unit footprints (from direct operations) in the base year.
- Calculation details for the natural land cover proportion per production unit for the base year.
- Disclose for each production unit whether the target is to increase or maintain natural land cover
- A narrative description of their strategy for achieving their Natural Land Cover target at each production unit.

[53] See Section 5.4 of the Accounting Guidelines for definitions of natural land classification within the Natural Lands Map.

2.2.3. Setting the Land Quality Targets

All companies required to set a Land Quality target must follow the procedure below to identify target requirements and prepare all required materials to be submitted for target validation. Under Land Quality there are three targets related to the following land quality categories:

- Soil organic carbon (SOC)
- Soil erosion
- Terrestrial acidification

Calculate Baseline Land Quality Indicators

A company must first establish the baselines values for each land quality category in each production unit. This is termed the product unit baselines. The processes to calculate a company's baseline land quality are outlined in Chapter 6 of the Accounting Guidelines (AGILE) and provide detailed methods for companies to calculate their impact on soil organic carbon, soil erosion and terrestrial acidification. The methods provided consist of:

- **Activity Assessment approach for soil organic carbon depletion and soil erosion:** Assessment based on land use data using Land Environmental Assessment Factors (LEAFs) (see Annex 4) to transform land use data into associated levels of maximum attainable SOC and soil erosion rates in a given location.
- **Alternative approach to calculate soil organic carbon:** Model-based, remote sensing-based and measurement-based approaches using the stock change accounting method derived from the (draft) GHG Protocol LSRG. For model-based approaches, the Rothamsted Carbon Model (RothC) [54] should be used.
- **Alternative approach to calculate soil erosion:** Revised Universal Soil Loss Equation (RUSLE).
- **Activity assessment approach for terrestrial acidification:** Assessment based on emissions of acidifying substances (ammonia, nitrogen oxides and sulfur dioxide), measured in kilograms, using characterization factors (CFs) to transform them into associated environmental impacts of terrestrial acidification, measured in kg SO_2-eq.

By following the above approach, a company will establish the ***production unit baselines*** for each land quality category. A high-level summary of the data requirements is provided in Table 11. Companies should calculate the baseline land impact at each production unit.

At a high-level, companies using the activity assessment approach will obtain the following information from it:

- For SOC, companies need to match their current land use for each production unit in the ecoregion they are located to the SOC LEAFs. In this case, LEAFs provide the Maximum Attainable SOC (MaxSOC) stock if operating conditions are kept the same. The factors then do not represent the current SOC stock of the soil, but rather an estimated potential in the future.
- For soil erosion, companies should follow the same approach as for SOC. In this case, LEAFs provide the estimated soil erosion rate for the current land use in a given ecoregion.
- Finally, for acidification, companies need to calculate their acidifying emissions and use specific ecoregional CFs to estimate their current potential terrestrial acidification impacts.

Detailed instructions are provided in Chapter 6 the Accounting Guidelines (AGILE).

SBTN *recommends* that companies baseline all three land quality categories across all production units.

Table 11: Data requirements for calculating the land quality within each production unit*.

Data	Unit	Spatial Data Requirement	Related Land Quality Category
Location of each production unit (country, sub-country, ecoregion)	-	Recommended	• SOC • Soil erosion • Terrestrial acidification
Land use type and intensity at each production unit**	-	-	• SOC • Soil erosion

[54] Rothamsted Carbon Model (RothC): Understanding Soil Carbon Dynamics -https://www.rothamsted.ac.uk/rothamsted-carbon-model-rothc

Data	Unit	Spatial Data Requirement	Related Land Quality Category
Land footprint per land use type at each production unit	ha	-	• SOC • Soil erosion • Terrestrial acidification
Time period under a given land use type per location each year	yr	-	• SOC • Soil erosion
Activity data to calculate ammonia (NH_3), nitrogen oxides (NO_x) and sulfur dioxide (SO_2) emissions (e.g. energy use) per production unit	kg	Recommended	• Terrestrial acidification

*Note these data requirements relate to the activity assessment approaches provided in the Accounting Guidelines (AGILE). Alternative approaches to the calculation of soil organic carbon and soil erosion are also provided in the Accounting Guidelines and the data requirements associated with these methods will vary from those summarized in this guidance.

**Predefined land use types are provided in the SBTN Accounting Guidelines Chapter 6.

Select the land quality categories for target setting

Review the Materiality Screening Tool and the High Impact Commodities [55] list to identify the most relevant land quality category for the company's operations. Companies that produce commodities with material terrestrial use or soil pollution are required to set one or more targets according to the following:

- Terrestrial use AND soil pollution are material: select one or more of soil organic carbon, soil erosion or terrestrial acidification for target-setting.
- Terrestrial use is material only: select either soil organic carbon or soil erosion or both for target setting.
- Soil pollution is material only: select terrestrial acidification for target setting.

Check if ecoregion thresholds have been exceeded within production unit locations

Thresholds have been generated at the ecoregion level for each land quality category and provide a science-based underpinning for what nature needs at the ecoregion level, thus informing the ambition of each target for each land quality category at this level. These ecoregion thresholds thus provide guidance in keeping a safe distance from threshold points for each land quality category and ecoregion in order to avoid unintended consequences to ecosystem resilience from further ecosystem degradation when approaching threshold points, as well as informing on the magnitude of actions that would best support an ecological system in maintaining or strengthening its resilience and resuming proper functioning if a threshold has been exceeded (See Annex 3 for further information and Annex 5 for ecoregion threshold examples). Inference from ecoregion-level thresholds are made relevant at production unit level in the instructions below. To establish if a threshold has been exceeded:

1. Determine the ecoregion that each production unit is situated within following the Dinerstein et al. 2017 [56, 57] ecoregion classification. This will produce a list of all the ecoregions that a company is operating in.
    - If a production unit is situated within more than one ecoregion, calculate the area of the production unit within each ecoregion and select the ecoregion that encompasses the largest portion of the production unit. [58]

[55] The HICL can be downloaded from the SBTN website here: https://sciencebasedtargetsnetwork.org/companies/take-action/assess/materiality-screening

56 Dinerstein, E., Olson, D., Joshi, A., Vynne, C., Burgess, N.D., Wikramanayake, E., Hahn, N., Palminteri, S., Hedao, P., Noss, R., Hansen, M., Locke, H., Ellis, E.C., Jones, B., Barber, C.V., Hayes, R., Kormos, C., Martin, V., Crist, E. and Sechrest, W. (2017). An Ecoregion-Based Approach to Protecting Half the Terrestrial Realm. BioScience, [online] 67(6), pp.534–545. doi:https://doi.org/10.1093/biosci/bix014.

57 Use https://ecoregions.appspot.com/ for reference of global ecoregions under this classification. Ecoregion shapefiles for use in spatial analyses in GIS software, as needed, can also be provided or downloaded from Dinerstein et al., 2017: https://academic.oup.com/bioscience/article/67/6/534/3102935?searchresult=1#supplementary-data

58 Ecoregion shapefiles for use in spatial analyses in GIS software, as needed, can also be provided or downloaded from Dinerstein et al., 2017: https://academic.oup.com/bioscience/article/67/6/534/3102935?searchresult=1#supplementary-data

2. Using the provided reference datasheet,[59] across all ecoregions identified in the previous step above, identify across the selected land quality categories (SOC, soil erosion, terrestrial acidification[60]), the ecoregion baseline and the ecoregion threshold.
3. Compare the ecoregion thresholds for each relevant land quality category to the respective ecoregion baselines and determine if the threshold has been exceeded in the ecoregion.
4. Determine the ecoregion target value that would potentially need to be set for each land quality category and each production unit, using the reference datasheet provided.[61]

This will provide the basis of the state of each land quality category in each ecoregion that is relevant to a company's production units under assessment, and the current condition of these land quality categories within those ecoregions.

In the next section, you will be able to identify more specifically how your company's specific commodity production in the production units under assessment relate to (i.e., exceed or don't exceed) the ecoregion thresholds and baselines for each land quality category. This will provide the guidance for how to proceed with setting these targets under a company's specific commodity production practices in these areas.

Check if ecoregion thresholds have been exceeded by company's operations

Depending on the type of land use in each relevant ecoregion (as it relates to the area where a company's production units lie in relation, identified above), a company's operations might be contributing to the steady improvement of the land condition in those ecoregions, by helping maintain or drive the land quality indicator levels in those ecoregions a safer distance from a respective threshold, or they could be worsening conditions, by pushing conditions closer towards exceeding the threshold and potentially causing the state of that ecoregion to be moved into a suboptimal, less stable operating space.

Therefore, companies also need to identify how their specific production practices relate to identified ecoregion level thresholds for relevant land quality categories. This includes an additional assessment of the specific production unit baselines for land quality categories that a company completes using the provided accounting guidelines. Using these production unit baselines, a company will then:

- For each production unit, compare the relevant ecoregion threshold for each relevant land quality category to the production unit baselines to determine if the ecoregion threshold has been exceeded [62].

Production Unit Prioritization

Depending on the thresholds that are exceeded for which ecoregions and overlapping production units under assessment, the production units for which either land quality improvement targets or land quality maintenance targets are to be set for each land quality category on the following basis: (Table 12)

- **First Priority:** If the current ecoregion baseline for a land quality category **exceeds** its respective ecoregion threshold AND the production unit baseline value **exceeds** the ecoregion threshold.
- **Second Priority:** If the current ecoregion baseline for a land quality category **does not exceed** its respective ecoregion threshold AND the production unit baseline value **exceeds** the ecoregion threshold.
- **Third Priority:** If the current ecoregion baseline for a land quality category **exceeds** the ecoregion threshold AND the production unit baseline value **does not exceed** the ecoregion threshold
- **Fourth Priority:** If the current ecoregion baseline for a land quality category **does not exceed** the ecoregion threshold AND the production unit baseline value **does not exceed** the ecoregion threshold.

[59] Ecoregion level thresholds, ecoregion level baselines (based on the ecoregion average value of each land quality category using the most up to date, global data layers for each land quality category) and targets for each land quality indicator and ecoregion (based on the referenced 10% buffer distance from each ecoregion land quality category threshold) will be provided in a datasheet when the final SBTs for Land Version 2 methods are formally launched. This is the reference that companies will use to complete this section. An example of this reference datasheet is provided in this document as an attachment to Annex 5.

[60] Note that in the thresholds work, terrestrial acidification is represented by total Nitrogen Deposition (NH_3 and Ammonia) as thresholds were identified for the terrestrial deposition of these substances which cause terrestrial acidification.

[61] Target values are based on integrating a 10% buffer around threshold values. This buffer distance is integrated to ensure that targets are set a safe distance from threshold points for land quality indicators following best practice for setting targets based on ecological thresholds. (See Annex 3, and Desmet, P. G. (2018). Using landscape fragmentation thresholds to determine ecological process targets in systematic conservation plans. Biological Conservation, 221, 257-260 for choice of the 10% buffer).

[62] For soil organic carbon, the threshold is considered exceeded when the production unit baseline value is below the SOC ecoregion threshold. As the threshold represents the level of SOC stock, higher values signify more SOC stock, indicative of higher quality soil conditions, and thus baseline values below these must be increased. For soil erosion and terrestrial acidification, the threshold is considered exceeded when the ecoregion baseline value relevant for each production unit is above the ecoregion threshold. For these indicators, the threshold represents either a rate of soil erosion or of total nitrogen (NH3 and NOx) deposition (leading to terrestrial acidification), meaning larger values signify greater levels of soil erosion and terrestrial acidification and thus greater negative impacts. Therefore, these levels must be decreased if baselines are higher than the ecoregion threshold.

For First Priority and Second Priority production units, the company needs to set a land quality **improvement** target. This target is based on a 10% buffer distance from the respective ecoregion and land quality category threshold if the threshold has been exceeded. [63, 64]

For Third Priority and Fourth Priority production units, it is *recommended* the company should, at a minimum, set a land quality **maintenance** target for this impact to be maintained at its current level.

Table 12: The criteria for determining the priority for target setting based on the degree of impact.

	First Priority	Second Priority	Third Priority	Fourth Priority
Ecoregion Baseline	Threshold Exceeded	Threshold Not Exceeded	Threshold Exceeded	Threshold Not Exceeded
Production Unit Baseline	Threshold Exceeded	Threshold Exceeded	Threshold Not Exceeded	Threshold Not Exceeded
Target Setting	Required	Required	Recommended	Recommended
Target Type	Quality Improvement	Quality Improvement	Quality Maintenance	Quality Maintenance

Amalgamating Production Units (APUs)

The expectation for setting land quality targets is that companies will set targets for each production unit with material impacts. However, some companies may have tens or hundreds of production units in their direct operations, making production unit level targets unfeasible to deliver. Therefore, some companies may set targets at an amalgamated level to reduce the data and effort burden.

In SBTN Step 1, companies will have assigned their production units to ISIC categories. Companies with more than five production units per ISIC category in a single ecoregion may set an amalgamated target for those units. Primary land quality data will still need to be collected for each production unit, but these values may be averaged across the set of amalgamated units in the same ISIC category. These amalgamated production unit baselines will be compared with the respective ecoregion threshold for the ecoregion in which they sit. If the amalgamated baseline average exceeds the threshold for the land quality indicator and ecoregion, a target will be set (10% safe buffer distance from the threshold) per ecoregion and land quality indicator, at the level of ISIC category in each evaluated ecoregion.

If a company has **>5** production units in one ISIC category in an ecoregion, production units can be amalgamated as follows:

- Calculate the production unit baseline for each land quality category (soil organic carbon, soil erosion and terrestrial acidification) for each production unit following the steps outlined in Chapter 6 of the accompanying Accounting Guidelines.
- For each land quality category, average the baseline values across all production units within the same ISIC category within a single ecoregion to determine an average baseline value per ISIC category per ecoregion. This is termed an 'amalgamated production unit baseline'.
- Compare the amalgamated production unit baseline to the relevant land quality ecoregion threshold value to determine whether the threshold has been exceeded following the same approach as outlined in the 'Calculate if thresholds have been exceeded' section.

Setting Land Quality Targets

Companies that have identified First Priority or Second Priority production units, or amalgamation of production units that are First Priority or Second Priority, are required to set Land Quality targets for 10% of the ecoregions they have direct operations on, up to 10 ecoregions if they operate in more than a 100. Companies are required to select first ecoregions with First priority production units and, if the 10% has not been reached, continue with ecoregions Second Priority production units. This should be done independently for each land quality category.

To select those ecoregions, companies should consider their land footprint or total production, as well as the level of exceedance between the ecoregion's threshold and their production unit baselines. Companies can also consider

[63] See Footnote 61 for brief explanation of 10% distance buffer between thresholds and their targets, Annex 3 for more details on reasoning for the 10% threshold safe buffer distance, and Annex 5 with attached datasheet for threshold example, including targets for all thresholds based on 10% safe distance from thresholds across ecoregions and land quality categories

[64] For soil organic carbon, the threshold is considered exceeded when the production unit baseline value is below the SOC ecoregion threshold. As the threshold represents the level of SOC stock, higher values signify more SOC stock, indicative of higher quality soil conditions, and thus baseline values below these must be increased. For soil erosion and terrestrial acidification, the threshold is considered exceeded when the ecoregion baseline value relevant for each production unit is above the ecoregion threshold. For these indicators, the threshold represents either a rate of soil erosion or of total nitrogen (NH_3 and NOx) deposition (leading to terrestrial acidification), meaning larger values signify greater levels of soil erosion and terrestrial acidification and thus greater negative impacts. Therefore, these levels must be decreased if baselines are higher than the ecoregion threshold.

other criteria during the selection process, including if the ecoregion has First or Second priority production units in more than one land quality category, proximity to KBAs, supply chain risk, inclusion of production units in the Land Area targets, or ease of implementation.

Companies that have identified Third Priority and Fourth Priority production units that have chosen to set targets can follow a similar approach to First Priority and Second Priority production units respectively. This will ensure that companies maintain beneficial practices in ecoregions where thresholds have been surpassed and maintain stable conditions and ecological resilience in ecoregions where they have not yet been crossed.

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

CONSULTATION QUESTION

Below is a potential alternative approach for ecoregion selection for target setting (We are seeking feedback on this alternative approach. Please see the Target 2 section in the public consultation survey questionnaire).

In order to select these ecoregions, companies will consider simultaneously the distances of the production unit land quality category baseline to the respective ecoregion land quality category thresholds, as well as the size of companies' operations. The following ranking and selection process should be followed:

- *For all First Priority production units and for each land quality category independently, calculate a land quality score by multiplying the total land footprint of each production unit by the difference between the ecoregion threshold and the production unit baseline*
- *In the case the company has several production units or amalgamated production units in an ecoregion, sum the total land quality score of each of them.*
- *Rank all ecoregions by land quality score from largest to smallest. Select the top 10% ecoregions, up to a 10, for each land quality category. If an ecoregion has First Priority production units on more than one land quality category, those should be included first.*
- *For companies with more than 5 amalgamated production units (APUs) per ecoregion after amalgamation, companies are recommended to set targets for all. Nevertheless, if that proves unfeasible, companies should include APUs that represent 80% of the total ecoregion land quality score.*
- *If after selecting all ecoregions with First Priority production units the company has not reached 10% of the ecoregions they operate within, companies should continue selecting ecoregions with Second Priority production units following steps 1 to 4 above until they have hit 10% of all ecoregions they operate within.*

Target Template Statement

The Land Quality target will be stated in the following forms:

Soil Organic Carbon

- For companies that have **exceeded** the applicable threshold within **a production unit**: [*Company name*] commits to increase the soil organic carbon stock to above [*target value*] t C ha^{-1} yr^{-1} within [*production unit*] in [*ecoregion*] ecoregion by [*target year*] from the [*base year*] base year.
- For companies that have **exceeded** the applicable threshold within **an amalgamated product unit**: [*Company name*] commits to increase the soil organic carbon stock to above [*target value*] t C ha^{-1} yr^{-1} on average across its [*insert ISIC classification*] production units in [*ecoregion*] ecoregion by [*target year*] from the [*base year*] base year.
- For companies that have **not exceeded** the applicable threshold within **a production unit**: [*Company name*] commits to maintain the soil organic carbon stock above [*target value*] t C ha^{-1} yr^{-1} within [*production unit*] in [*ecoregion*] ecoregion.
- For companies that have **not exceeded** the applicable threshold within **an amalgamated product unit**: [*Company name*] commits to maintain the soil organic carbon stock to above [*target value*] t C ha^{-1} yr^{-1}, on average across its [*insert ISIC classification*] production units in [*ecoregion*] ecoregion.

Soil Erosion

- For companies that have **exceeded** the applicable threshold within **a production unit**: [*Company name*] commits to reduce the soil erosion rate to below [*target value*] t ha^{-1} yr^{-1} within [*production unit*] in [*ecoregion*] ecoregion by [*target year*] from the [*base year*] base year.
- For companies that have **exceeded** the applicable threshold within **an amalgamated production unit**: [*Company name*] commits to reduce the soil erosion rate to below [*target value*] t ha^{-1} yr^{-1} on average across its [*insert ISIC classification*] production units in [*ecoregion*] ecoregion by [*target year*] from the [*base year*] base year.

- For companies that have **not exceeded** the applicable threshold within **a production unit**: [*Company name*] commits to maintain the soil erosion rate below or equal to [*baseline soil erosion value*] t ha^{-1} yr^{-1} within [*production unit*] in [*ecoregion*] ecoregion.
- For companies that have **not exceeded** the applicable threshold within **an amalgamated production unit**: [*Company name*] commits to maintain the soil erosion rate below or equal to [*baseline soil erosion value*] t ha^{-1} yr^{-1} on average across its [*insert ISIC classification*] production units in [*ecoregion*] ecoregion.

Terrestrial Acidification

- For companies that have **exceeded** the applicable threshold within **a production unit**: [*Company name*] commits to reduce the terrestrial acidification rate below [*target value*] kg SO_2-eq within [*production unit*] in [*ecoregion*] ecoregion by [*target year*] from the [*base year*] base year.
- For companies that have **exceeded** the applicable threshold within **an amalgamated production unit**: [*Company name*] commits to reduce the terrestrial acidification rate below [*target value*] kg SO_2-eq on average across its [*insert ISIC classification*] production units in [*ecoregion*] ecoregion by [*target year*] from the [*base year*] base year.
- For companies that have **not exceeded** the applicable threshold within **a production unit**: [*Company name*] commits to maintain the terrestrial acidification rate below or equal to [*baseline terrestrial acidification value*] kg SO_2-eq within [*production unit*] in [*ecoregion*] ecoregion.
- For companies that have **not exceeded** the applicable threshold within **an amalgamated production unit**: [*Company name*] commits to maintain the terrestrial acidification rate below or equal to [*baseline terrestrial acidification value*] kg SO_2-eq on average across its [*insert ISIC classification*] production units in [*ecoregion*] ecoregion.

Target validation and disclosure

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

- ISIC sector classification(s) for activities within their direct operations.
- Disclosure of production unit footprints (from direct operations) in the base year and their respective ecoregion.
- Disclosure of the production units that have been amalgamated (if relevant), and their respective ISIC categories and ecoregions
- Disclosure for each production unit and/or amalgamated production unit the calculated baseline value for each land impact category
- Disclosure for each production unit and/or amalgamated production on whether the threshold has been exceeded and the relevant priority.
- Disclosure of the target values for First Priority and Second Priority exceeded thresholds.
- A narrative description of their strategy for achieving their Land Impact target(s) at each production unit.

2.3. Why is the Working Land Regeneration and Restoration target needed?

The most dominant threat to terrestrial nature is the conversion of natural land to agricultural land. SBTN Land targets ask companies to directly address this threat through the no conversion of natural ecosystems target. However, for land that is already converted there is a massive opportunity to support regeneration and restoration activities that support improvements to natural and semi-natural land cover and improvements in the quality of previously converted land. In fact, the area globally available for such improvements, combining all agricultural (4.76 billion hectares), forestry (1.15 billion hectares) and other commodity production lands global exceeds 6 billion hectares. The largest potential for land-based improvements to ecological condition and biodiversity exist within these working lands.

Expanding human activity at the expense of natural ecosystems and biodiversity has historically been considered a precondition for economic development. However, there is an abundance of evidence that it is both possible and necessary to halt conversion of natural ecosystems and regenerate and restore hundreds of millions of hectares of working land, all while supporting development goals and objectives. The Kunming-Montreal Global Biodiversity Framework targets, the Paris Agreement, and the Sustainable Development Goals all rely upon transformation of land systems at this scale to realize the future for humanity inherent in these frameworks.

While the massive land area designated as working lands is important in achieving these global objectives, the complexity of land ownership, access, tenure, and management across public and private sector actors is confounding. While countries can make commitments to global environmental conventions and work to reform national policy in support of their objectives, the production of commodities and their exchange takes place largely within or mediated by the private sector. The working land regeneration and restoration target provides an implementation vehicle for these global goals within working lands that is actionable in a voluntary context by the private sector.

To accomplish this the Working Land Regeneration and Restoration target combines both an area-based and quality-based approach for land under management by human activities. The area-based targets ask companies to increase the coverage of natural or semi-natural land (in line with SBTN's definition of Natural Land) to a minimum of 25% per km^2 and/or a reduction in land footprint (for agricultural companies). Paired with these area-based improvements, companies will also set science-based targets on land quality that are aligned with ecoregional thresholds. This approach to target setting is novel and responds to a more nuanced understanding of land quality and natural area needs within a more localized context. The working lands target, for the first time, will allow companies to plan and implement actions specifically designed to improve land area and quality metrics backed by place-based need and ecoregional condition. For companies that engage in SBTN land targets to support supply chain resilience, the working land target provides specific, localized thresholds for how to understand and set land targets in support of this resilience.

Target 3:
Landscape Engagement

Target 3: Landscape Engagement

This chapter of the SBTN Land Guidance sets out:

1 Information on what is a Landscape Engagement target

2 Information on how to set, report, and communicate on Landscape Engagement

3 Technical annexes and supplementary material articulating the scientific bases of the target and other supporting materials

3.1. What is a Landscape Engagement target?

The intention of landscape engagement is to incentivize **regenerative, restorative, and transformational actions** in landscapes that are relevant for a company's operations and supply chains. The third Land target therefore complements Target 1 and Target 2, which are focused on the avoidance and reduction of impacts and the regeneration and restoration of working lands. This trio of Land targets incentivizes actions that span all categories of the SBTN AR3T Framework. Section 3.2.6 presents a more detailed overview of the interconnection that exists between the three Land targets, biodiversity, and climate and freshwater and ocean science-based targets.

The importance of landscape-scale engagement is that it allows for the consideration of multiple objectives of multiple stakeholders, including nature. Since most landscapes that are material to a company involve a matrix of different non-natural, semi-natural, and natural land cover and use, a landscape-scale engagement helps to determine larger-scale impacts and dependencies among land-use types, nature and natural processes, and the stakeholders that rely on functional landscapes. Working at the landscape scale to understand the landscape condition, constraints, and trajectory is the prevailing approach to a theory of change that will allow for a safe and just future for humanity in nature.

Building on Version 1, this updated guidance now includes under Target 2 quantitative methods for calculating land quality to include greater specificity for companies in directing actions that consider place-based characteristics and ecological thresholds for these identified land quality indicators, at the ecoregion level. As specified under the expanded Target 2, companies are expected to take actions in landscapes linked to their direct operations and upstream supply chains to drive targeted and ecological and social benefits, while also creating an enabling environment for achieving these goals. As in Version 1, the Landscape Engagement target continues to use existing landscape initiatives as a vehicle to drive the implementation of corporate actions that must be deployed collectively and at scale to support corporate Landscape Engagement targets. The urgency of biodiversity loss and land degradation, and the need for collective action and financing at the landscape scale is critical, and thus the Landscape Engagement target aims to address this.

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

The Landscape Engagement target requires companies to:

1. Engage in either
   - **One landscape initiative that is equivalent to a 10% coverage of the company's estimated land impact area footprint.**
     - The 10% coverage is recommended following the SBTN Step 2 Guidance, which recommends companies to use the outcome of their land-use target boundary rankings (combined with biodiversity) and to address the top 10% of areas within the target boundaries for land use or change and/or soil pollution.
     - The prioritized list of Step 2 should include, for each target boundary, sites that cover at least 10% of the total direct operations and upstream target boundaries (respectively).

   OR

   - **Two landscape initiatives, regardless of their size, in materially relevant landscapes.**

2. **Select landscapes** following the two approaches to selection of material landscapes listed in section 3.2.1.
3. **Evaluate the prioritized landscape initiatives** ensuring that these initiatives comply with the key criteria for validated landscape initiatives identified in section 3.2.3 and taking into account ecological thresholds.
4. **Commit to a substantial improvement** of the ecological and social condition and metrics of the landscape.
5. **Develop an action plan** for engagement in the landscape(s).

For companies that are already investing in landscape initiatives, landscape engagement may provide a simplified, integrated framework for quantifying and recognizing such contributions. However, the extent to which existing company actions within landscape initiatives contribute toward their science-based target depends first on their materiality to the landscape. Actions taken in landscapes that are only site-based and/or not materially relevant to a company cannot satisfy the requirements of the Landscape Engagement target.

Additional guidance for companies on what constitutes a landscape investment or action that could be recognized by SBTN is provided by ISEAL [65] and outlines that the landscape investment or action:

- addresses critical sustainability issues in the landscape and contributes to agreed landscape goals;
- aims to have impacts beyond individual supply chains;
- includes support to multi-stakeholder landscape coordination processes;
- is embedded in collective action plans, ensuring complementarity with other activities and interventions in the landscape; and
- contributes to broader systems level change, helping to create the enabling conditions for achieving agreed landscape goals.

Therefore, companies that are already involved in selected landscape initiatives must demonstrate both the materiality and quality of landscape initiatives in which they are currently engaged as well as the minimum land impact area coverage. It is also important that a commitment to Landscape Engagement under SBTN represents an acceleration of ambition, not only a recognition of the existing engagement of companies in landscape initiatives. Here, demonstrating additionality is also key, but not prescriptive, such that increased engagements in existing material landscapes would likely qualify.

When landscape initiatives are not present in any of the prioritized locations or they do not meet the key criteria, companies can rely on their roadmap documentation showing the planned steps to meet the criteria or they can develop new landscape initiatives.

Social, human, land rights

All actions proposed within a landscape initiative must adhere to social safeguards and follow best practices with respect to human rights and the recognition of Indigenous peoples and other impacted/affected stakeholders. Companies must respect the rights of Indigenous peoples to free, prior, and informed consent and engage with stakeholders as equals rather than only as beneficiaries. Companies engaged in science-based targets must attempt to include all relevant stakeholders in the process. Respect for human rights and effective and informed participation is crucial for any landscape initiative's success (see also Proforest, 2023).[53] For additional guidance please see SBTN's Stakeholder Engagement Guidance. [66]

SBTN also recognizes that ambitious land targets may bring with them risks of limiting vulnerable producers' and smallholders' opportunities to benefit from corporate supply chains and associated resources. For this reason, it is important that desired conservation/regeneration outcomes and the equity and rights of local producers and smallholders in their access to markets are recognized, and potential perverse social outcomes are evaluated as part of the target validation process and continuously reevaluated as companies make progress on their target.

Therefore, companies should include a preliminary assessment of the potential consequences of their actions to be implemented in landscape initiatives in their target documentation, to identify any potential for negative or unintended impacts on people and the environment. Engagement within a multi-stakeholder process can expose companies to stakeholders that may more clearly see such risks and is a clear benefit of broad stakeholder engagement within a landscape context as part of a landscape initiative. Here, companies can be more aware of potential trade-offs and consider whether these trade-offs are acceptable or not within the context of the landscape initiative and land targets.

In the latter case, steps need to be taken to avoid or mitigate these unacceptable outcomes. The company should then be able to better communicate about any trade-offs and the steps taken to avoid or mitigate any unacceptable outcomes (see also ISEAL, 2023). [67]

[65] https://www.isealalliance.org/get-involved/resources/joint-landscape-position-papers-20222023
[66] https://sciencebasedtargetsnetwork.org/wp-content/uploads/2024/10/Stakeholder-engagement-guidance-v1-0.pdf
[67] Respecting Rights of Indigenous Peoples and Local Communities in Landscape Initiatives: A Guide for Practitioners on Minimum Safeguards and Evolving Best Practices. 2023. https://www.proforest.net/fileadmin/uploads/proforest/IPLCs_ in_Landscape_Initiatives.pdf

3.2. How to set a Landscape Engagement target

Materially Relevant Landscapes

All companies required to set a Landscape Engagement target (see section i, "How to determine if your company must set Land targets") must follow this summarized procedure to identify target requirements and prepare all required materials to be submitted for target validation.

1 Selection of landscapes for engagement

- Use one of two approaches (outlined in more detail in section 3.2.1 below) for prioritization of landscapes:
  - **Approach 1:** Choosing landscapes for engagement in connection with SBTN Steps 1 & 2 and in connection with a **Working Land Regeneration and Restoration** target.
  - **Approach 2:** Choosing landscapes for engagement in connection with a **No Conversion of Natural Ecosystems target**.
- Evaluate existing candidate prioritized landscape initiatives against the Maturity Matrix and key criteria for landscape investments and actions.
- Calculate % coverage of land use impact of selected initiatives.
- If, while selecting landscapes for engagement, companies are not able to find an existing landscape initiative in prioritized landscapes, they can set up new initiatives following the key criteria to be validated in the target validation process.
- AGILE Chapter 7 provides guidelines for companies to set baselines and measure progress on selected landscapes for engagement.

2 Commit to substantial improvement of ecological and social conditions in the landscape

This commitment must be in line with the selected landscape initiative objectives and material land impacts. Companies commit to substantially increasing ecological and social conditions at the landscape level for the selected landscapes using recommended metrics and stakeholder-defined landscape initiative objectives. Calculating the baseline information on selected landscapes is not a requirement for setting a Landscape Engagement target but it is necessary to demonstrate progress on this target.

3 Develop an action plan for engagement in the landscape

- Companies commit to develop and/or contribute to collective actions within landscape initiatives.
- Companies assess the potential negative social or environmental impacts from their potential engagement in the landscape.
- Companies should choose appropriately aligned indicators to measure and track progress in their landscape initiatives

4. Target validation

A company is ready to submit its data for target validation (see section 3.3, "Target validation and disclosure"). Once the target is approved, a company can make a public statement as outlined in the SBTN claims guidance.

3.2.1. Selection of material landscapes— two approaches

Two main approaches are outlined in Table 13. They provide guidance on how a company will prioritize landscapes for engagement:

Table 13: Two approaches for selecting material landscapes.

Approach 1	
Choosing landscapes for engagement in connection with SBTN Steps 1 & 2 and in connection with Working Land Regeneration and Restoration target	This approach should be followed by companies that are setting a Working Land Regeneration and Restoration target or have material impacts in their supply chains for one or more of the land quality categories.
Approach 2	
Choosing landscapes for engagement in connection with a No Conversion of Natural Ecosystems target.	This approach is suitable for companies with **significant amounts of conversion** within their operations or supply chain.

APPROACH 1. CHOOSE LANDSCAPES FOR ENGAGEMENT IN CONNECTION WITH SBTN STEPS 1 & 2

This approach should be followed by companies that are required to set a Working Land Regeneration and Restoration target or have material impacts in their supply chains for one or more of the land quality categories as described in section 2.1.3.

After using the SBTN methods for Step 1: Assess and Step 2: Interpret & Prioritize, companies will have already estimated their value chain pressures and know where these are occurring.

Using the pressure estimates generated for those sector activities or high-impact commodities for land use (km^2)[68] and the associated states in the Step 1b: Value Chain Assessment, companies can choose the landscapes within which to set Landscape Engagement targets in several ways.

For companies who are only setting SBTN Land targets, it is recommended that they use a combination of impact of land use area and state of nature assessment approaches to determine the top-ranked landscapes for which to set Landscape Engagement targets.

a. Using the outputs of Step 1b and Step 2, rank landscapes using:

   i. land use area (km^2); and

   ii. any combination of terrestrial ecosystem state of nature (pressure-sensitive and biodiversity) metrics (e.g., extent of natural ecosystems, species threat abatement and restoration (STAR) metric) to rank landscapes for potential engagement.

b. Choose a % land area coverage based on the land use area for the company supply chain as appropriate to the company supply chain position.

   i. We recommend at least 10% coverage out of the land use area of the supply chain of a company for a validated target.

   ii. The number may be higher for production-side companies and lower for demand-side companies.

   iii. In the validation form, companies should disclose the approach to landscape selection and % coverage including a justification statement for each.

   iv. As noted in target validation requirements, when the percentage of coverage is 10% or more of the total land use area, then the requirement on coverage is satisfied. Otherwise, a company must engage in an additional landscape initiative, for a total of two, and will satisfy the requirement regardless of the coverage.

1. **For companies who are setting multiple targets across water, land, oceans and climate**, we recommend an impact on multiple pressures with a state of nature assessment.

a. Companies should follow the same approach as outlined above, but also **add priority water basins, marine ecosystems or climate impact landscapes to the analysis to maximize multiple benefits across targets, as suggested in Step 2.**

b. Companies will need to concentrate resources across multiple areas of activity—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 on places that provide multiple outcomes

Note: The Land Footprint Reduction component of Target 2 does not mandate that the lands taken out of production are restored to natural lands since these methods cannot hope to capture the tenure and rights contexts of all such lands in addition to other data constraints. That said, restoring lands taken out of production is a worthy goal and central to the natural land cover target (under Target 2) as well as a contribution to a Landscape Engagement target. In addition, a Landscape Engagement target can help companies and other stakeholders link goals to sustainably boost productivity with goals to protect and/or restore natural ecosystems in critical landscapes.

Companies who set a Land Footprint Reduction target must use the Landscape Engagement target to align lands removed from production with local or regional landscape initiatives, as well as the biodiversity (CBD), climate (UNFCCC), and land degradation (UNCCD) agendas over time.

Box 6: 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 fiber sourced), it may be more appropriate to prioritize landscapes using the state of nature assessment.

To comply with this approach, companies should complete the assessment in Step 1b and Step 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

[68] Note. Where necessary Step 2 methods will be updated to align to expanded Target 2 requirements for setting Land Quality targets.

document the rationale. Please note that this approach will be accepted for the next 1-2 years of SBTN Land targets.

Companies are also encouraged to include information provided by ecological thresholds data to help inform selection of landscape initiatives, where possible. For example, areas where the ecoregion level average [69] of particular land quality indicators (see below) has exceeded ecoregion thresholds for those indicators, may be prioritized due to the more pressing need to improve ecological conditions in these areas in relation to areas that may have more stable conditions. Ecoregion thresholds may also be used where relevant for a given landscape initiative to inform the level of ambition of actions on the ground that contribute to improvement of ecological conditions. For example, to understand by how much the levels of one of the land quality indicators should be improved if the current levels have exceeded thresholds for that indicator and ecoregion in which a landscape initiative is chosen or created.

The indicators for which ecoregion thresholds exist are as described for the Land Quality categories in Target 2, Land Quality, as well as natural vegetation cover threshold: [70]:

- Natural vegetation cover (%)
- Soil Organic Carbon (SOC) stock (t/ha, 0-30 cm depth)
- Soil Erosion (soil displacement by water, $t/ha^{-1}\ yr^{-1}$)
- Terrestrial eutrophication + acidification (Total atmospheric nitrogen deposition, $kg\ N\ ha^{-1}\ yr^{-1}$)

Refer to Annex 3 for further details on ecological thresholds.

Companies should report on the % of their land footprint that each landscape initiative is estimated to cover in their validation submission and track and disclose changes in land footprint related to those landscape initiative(s) over time.

APPROACH 2. CHOOSE LANDSCAPES FOR ENGAGEMENT IN CONNECTION WITH A NO CONVERSION OF NATURAL ECOSYSTEMS TARGET

The No Conversion of Natural Ecosystems target requires companies to commit to achieving no conversion across their operations and supply chain volumes and to make and disclose progress toward that goal. Following this approach, companies will select landscapes based on the assessment of conversion that occurred between the cutoff date and the date their No Conversion target is set. These should be landscapes that exhibit the highest levels of ecosystem conversion.

Landscape initiatives and collaboration between multiple stakeholder groups can help companies in their efforts to achieve Target 1: No Conversion of Natural Ecosystems.

Additionally, collective action in landscape initiatives, such as between producers of conversion-driving commodities, sourcing companies, and local communities and administrations, can support the remediation of land that was converted post cutoff date.

Please see section 3.2.6 for further elaboration on how landscape initiatives can support the achievement of Target 1 on No Conversion of Natural Ecosystems.

3.2.2. Screening of landscape readiness—Maturity Matrix

CDP, in collaboration with the SBTN Land Hub, ISEAL and LandScale, developed the landscape Maturity Matrix, where the concept of maturity is used to understand whether an initiative contains the elements necessary for lasting positive impact and resilience over time. CDP's Maturity Matrix provides a valuable framework for assessing the quality of disclosure data and enabling organizations implementing or supporting landscape initiatives to gain a better understanding of the minimal elements of what constitutes a credible disclosure of corporate engagements in landscape initiatives.

[69] Ecoregion average is referred to as an ecoregion baseline in the Target 2 text and refers to the measured ecoregion average of each land quality category/indicator using the same data layers used in the threshold modelling analyses. To that end, these average levels or baselines may be from different years, depending on the most up to date global layers representing the land quality categories under assessment but are referred to as current baselines for simplicity in the text.

[70] This natural vegetation cover threshold differs from the natural land target in Target 2, Land Quality in a few keyways; namely, how it was derived and its implications are a key difference. This natural vegetation cover threshold was derived using the same modelling approach as the other land quality category thresholds used to inform Target 2, Land Quality with the same conditions, variables and parameters considered. This threshold was also defined considering all-natural vegetation in relation to ecoregion stability (See Annex 3). The natural land target in Target 2, on the other hand, focuses on the amount of natural land to be maintained within working lands specifically, with a particular emphasis on the extent needed to maintain particular Nature's Contributions to People (NCP) within working lands, as outlined in the work from which it is derived (See: Mohamed, A., DeClerck, F., Verburg, P. H., Obura, D., Abrams, J. F., Zafra-Calvo, N., ... & Stewart-Koster, B. (2024). Securing Nature's Contributions to People requires at least 20%–25%(semi-) natural habitat in human-modified landscapes. One Earth, 7(1), 59-71.
Also see: Rockström, J., Gupta, J., Qin, D., Lade, S. J., Abrams, J. F., Andersen, L. S., ... & Zhang, X. (2023). Safe and just Earth system boundaries. Nature, 619(7968), 102-111.

This understanding is essential to determine the credibility and quality of the way that a corporate is engaging in a landscape initiative. The Maturity Matrix (see Table 14) is built on the core principles of landscape and jurisdictional initiatives[71] and the key characteristics of effective corporate engagement.

The key criteria outlined in the Maturity Matrix guide companies setting a Landscape Engagement target in assessing and prioritizing landscape initiatives for their engagement.

More broadly, the Maturity Matrix can guide company investment and action in landscape initiatives and stimulate the adoption of transparent reporting systems through which a company can demonstrate its contribution to the actions and processes that form the core of the initiative.

The key criteria are based on:

1. The scale of the initiative.
2. The involvement of multi-stakeholder groups in the process.
3. The identification of collective goals and action and investments to be deployed collectively to achieve the goals.
4. The presence of a transparent reporting or information system.

Three broad levels of maturity have been defined, considering the four criteria outlined above with more detailed descriptions of each in Table 14:

Comprehensive

- The landscape or jurisdictional approach is robust and at a stage of maturity to deliver lasting sustainability outcomes at the scale of the landscape in question.
- Companies engaging in comprehensive initiatives should be able to demonstrate that the initiatives fully incorporate all four criteria of landscape and jurisdictional approaches. 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 should demonstrate that the initiatives have adequate conditions for the maintenance/permanence of those elements secured in time.

Partial

The initiative is in an early or middle stage of development and demonstrates that it is progressing steadily toward maturity. The initiative should comply with the first criteria of scale and companies should be able to demonstrate that actions or investments are supporting the progress toward complying with the three additional criteria.

Uncertain

- The landscape or jurisdictional approach does not qualify as credible or mature.
- Initiatives not qualifying either do not operate at the scale of a recognized geographic, administrative, or ecological boundary (e.g., are exclusively site- based), or do not demonstrate evidence of addressing or planning to address the additional three criteria.

[71] Sayer, J. et al. (2013). Ten principles for a landscape approach to reconciling agriculture, conservation, and other competing land uses. Proceedings of the National Academy of Sciences, 110(21):8349–8356.

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 stakeholder groups (civil and government) are organized and involved in the design, implementation, and monitoring. Gender, age, and local and Indigenous community representativity is ensured and effectively included. E.g., NGOs, local and Indigenous communities, local governments, and the private sector regularly meet to collaborate and discuss the progress and next steps on the initiative.	Stakeholders have defined collective goals related to human wellbeing, sustainable production (e.g., of high-impact commodities), biodiversity, and landscape conservation. Collective actions and investments are 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 of an assessment baseline using a recognized global assessment and is now supporting an independent monitoring system for the initiative that 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 stakeholder 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 are planned 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 distinct and separate boundaries, or does not describe any boundary.	Only the reporting company is involved in the initiative. No additional stakeholder groups participate in the initiative.	Only internal company objectives are included, or holistic goals have not yet been determined. E.g., selected goals and qualitative responses only address production/ productivity goals.	Only the reporting company carries out monitoring and internal reporting for its own goals; there is no collective information system in place.

Table 14 : Landscape and jurisdictional Maturity Matrix.

3.2.3. Key criteria for validated landscape initiatives and self-assessment

The key requirements of landscape initiatives for target validation are:

1 **Criterion 1.** The boundary that the landscape initiative is aiming to exert influence over follows the boundary of either a jurisdiction, watershed, ecoregion or another area considered to be of ecological or socio-economic importance. When the area is not defined following ecological, jurisdictional, or water-basin boundaries, then the area must be at least 10,000 ha.

2 **Criterion 2**. The visions and needs of relevant stakeholder groups must be included in the design, implementation, and monitoring of an initiative.

a. At least three stakeholder groups have participated in one or more phases of the landscape initiative.

b. A written collaboration agreement has been developed and signed by participating landscape stakeholders to formalize the partnership.

2. **Criterion 3.** There are collective objectives and actions for nature and people.

a. At least three landscape objectives have been identified, including at least one environmental objective and one social objective. Each objective includes a specific, measurable milestone that the initiative aims to achieve by a specific date e.g., reduce deforestation by 20% in relation to the 2020 baseline by 2030.

b. A collective action plan that aims to contribute to meeting the defined landscape objectives has been developed and is publicly available.

3. **Criterion 4.** There are transparent reporting and presentation/information systems sharing the actions/investments made in the initiative.

a. Regular reports are produced to describe the progress and setbacks in implementing the activities included in the action plan.

b. A baseline assessment of the ecological and social condition of the landscape has been conducted and is publicly available. This should include at least one indicator that is relevant to each landscape goal.

c. A time-series including at least two results (the baseline result and one more-recent result) is publicly available for all indicators included in the baseline assessment.

d. All results included in the baseline assessment of landscape performance, or subsequent assessments of landscape performance, have been validated by an entity with some degree of independence from those involved in conducting the assessment and the landscape initiative.

The key criteria of landscape initiatives presented in the previous section inform the key requirements that the landscape initiative selected for engagement and presented for target validation must fulfil.

SBTN *recommends* that companies:

- engage in initiatives that are not yet mature and follow the guidelines provided in this chapter and in supplementary material for improving the maturity of the initiatives;
- establish new landscape initiatives beyond target requirements, as multi-stakeholder, collective action will be crucial in achieving science-based targets for nature at scale, and;
- Take into account ecological, ecoregion-level thresholds for inference in the landscapes that have been shortlisted – where possible directing actions and financing towards initiatives that could contribute to support improvement of ecosystems away from threshold boundaries to more favorable conditions. Thresholds can guide ambition on by how much conditions for the particular indicators, for which ecoregions thresholds have been derived,[72] can be improved upon, in relation to measured ecoregion averages or, where available, current levels within the landscape initiative boundary as assessed by the landscape initiative. Companies should also include information provided by ecological thresholds data to help inform selection of landscape initiative. For example, areas where the ecoregion level average (baseline) of particular land quality indicators has exceeded ecoregion thresholds for those indicators, may be prioritized due to the more pressing need to improve ecological conditions in these areas in relation to those that may have more stable conditions. Refer to Annex 3 for further details on ecological thresholds.

By assessing the initiative(s) with the four criteria above, the company might fall into three different scenarios, listed below. For each scenario, the company will have to provide a list of documents, called roadmap documents.

[72] See above for reference to indicators for which ecoregion thresholds exist, or Annex 3 for more details

The three scenarios are:

Scenario 1: the landscape initiative is present, and it meets all four of the key criteria

- In this case, the landscape engagement roadmap information needs to be comprehensive in showing the structure and governance, but most importantly it needs to document how the company is planning to achieve the improvements in ecological and social conditions.
- The actual linkage of actions to results will be part of Step 4, but in this phase the company needs to build the baseline for the landscape initiative and still provide accurate information on its presence in the initiative.
- The information needs to include the list of selected metrics and indicators (part of the list below) for the whole area that the landscape initiative is working to influence, so that the company can then demonstrate the improvement of its investment to the overall landscape (e.g., restoration, regeneration, improvement of ecological conditions, etc.).

Scenario 2: the landscape initiative is present, but the structure/governance does not meet all the key criteria

In this case, the roadmap information needs to include:

- How to improve the governance and structure of the initiative, in order to meet the key criteria.
- How to achieve ecological and social conditions.

Some requirements of the roadmap information are less strict in this case, since initiatives might not have all the documentation ready and/or might still miss certain governance/transparency, which the company is working on.

Scenario 3: the landscape initiative is present, but it does not meet any of the key criteria, or the landscape initiative is not present, and the company starts a new initiative

- For a current initiative, the roadmap information needs to include all the steps the company will take to meet the key criteria.
- For a new initiative, the roadmap information needs to include the steps the company is working on to set up a new initiative that will meet the key criteria.

Companies must complete a self-assessment of whether the landscape initiative they have selected fulfils the four key criteria listed below. This is a binary assessment conducted for each criterion individually:

- Criterion 1. Does the landscape initiative fulfil this criterion? *Yes or No*
- Criterion 2. Does the landscape initiative fulfil this criterion? *Yes or No*
- Criterion 3. Does the landscape initiative fulfil this criterion? *Yes or No*
- Criterion 4. Does the landscape initiative fulfil this criterion? *Yes or No*

If the answer to all four criteria is ***Yes***, then the company can determine that the landscape initiative falls under scenario 1.

If the answer to at least one but not all of the criteria is ***No***, then the company can determine that the landscape initiative falls under scenario 2.

If the answer to all of the criteria is ***No***, then the company can determine that the landscape initiative falls under scenario 3.

Validators will ask for evidence that the self-assessment has been completed.

3.2.4. Landscape engagement roadmap—what is required based on each landscape scenario

In Annex 6, companies will find a table with each requirement matched with the key criteria listed above. Please note that some information and documentation is covering more than one key criterion.

The landscape engagement roadmap has been built by integrating the most up-to-date information and principles from experts and organizations active in landscape initiatives globally.

3.2.5. Establishing and improving landscape initiatives

In situations where the landscape initiatives prioritized do not meet the criteria for validation or when landscape initiatives are not present in the prioritized locations, companies can either present an action plan and work toward changing the initiatives for compliance against the Maturity Matrix, or they can develop new landscape initiatives by following the list of key criteria and working toward an improvement plan along the Maturity Matrix. In general, companies should seek to improve conditions in the landscape as a whole and in alignment with landscape objectives and taking into account ecological thresholds, rather than work only for a specific set of producers or

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

To make sure landscape initiatives achieve their objectives, companies can initiate or contribute to a varied range of activities and actions in collaboration and alignment with a landscape initiative. Companies' actions can range from avoidance and reduction of pressures on land (i.e. loss of soil organic carbon, increases in soil erosion or terrestrial acidification) biodiversity and nature loss, to restoration and regeneration of the state of nature (e.g., the extent and integrity of ecosystems and species extinction risk), and the transformation of underlying socio-economic systems at multiple levels to address the drivers of degradation and nature loss. All of these approaches will be instrumental in successfully achieving landscape-scale objectives.

3.2.6. Relationship with other land, climate, freshwater, and ocean targets

All of the SBTN Land targets are designed to work together to incentivize the action and engagement that companies will implement to contribute to regional and global nature goals. These actions span all categories of the SBTN AR3T Framework. Companies that engage in material landscapes will avoid the conversion of natural ecosystems in line with the first Land target and Approach 2 for their Landscape Engagement target. Companies that are required to set a Working Land Regeneration and Restoration target (Target 2) will link the land taken out of production with the broader landscape goals as defined by landscape initiatives in which they engage and seek to increase natural land cover and reduce land impacts such as soil erosion and acidification.

Companies that are required to set all three of the Land targets should be able to demonstrate how these targets work together within a landscape scale, even if additional actions on No Conversion of Natural Ecosystems (Target 1) and Working Land Regeneration and Restoration (Target 2) take place across their entire value chains.

Landscape Engagement and Target 1: No Conversion of Natural Ecosystems

Engaging in landscape initiatives through collective actions will help companies in their efforts to achieve Target 1: No Conversion of Natural Ecosystems.

Landscape engagement is widely considered to be a key success factor for tackling deforestation and conversion of natural ecosystems[73] [74] by addressing local drivers of conversion, driving collective action, ensuring that efforts to halt the conversion of natural ecosystems also deliver outcomes for local communities and biodiversity, and reducing the risk of leakage, for example by:

- bringing together companies from different sectors
- expanding action beyond the scale of individual operational sites
- building partnerships with local communities and with local administration
- considering local needs
- protecting livelihoods and human rights
- planning collectively for land use
- providing choices that protect or restore species, genetic diversity, and remaining natural ecosystems
- remediating conversion since the cutoff date.

Landscape Engagement and Target 2: Working Land Regeneration and Restoration

Land Area Targets – Land Footprint Reduction and Natural Land Cover

Companies that set a Land Footprint Reduction and a Natural Land Cover target must appropriately balance the need to use land more efficiently with avoiding unsustainable forms of agricultural intensification (e.g., overuse of fertilizers and chemical inputs) that would reduce the ecological integrity of the landscape and would therefore conflict with outcomes of the Landscape Engagement target. Landscape engagement offers a framework for collective action in which the land freed up to achieve a Land Footprint Reduction target is used for achieving broader nature and climate goals. For example, it may be possible to increase natural land cover and by ecologically restoring land removed from agricultural production, which can have positive impacts on ecological integrity, biodiversity, soil quality, and freshwater quality, and can increase carbon sequestration if well balanced with local needs.

It follows that, in the context of landscape engagement, a company's efforts to reduce its land footprint and/or increase agricultural productivity can support the achievement of other environmental goals for which it can gain recognition. For instance, where data are available and where there is a clear link to a landscape-level initiative, companies can report how many hectares are liberated for nature (increase natural land cover), for the establishment of ecological corridors, the increase of ecosystem connectivity, the support of human rights to cultural heritage, restoration or historical tenure, in support of human health, or many other possibilities. The

[73] https://www.theconsumergoodsforum.com/news_updates/landscape-engagement-is-key-to-tackling-deforestation-says-cgf-sustainability-director
[74] http://forestsolutions.panda.org/solutions/landscape-approaches

company can also show how its actions (alongside other stakeholders) are contributing to food security while simultaneously contributing to ecosystem protection and restoration in important landscapes.

Land Quality Targets

The Land Quality target (under Target 2) is focused on direct operations due to the high level of data requirements; however, a company's supply chain is also likely to have an impact on soil organic carbon depletion, soil erosion, terrestrial acidification, or all three. Nevertheless, companies must reduce the land impact in their direct operations and also reduce the impact on land within their value chain. Landscape engagement offers a framework for companies to collectively engage in activities, actions and financing at the landscape scale that can demonstrate effective strategies and deliver positive change on the ground. For example, it may be possible to support a change in practices to no-till farming or contour farming, improved fertilizer management to reduce nitrogen oxide emissions, cover cropping to absorb excess nutrients.

Landscape Engagement and Climate targets

The SBTN Land targets can support the achievement of climate targets (see Annex 6 for a preliminary overview of action that can positively contribute to the achievement of multiple targets) and limit trade-offs and unintended consequences that could emerge from the implementation of climate action without the consideration of impacts that this may have on nature. The integration of climate and nature at the target- setting level incentivizes approaches that can assess trade-offs and find optimal solutions to corporate investments in nature and climate targets. 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.

The Landscape Engagement target can help ensure that activities such as restoration, even if undertaken primarily for climate objectives, are linked with what both nature and people need in a specific landscape.

Relationship with Freshwater targets

The Landscape Engagement target can also form an integral part of the target-setting process of the SBTN Freshwater targets. If a company is planning to set a Landscape Engagement target in the same basin where it is using a local model to set Freshwater Quantity/ Quality targets, then it should first follow the necessary steps for setting a Freshwater target, by following sections 3.1.2 and 3.1.3 on Hydrological Model Selection in the SBTN Freshwater Guidance. When using a local model for Freshwater targets, a company is setting freshwater targets that are based on hydrological and/or freshwater quality models specific to a given basin (i.e., developed for that basin). These are paired with locally based thresholds, emphasizing those which are recognized by the local basin management authority or water resources management agency. Stakeholder engagement is a critical part of ensuring that the model and threshold chosen are appropriate and compatible with corporate data, and it therefore strongly aligns with and complements several requirements of the Landscape Engagement target in this guidance.

Companies should make sure they provide the necessary Freshwater documentation as part of their validation submission, before continuing with the Landscape Engagement target.

Relationship with Ocean targets

The Landscape Engagement target can also form a part of the target-setting process of SBTN Ocean targets. Notably the Ocean target setting guidance released in March 2025, includes a seascape engagement roadmap that has been built following the Landscape Engagement Roadmap developed for land targets (Annex 6) and is intended to have close alignment for ease of use for companies. As the Ocean targets focuses on seafood value chains there is a link to land-based systems and working land. For example, companies with land-based aquaculture, or that use aquaculture feed derived from agricultural products, may need to set Land and/or Freshwater targets. Equally, aquaculture facilities need to ensure they do not contribute to the loss of any functionality or ecosystem services in the land or freshwater habitats (particularly wetlands or mangroves) where they operate. Therefore, where possible Landscape Engagement initiatives that intersect or overlap for example with coastal or wetland areas should look to understand and address the intersectionality of challenges and potential opportunities for mitigation of impacts that affect land, freshwater and oceans. As SBTN Ocean target guidance evolves and expands in future updates, the overlap between Land and Ocean target setting is expected to increase.

3.3. Target validation and disclosure

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

1. ISIC sector classification(s) describing their direct operations and upstream activities.
2. Data required in section ii, "Data requirements to set Land targets".
3. Demonstrated engagement with one landscape initiative that covers 10% of land use impact (as defined in Step 2) OR demonstrated engagement in two landscape initiatives.
4. Descriptive rationale of the process chosen for the selection of priority landscapes.

5. Results of the screening of readiness status of landscape initiatives selected using the Maturity Matrix (see section 3.2.2). Landscape initiatives must satisfy the following key requirements:

   i. Operate at the scale of a recognized ecological area (such as a watershed or land ecosystem) or administrative area (such as states, provinces, municipalities, districts).

   ii. Include the needs of relevant stakeholder groups in the design, implementation, and monitoring of an initiative.

   iii. Have clear collective goals that go beyond a company's objectives and are determined through a multi-stakeholder process.

   iv. Have transparent reporting and presentation/information systems sharing the actions/investments made in the initiative.

6. Demonstrated engagement within an iterative process of stakeholder consultation that includes relevant parties as needed.

7. Evidence that an adequate and impartial assessment of the needs of local communities has taken place within this stakeholder consultation.

8. Alignment of corporate actions with community needs and objectives resulting from the stakeholder consultation process.

3.3.1. List of potential metrics— baselining for ecological and social conditions

SBTN acknowledges the variety of indicators, metrics, and indexes that can be used to assess ecological and social conditions in landscapes. Companies setting a Landscape Engagement target should therefore assess the use of an appropriate set of metrics to be selected according to the needs of specific locations and in collaboration with other stakeholder groups involved in the initiative. Companies should therefore be able to define and select local metrics to report on key issues for the local context. A key addition to Version 2 is the inclusion of impact-based metrics covered under the Land Quality target (Soil Organic Carbon, Soil Erosion, and Acidification).

Below in Table 15, is a non-exhaustive list of potential metrics. The list has been compiled based on availability and usability, and it is the outcome of a selection from SBTN methods and several commonly used landscape assessment frameworks, such as LandScale Assessment Framework,[75] Restoration Opportunities Assessment Methodology (ROAM),[76] and Landscape Reporting Framework from GCF.[77] The list also includes metrics from the CBD's Global Biodiversity Framework monitoring guidance.

Note: AGILE Chapter 7 provides guidelines for companies to set baselines and measure progress against selected metrics and has an example case study.

Table 15: List of potential metrics for ecological and social conditions.

Indicator	Topic	Metric
1.1	Ecosystems	Proportion of target boundary A land area under productive and sustainable land management.
1.2	Ecosystems	Total area (ha) within the engaged landscape(s) of natural lands converted since 2020 (SBTN Natural Lands Map).
1.3	Ecosystems	Total area (ha) "under restoration" in the landscape.
1.4	Ecosystems	Coverage (in % out of total area in the landscape) of protected areas and other effective conservation measures (OECMs).
1.5	Ecosystems	Total area (ha) and percentage (%) of natural ecosystems in the landscape that are currently degraded.
1.6	Ecosystems	Biodiversity risk assessment including dependencies and impacts using WWF's Biodiversity Risk Filter.
1.7	Ecosystems	Water risk assessment using the WWF Water Risk Filter or WRI Aqueduct.
1.8	Ecosystems	Species threat abatement and restoration (STAR) score at the landscape scale (using freely available 5 km2 resolution data).

[75] https://www.landscale.org/assessment-framework/

[76] https://www.wri.org/research/restoration-opportunities- assessment-methodology-roam

[77] https://www.proforest.net/fileadmin/uploads/proforest/Documents/Landscape__Action__Progress__Reporting__ Framework__2022.pdf

Indicator	Topic	Metric
1.9	Ecosystems	Species threat abatement and restoration (STAR) score at the landscape scale (using finer resolution data through data purchased through an Integrated Biodiversity Assessment Toolsubscription).
1.10	Ecosystems	Services provided by ecosystems or an assessment of critical natural assets.
1.11	Ecosystems	Total climate regulation services provided by ecosystems by ecosystem type (System of Environmental Economic Accounts).
1.12	Ecosystems	Species Population Abundance (IND9)[78] The number and proportion of species that meet the Entry/Standard/Advanced-Level case-specific trigger criteria.
1.13	Ecosystems	Soil Organic Carbon - metric tons C/yr
1.14	Ecosystems	Soil Erosion – tons of soil loss per ha/yr
1.15	Ecosystems	Terrestrial Acidification and Eutrophication (Threshold in total Nitrogen Deposition in Kg N/ha) - $kgSO_2$-eq
1.16	Ecosystems	Natural Land Cover % per km^2 [79]
2.1	Governance	Number of stakeholder groups involved, (e.g., representatives of local communities; representatives of producers; representatives of government; representatives of Indigenous Peoples (if applicable); others).
2.2	Governance	Type of governance implemented in the landscape initiative—full, equitable, inclusive, effective, and gender-responsive representation and participation in decision-making, including a gender-action plan.
2.3	Governance	Number of unresolved land and resource conflicts or grievances, [80] and the area of land (ha) subject to such conflicts.
2.4	Governance	User-defined metric(s) on access and use rights for key natural resources in the landscape.
2.5	Governance	Number of stakeholder organizations with full, equitable, inclusive, effective, and gender-responsive representation and participation in decision-making, including a gender-action plan.
2.6	Governance	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 gender and type of tenure.
3.1	Health and Wellbeing	Percentage (%) of female and male population living below the local poverty line (or, if this is not specified, earning <$1.90/day).
3.2	Health and Wellbeing	Percentage (%) of girls and boys who are undernourished.
3.3	Health and Wellbeing	Percentage (%) of households without electricity.
3.4	Health and Wellbeing	Number of farmers realizing additional benefits and income streams.
3.5	Health and Wellbeing	Percentage (%) of households without access to safe drinking water within a 15-minute walk from home.

In addition to the potential metrics listed above, companies may also consider the use of composite indexes to measure the ecological condition in landscapes, such as the Ecosystem Integrity Index (EII) and SEED Biocomplexity Index, the State of Nature Metrics currently being tested by the Nature Positive [81] Initiative among others.

[78] Species Population Abundance is part of a suite of State of Nature Metrics. Note the metrics are still undergoing testing https://www.naturepositive.org/metrics/
[79] Securing Nature's Contributions to People - https://www.sciencedirect.com/science/article/pii/S259033222300564X
[80] For good practice of grievance mechanism, please also see: https://www.isealalliance.org/get-involved/resources/grievance-mechanisms-briefing-note-twentyfifty-bonsucro-rjc
[81] Nature Positive Initiative metrics - https://www.naturepositive.org/metrics Nature Positive Initiative metrics - https://www.naturepositive.org/metrics

The EII is being developed by UNEP-WCMC[82] and provides an index of the structure, composition, and function of ecosystems within a defined boundary.

SEED is a multi-composite index that monitors and measures biodiversity at scale, and it attempts to put together the variation that exists within species (genetic diversity), between species (species diversity), and across ecosystems (ecosystem diversity). Both indexes are currently under development and further guidance will be given in future versions of the guidance.

Crucial to the selection of an appropriate indicator is the ability and capacity of a company to measure progress in the landscape using the same indicator over the life of the target. The ability to track and measure progress against the metrics listed here will likely differ among landscapes. Therefore, it is essential that companies clearly evaluate and understand the long-term capacity of any of these metrics to change and be measured within the landscape and the target period.

3.4. Template statement for Landscape Engagement targets

Landscape Engagement targets will be stated in the following form:

Box 7: Formulation of Landscape Engagement target

> [*Company name*] is engaged in [*initiative name*] and committed to a substantial improvement in ecological and social conditions by 2030.

[82] Hill, S. L., Harrison, M. L. K., Maney, C., Fajardo, J., Harris, M., Ash, N., ... & Burgess, N. (2022). The Ecosystem Integrity Index: a novel measure of terrestrial ecosystem integrity. Biorxiv, 2022-08.

ANNEXES

ANNEX 1: No Conversion of Natural Ecosystems

a. Conversion-driving commodities list

Table 16: List of conversion-driving commodities with earlier target dates.

Soft commodities (with target dates aligned with EUDR and other standards)	Source
Cattle	Multiple sources
Cocoa	Multiple sources
Coffee	Hoang, 2021[83]
Oil palm	Multiple sources
Rubber	Multiple sources
Soybeans	Multiple sources
Timber/wood fiber	Multiple sources

Table 17: Additional conversion-driving commodities

Soft commodities	Source
Avocados	Dryad, 2020[84]
Banana	Meyfroidt, 2014[85]; Jayathilake, 2021[86]
Beans	Phalan, 2013[87]
Buckwheat	Plowprint, 2022[88]
Camelina	Plowprint, 2022[89]
Canola	Plowprint, 2022[90]
Cassava	Phalan, 2013[91]; Jayathilake, 2021[92]; Pendrill, 2022[93]
Charcoal, commercial	Jayathilake, 2021[94]
Coconut	Dryad, 2020[95]; Jayathilake, 2021[96]

[83] Hoang, N. T., & K. Kanemoto. (2021). Mapping the deforestation footprint of nations reveals growing threat to tropical forests. Nature Ecology & Evolution, 5, 845–853.
[84] 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.
[85] Meyfroidt, P. et al. (2014). Multiple pathways of commodity crop expansion in tropical forest landscapes. Environmental Research Letters, 9, 074012.
[86] Jayathilake, H. Manjari, et al. (2021). Drivers of deforestation and degradation for 28 tropical conservation landscapes. Ambio, 50, 215–228.
[87] Phalan, B. et al. (2013). Crop expansion and conservation priorities in tropical countries. PLoS ONE, 8(1), e51759. doi: 10.1371/journal.pone.0051759.
[88] WWF. (2022). PlowPrint Report.
[89] WWF. (2022). PlowPrint Report.
[90] WWF. (2022). PlowPrint Report.
[91] Phalan, B. et al. (2013). Crop expansion and conservation priorities in tropical countries. PLoS ONE, 8(1), e51759. doi : 10.1371/journal.pone.0051759.
[92] Jayathilake, H. Manjari, et al. (2021). Drivers of deforestation and degradation for 28 tropical conservation landscapes. Ambio, 50, 215–228.
[93] Pendrill, F. et al. (2022). Disentangling the numbers behind agriculture-driven tropical deforestation. Science, 377, abm9267.
[94] Jayathilake, H. Manjari, et al. (2021). Drivers of deforestation and degradation for 28 tropical conservation landscapes. Ambio, 50, 215–228.
[95] 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.
[96] Jayathilake, H. Manjari, et al. (2021). Drivers of deforestation and degradation for 28 tropical conservation landscapes. Ambio, 50, 215–228.

Soft commodities	Source
Cotton	Dryad, 2020[97]
Cowpeas	Phalan, 2013[98]
Grapes	Plowprint, 2022[99]
Groundnut	Phalan, 2013[100]
Maize	Multiple sources
Millet	Phalan, 2013[101]
Mustard	Plowprint, 2022[102]
Onions	Plowprint, 2022[103]
Pineapple	Meyfroidt, 2014[104]
Potato	Plowprint, 2022[105]
Radishes	Plowprint, 2022[106]
Rice	Multiple sources
Rye	Plowprint, 2022[107]
Safflower	Plowprint, 2022[108]
Sorghum	Phalan, 2013[109]
Speltz	Plowprint, 2022[110]
Sugarcane	Phalan, 2013[111]; Dryad, 2020[112]
Sugar beets	Plowprint, 2022[113]; Dryad, 2020[114]
Tobacco	SBTN HICL 2022[115]

[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] Phalan, B. et al. (2013). Crop expansion and conservation priorities in tropical countries. PLoS ONE, 8(1), e51759. doi: 10.1371/journal.pone.0051759.
[99] WWF. (2022). PlowPrint Report.
[100] Phalan, B. et al. (2013). Crop expansion and conservation priorities in tropical countries. PLoS ONE, 8(1), e51759. doi : 10.1371/journal.pone.0051759.
[101] Phalan, B. 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.
[103] WWF. (2022). PlowPrint Report.
[104] Meyfroidt, P. et al. (2014). Multiple pathways of commodity crop expansion in tropical forest landscapes. Environmental Research Letters, 9, 074012.
[105] WWF. (2022). PlowPrint Report.
[106] WWF. (2022). PlowPrint Report.
[107] WWF. (2022). PlowPrint Report.
[108] WWF. (2022). PlowPrint Report.
[109] Phalan, B. et al. (2013). Crop expansion and conservation priorities in tropical countries. PLoS ONE, 8(1), e51759. doi: 10.1371/journal.pone.0051759.
[110] WWF. (2022). PlowPrint Report.
[111] Phalan, B. et al. (2013). Crop expansion and conservation priorities in tropical countries. PLoS ONE, 8(1), e51759. doi: 10.1371/journal.pone.0051759.
[112] 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.
[113] WWF. (2022). PlowPrint Report.
[114] 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.
[115]https://sciencebasedtargetsnetwork.org/wp-content/uploads/2024/07/High-Impact-Commodity-List-v1-1.xlsx

Soft commodities	Source
Triticale	Plowprint, 2022[116]
Vetch	Plowprint, 2022[117]
Wheat	Multiple sources

Hard commodities	Source
Bauxite	Luckeneder, 2021[118]
Coal, surface mining	Yu, 2018[119]
Copper	Luckeneder, 2021[120]
Gold	Luckeneder, 2021[121]
Iron	Luckeneder, 2021[122]
Lead	Luckeneder, 2021[123]
Manganese	Luckeneder, 2021[124]
Nickel	Luckeneder, 2021[125]
Palladium	SBTN HICL, 2022[126]
Platinum	SBTN HICL, 2022[127]
Silver	Luckeneder, 2021[128]
Zinc	Luckeneder, 2021[129]

Activities/applications	Source
Biofuels (ethanol, solid biomass, etc.)	Multiple sources
Feed for animal protein—cattle, pork, chicken, aquaculture, etc.	Multiple sources
Urban/settlement and infrastructure development	Jayathilake, 2021[130]
Hydroelectric dam development	WWF, Deforestation Fronts, 2021[131]

[116] WWF. (2022). PlowPrint Report.
[117] WWF. (2022). PlowPrint Report.
[118] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[119] Yu, L. et al. (2018). Monitoring surface mining belts using multiple remote sensing datasets: A global perspective. Ore Geology Reviews, 101, 675–687.
[120] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[121] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[122] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[123] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[124] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[125] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[126] McCraine, S. et al. (2022). SBTN High Impact Commodity List, draft form. Excel file shared via email.
[127] McCraine, S. et al. (2022). SBTN High Impact Commodity List, draft form. Excel file shared via email.
[128] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[129] Luckeneder, S. et al. (2021). Surge in global metal mining threatens vulnerable ecosystems. Global Environmental Change, 69, 102303.
[130] Jayathilake, H. Manjari, et al. (2021). Drivers of deforestation and degradation for 28 tropical conservation landscapes. Ambio, 50, 215–228.
[131] WWF. Pacheco, P. et al. (2021). Deforestation fronts: Drivers and responses in a changing world. WWF, Gland, Switzerland.

Soft commodities	Source
Oil and gas exploration	Jayathilake, 2021[132]

b. First point of aggregation

The data requirements within the No Conversion of Natural Ecosystems target differ based on a company's value chain position(s) and proximity to the site of soft commodity harvest/production or hard commodity extraction (e.g., "the cradle" in life cycle assessment terminology).

While "producers and site owners/operators" are clearly defined, as they own and/or operate the land where production/harvest and extraction occur, companies sourcing from producers and from the "first point of aggregation" are less defined. These actors are key for spatially explicit target setting, as they should theoretically have traceability to the production or extraction site (where targets will be implemented). We understand that not all companies at the first point of aggregation have traceability for all supply chains at this time—the intention is for this to be a stretch goal for companies to implement over time. Increased transparency at the front end of supply chains will benefit companies further down the supply chain (closer to retail, consumers, and asset management) who can assess risk and take actions to align their supply chain with their stated goals.

Table 18 defines SBTN's first point of aggregation for many conversion-driving commodities.

Table 18: SBTN's suggestion for first point of aggregation.

Global conversion-driving commodities	First Point of Aggregation
Cattle	Meat packing and processing facilities, milk and dairy processing facilities
Cocoa	Refineries and grinders
Coffee	Processing (drying to grinding beans)
Maize	Wet and dry milling
Oil palm	Oil palm mill and collection port
Rice	Rice mill (cleaning and husking)
Rubber	Rubber dealer/first processing
Sorghum	Milling
Soybeans	Crushing facilities
Sugarcane	Sugar mills
Timber/wood fiber	Timber mill/pulp production facility
Wheat	Milling facilities
Biofuels (ethanol, solid biomass, etc.)	Depending on feedstock, align with first point of aggregation above by commodity
Feed for animal protein—cattle, pork, chicken, aquaculture, etc.	Feed mixing and pellet processing facility

[132] Jayathilake, H. Manjari, et al. (2021). Drivers of deforestation and degradation for 28 tropical conservation landscapes. Ambio, 50, 215–228.

c. Target 1 No conversion of natural ecosystems– illustrative reporting template for companies to disclose progress towards target dates

Required Disclosures							Recommended disclosures				
Commodity	Conversion free target date*	Deforestation free target date*	Cut-off date (2020 or earlier)	% volumes conversion free in conversion hotspots	% volumes deforestation free	Compliance methods (spatial data / sourcing from DCF jurisdiction, certifications)	Volume / weight of non DCF compliant commodities (tonnes)	Sourcing Markets / Geographies / hotspots (sub national, regional, local jurisdiction)	Value chain position	CDP Forests Score or similar	Rationale**
Soy											
Cattle											
Oil palm											
Wood											
Cocoa											
Coffee											
Rubber											

Table 19. Illustrative reporting template for Target 1 No Conversion of Natural Ecosystems

*Refer to table 5 in section 1.1 of this document for details on target dates
**Provide rationale for postponing SBTN target date and recommendations on conditions to bring each commodity into compliance with the commodity-defined SBTN target date

ANNEX 2: Land Footprint Reduction

a. The relative merit of absolute versus intensity approaches

This section provides information on the scientific basis of the absolute and intensity Land Footprint Reduction target options and explores the benefits and challenges of each approach.

THE SCIENCE BASED TARGETS INITIATIVE'S (SBTi) APPROACH

SBTi allocates responsibility for climate mitigation based on convergence or contraction approaches (see Figure 8). For the convergence approach, all companies in a given sector reduce their emissions intensity to a common value by a given year as dictated by a global temperature pathway. For example, power sector companies reduce their emissions intensity per kWh produced to the same value. For the contraction approach, all companies reduce their absolute or economic intensity emissions at the same rate, regardless of baseline performance. For example, the power companies may each reduce their emissions intensity by a common percentage but arrive at different absolute values.[133]

ABSOLUTE CONTRACTION APPROACH FOR LAND FOOTPRINT REDUCTION

Applying this concept to Land Footprint Reduction, all companies reduce their agricultural land footprint at the same rate (determined by the global IPCC target for agricultural footprint reduction), regardless of sector baseline performance (see Figure 9).

Companies setting absolute Land Footprint Reduction targets would reduce their absolute land footprint at a linear rate of 0.35% per year, or by 3.5% by 2030, from a 2020 base year, and by 10.6% by 2050 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 20 summarizes the inputs and outputs of the method

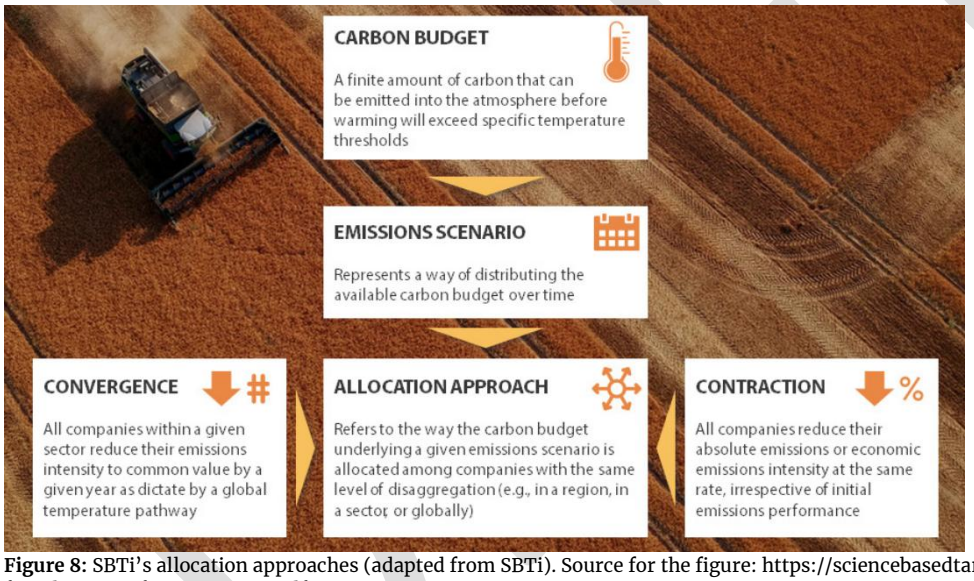

Figure 8: SBTi's allocation approaches (adapted from SBTi). Source for the figure: https://sciencebasedtargets.org/resources/files/foundations-of-SBT-setting.pdf

133 https://sciencebasedtargets.org/resources/files/foundations-of-SBT-setting.pdf

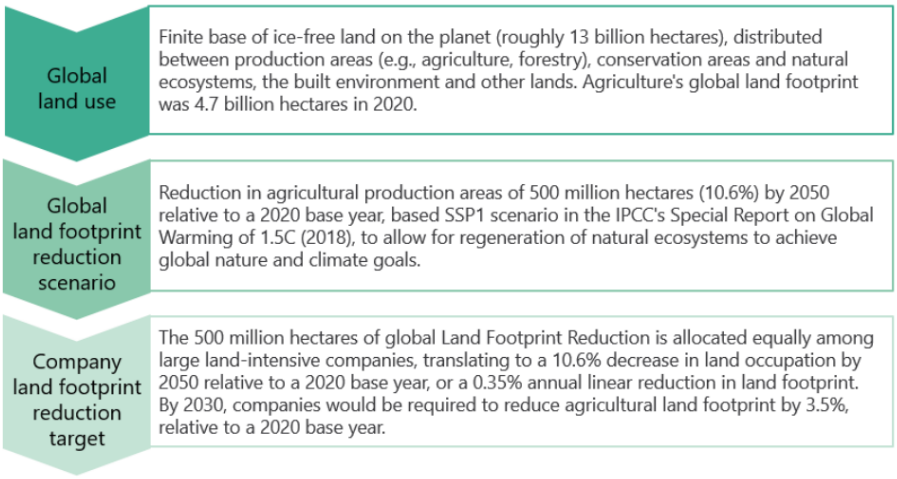

Figure 9: SBTN method for absolute land footprint reduction

Intensity contraction approach for land footprint reduction

SBTi also includes an intensity contraction approach where companies in a given sector reduce their emissions intensity by a common percentage by a given year. [134]

With global food demand projected to grow by 45% between 2017 and 2050 [135], it follows that if productivity in terms of food produced per hectare were also to grow 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 free up an amount of land greater than the 500 Mha goal of global agricultural land footprint reduction in the SSP1 scenario in the IPCC's Special Report on Global Warming of 1.5°C. [136]

In a similar vein, the Food and Land Use Coalition's "Better Futures" scenario (2019) 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. [137]

Table 20: Characteristics of the absolute and intensity reduction approach

Method	Company input	Method output
Absolute Reduction	• Base year. • Target year. • 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 agricultural land footprint of the company by the target year, relative to the base year, using a rate of 0.35% annual linear reduction.
Intensity Reduction	• Base year. • Target year. • Base year agricultural land footprint, disaggregated by direct operations versus upstream impacts (Step 1 output). • Activity level in the base year (e.g., amount of agricultural products produced or purchased). • Projected change in activity by target year	A reduction in the agricultural land footprint of the company by the target year per kg of agricultural products, relative to the base year, using a rate of 1% annual linear reduction, and its translation to absolute change in land footprint.

134 https://sciencebasedtargets.org/resources/files/foundations-of-SBT-setting.pdf

[135] Searchinger, T., Zionts, J., Wirsenius, S., Peng, L., Beringer, T., Dumas, P., Taff, G., Waite, R., Rich, D., Ranganathan, J. and Rudee, A. (2021). *A Pathway to Carbon Neutral Agriculture in Denmark A PATHWAY TO CARBON NEUTRAL AGRICULTURE IN DENMARK*. Available at: https://searchinger.princeton.edu/sites/g/files/toruqf4701/files/wri-carbonneutralag-denmark-2021.pdf

136 https://www.ipcc.ch/sr15

137https://www.foodandlandusecoalition.org/wp-content/uploads/2019/09/FOLU-GrowingBetter-GlobalReport.pdf

To be precautionary and ambitious, SBTN Land proposes that the land footprint intensity reduction method is 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 kg of agricultural products produced per year.115 Table 21 summarizes the inputs and outputs of this intensity reduction (contraction) method.

Pros and cons of absolute versus intensity land footprint reduction targets

Absolute and intensity targets each have advantages and disadvantages, which are shown in Table 22. For both sets of targets, there is a risk that they incentivize unsustainable agricultural intensification or incentivize consumer companies to shift away from lower-yielding smallholder farmers if not appropriately balanced with social and environmental safeguards.

Given the benefits and challenges with both approaches, SBTN Land has left open the option for companies to set either type of target as part of the revised Target 2, but we recommend absolute targets especially for large consumer companies such as retailers given that they have greater ability to reduce land footprint through demand-side measures such as shifting their portfolios to less-land-intensive product

Table 21: 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., US$)	Most businesses already measure this, easy to communicate.	Commodity prices fluctuate, which can hide true trends in land footprint intensity; it is therefore less accurate as a land footprint 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, vegetable oils).
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.

Table 22: Considerations regarding absolute vs. intensity targets for Land Footprint Reduction

Aspect	Absolute target	Intensity target
Weight (e.g., kg or t)	Simpler to calculate and communicate.	Can be more complex to calculate and communicate. If targets are differentiated by geography or commodity in future versions, it would increase complexity but could also introduce clarity about where there are yield gaps and sustainable intensification opportunities.
Spend or sales (e.g., US$)	Clear link; company can say it is reducing land pressures in line with global goal.	Needs additional step to convert into absolute target and link to global goal.
Kilocalories	A company could hit an absolute target by reducing agricultural production; if not made up in efficiency elsewhere then other actors' agricultural land footprints could expand.	A company could hit an intensity target even while its absolute land footprint continues to increase.
Protein	Bias toward large producers and purchasers; unfair for small landowners;	Can accommodate both large and small producers and purchasers; could be

	unfair for small companies producing less-land-intensive products (similar to SBTi for absolute GHG emissions).	more appropriate for companies based in Global South.
Combined nutrient quality metric or index	No link; no guarantee that the company will be "doing its fair share" of contribution to global productivity growth; targets can be met for wrong reason (business failure).	Company "does its fair share" of contribution to global productivity growth, regardless of its size and projected business growth.
Risk of unintended consequences for nature (note: risk mitigated in Version 2.0 through the No Conversion of Natural Ecosystems and Landscape Engagement targets)	Could incentivize unsustainable agricultural intensification; safeguards needed (company must also set SBTi FLAG climate and SBTN water targets; future SBTN Land targets could 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; future SBTN Land targets could include soil health); could disincentivize forms of agriculture that are lower yielding but have lower local environmental impacts

1

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ANNEX 3: Introduction to Thresholds

Defining what nature needs in a given location, both in terms of avoiding further ecosystem degradation and loss, as well as defining how much is enough when it comes to restoration actions needed to support the system in returning to a stable state and resuming proper functioning, is a critical question we aim to answer through identification of ecological thresholds for land.

Understanding land system thresholds is therefore a key part of defining the level of ambition of science-based targets for land. Identification of land system thresholds is similar to aligning climate targets with 1.5°C, which has been identified as the safer upper limit of climate change, beyond which we predict catastrophic impacts. However, unlike climate targets, when it comes to nature targets, place matters – SBTN Land targets therefore must be place-based, spatially explicit and relevant to the geographic areas where companies operate or source from.

There are a variety of different definitions of thresholds that exist in the literature[138] which can complicate understanding of the concept and its implications. Put simply for our purposes here, an ecological threshold is considered a point at which there is an abrupt change in an ecosystem quality, property or phenomenon, or where small changes in an environmental driver produce disproportionately large responses in the ecosystem state.[139] When a tipping point, one specific type of ecological threshold, has been passed, it is possible that the ecosystem may undergo a self-perpetuating and irreversible shift known as a regime shift, whereby it is no longer able to return to its state by means of its inherent resilience (i.e., it cannot recover).[140] However, not all ecological thresholds are characterized as tipping points. For some ecological thresholds the system may lose critical resilience and stability in the ecosystem state, without necessarily experiencing the irreversibility in the ecosystem state indicative of a true tipping point.[141] In this work, we focus on identifying the broader concept ecological thresholds between indicator variables of interest[142] (based on pressures to land systems), and the ecosystem state variable, ecosystem stability (detailed below), without explicitly restricting our analysis to identifying true tipping points. These thresholds are nevertheless indicative of important, abrupt shifts in the relationship between our land pressure indicators and ecosystem stability at the ecoregion level, and thus provide valuable inference for how to best avoid detrimental impacts and loss of resilience by maintaining a safe distance from threshold points in these important land system indicators.

Ecoregion thresholds: description and methods overview

Terrestrial ecoregion thresholds were derived globally for the above state variables to define what these ecoregions need in terms of physical extent and functional conditions to maintain or restore stability in the face of the described pressures to land systems. To derive ecoregion thresholds for the state variables describing the primary land pressures we were interested in assessing, we developed a novel machine learning (XGBoost) and threshold (non-linear regression) modelling approach with collaborators in the Crowther Lab at ETH Zürich and the Complutense University of Madrid (UCM)[143] using R programming software and Amazon Web Services (AWS) cloud computing platform to more officially process large datasets. These thresholds were derived to identify at what level for each of these important indicators, at the spatially explicit, ecoregion scale, we might detect an abrupt change in the ecosystem stability within those ecoregions.

The manuscript characterizing the full, detailed methodological approach underpinning this work is currently in prep and will be submitted for review prior to full public release of the SBTN Land Version 2 targets. The full table of thresholds data for use in target setting (Target 2, Land Quality targets) will also be included in the final version of this methods guidance once officially launched.[144] For our purposes here, we will restrict coverage of the thresholds work to what is relevant in regard to the process to integrate and use thresholds to support the targets laid out in this document, as well as a sample of the thresholds data for reference in Annex 5a. Below is a brief description of the methodology. Please also see below under section" How thresholds are used within the target setting guidelines: Using the precautionary principle to inform threshold integration and support target ambition" in Annex 3 for further details on the process to integrate of threshold values for use in the target-setting process.

138 E.g. Spake, R., Barajas-Barbosa, M. P., Blowes, S. A., Bowler, D. E., Callaghan, C. T., Garbowski, M., ... & Chase, J. M. (2022). Detecting thresholds of ecological change in the Anthropocene. Annual Review of Environment and Resources, 47(1), 797-821; Groffman, P. M., Baron, J. S., Blett, T., Gold, A. J., Goodman, I., Gunderson, L. H., ... & Wiens, J. (2006). Ecological thresholds: the key to successful environmental management or an important concept with no practical application?. Ecosystems, 9, 1-13.; Huggett, A. J. (2005). The concept and utility of 'ecological thresholds' in biodiversity conservation. Biological conservation, 124(3), 301-310; Muradian, R. (2001). Ecological thresholds: a survey. Ecological economics, 38(1), 7-24.

139 Groffman, P. M., Baron, J. S., Blett, T., Gold, A. J., Goodman, I., Gunderson, L. H., ... & Wiens, J. (2006). Ecological thresholds: the key to successful environmental management or an important concept with no practical application?. Ecosystems, 9, 1-13.

140 Van Meerbeek, K., Jucker, T., & Svenning, J. C. (2021). Unifying the concepts of stability and resilience in ecology. Journal of Ecology, 109(9), 3114-3132; Lenton, T. M. (2013). Environmental tipping points. Annual review of Environment and Resources, 38(1), 1-29; Scheffer, M., Bascompte, J., Brock, W. A., Brovkin, V., Carpenter, S. R., Dakos, V., ... & Sugihara, G. (2009). Early-warning signals for critical transitions. Nature, 461(7260), 53-59.; Scheffer, M., Carpenter, S., Foley, J. A., Folke, C., & Walker, B. (2001). Catastrophic shifts in ecosystems. Nature, 413(6856), 591-596; Groffman, P. M., Baron, J. S., Blett, T., Gold, A. J., Goodman, I., Gunderson, L. H., ... & Wiens, J. (2006). Ecological thresholds: the key to successful environmental management or an important concept with no practical application?. Ecosystems, 9, 1-13.

141 Van Meerbeek, K., Jucker, T., & Svenning, J. C. (2021). Unifying the concepts of stability and resilience in ecology. Journal of Ecology, 109(9), 3114-3132.

142 Referred to as Land Quality Categories in Target 2 language

143 The manuscript characterizing the full, detailed methodological approach underpinning this work is currently in prep and will be submitted for review prior to full public release of the SBTN Land Version 2 targets. For our purposes here, we will restrict coverage of the thresholds work to what is relevant in regard to the process to integrate and use thresholds to support the targets laid out in this document.

144 A pre-print of these methods will be available and linked here for consideration of those interested in the details of the scientific method used to derive these ecoregion threshold values.

Variable review and selection process

A select group of key indicators were chosen for which to generate thresholds at the ecoregion level[145] to provide a basis for our targets, namely Target 2, Land Quality. These indicators are based on evaluation of ecosystem attributes with significance for representing terrestrial ecosystem health and for measuring extent of pressure and terrestrial degradation. These indicators were chosen based on extensive review of the literature, and existing relevant conventions of global importance, including, UNCCD LDN (UN Convention to Combat Desertification: Land Degradation Neutrality)[146], the UN CBD Global Biodiversity Framework[147] and the IPBES 2019 special report.[148] Indicators were further refined based on availability of data layers at a global extent and thus ability to generate machine learning models for which thresholds for these indicators were defined[149].

The land pressure indicators are:[150]

- Loss of natural vegetation cover[151]
- Loss of Soil Organic Carbon (SOC) (Stock in t C/ha, 30 cm depth)
- Soil Erosion (Soil displacement by water, t/ha^{-1} yr^{-1})
- Terrestrial acidification and eutrophication (Total atmospheric nitrogen deposition, kg N ha^{-1} yr^{-1})[152]

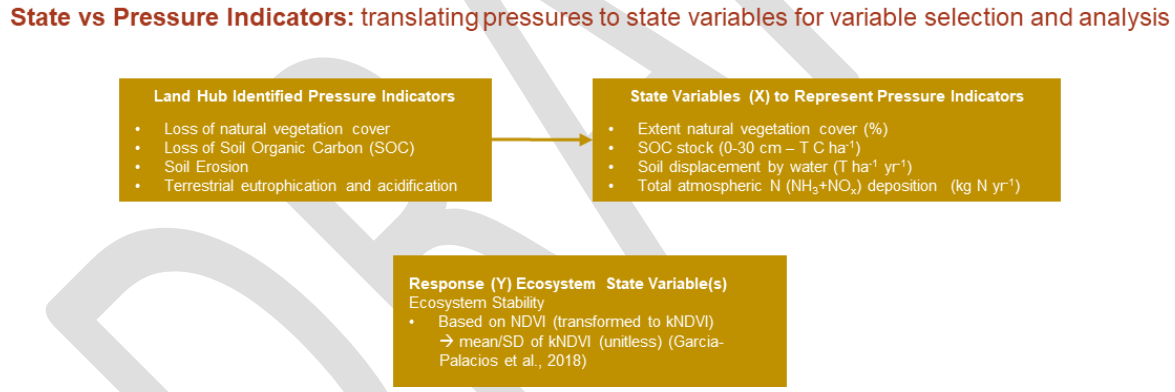

Figure 10: *Land Hub pressure indicators describing the primary pressures to land systems the Land Hub was focused on evaluating and mitigating with land targets in Target 2, Land Quality (Upper, Left hand box). State variables were then used to represent these primary land pressures to generate thresholds in modeling approach (Upper right hand box) in relation to ecosystem stability variable used to represent the ecosystem state in models (Lower, middle box).*

The stability metric that is used here as our ecosystem state response variable indicates the temporal stability of vegetation status in a fluctuating environment and has been used as a proxy for the stability of ecosystem function (for example, biomass or productivity).[153]The stability of plant community biomass over time is a fundamental ecosystem property key to functioning systems[154] and is also critical to providing ecosystem services related to plant biomass (e.g. carbon sequestration, soil fertility and food security). Loss of ecosystem functioning and the nature's

145 Using the ecoregion classification by Dinerstein et al. 2017: Dinerstein, E., Olson, D., Joshi, A., Vynne, C., Burgess, N. D., Wikramanayake, E., ... & Saleem, M. (2017). An ecoregion-based approach to protecting half the terrestrial realm. BioScience, 67(6), 534-545.
146 Orr, B. J., Cowie, A. L., Castillo Sanchez, V. M., Chasek, P., Crossman, N. D., Erlewein, A., Louwagie, G., Maron, M., Metternicht, G. I., Minelli, S., Tengberg, A. E., Walter, S., & Welton, S. (2017). *Scientific conceptual framework for land degradation neutrality: A report of the Science-Policy Interface*. United Nations Convention to Combat Desertification (UNCCD). https://www.unccd.int/sites/default/files/documents/2017-08/LDN_CF_report_web-english.pdf:contentReference[oaicite:0]{index=0}.
147 Convention on Biological Diversity. (2022). Kunming-Montreal Global Biodiversity Framework. Secretariat of the Convention on Biological Diversity. https://www.cbd.int/gbf/
148 Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). (2019). Summary for policymakers of the global assessment report on biodiversity and ecosystem services (E. S. Brondizio, J. Settele, S. Díaz, & H. T. Ngo, Eds.). IPBES Secretariat. https://doi.org/10.5281/zenodo.3831673
149 Further details on process described below and will be detailed in manuscript in prep
150 See below figure for translation of pressure indicators to state variables to represent these pressures or processes (e.g. soil erosion) in models to derive thresholds for these pressures
151 Natural vegetation cover threshold only offered as an option for use in Target 3, Landscape Engagement
152 While the thresholds consider the influence of nitrogen deposition on terrestrial eutrophication, as was previously identified as another key soil pollution category, target 2, Land Quality where these thresholds are used only includes terrestrial acidification. This is due to the absence of robust methods to measure terrestrial eutrophication at a corporate level in our LEAF methods. However, managing the causal factors of terrestrial acidification should also lead to mitigation of impacts on terrestrial eutrophication through remediation of sulfur and nitrogen emissions, the causal factors in both processes.
153Liang, M., Baiser, B., Hallett, L. M., Hautier, Y., Jiang, L., Loreau, M., ... & Wang, S. (2022). Consistent stabilizing effects of plant diversity across spatial scales and climatic gradients. Nature Ecology & Evolution, 6(11), 1669-1675; Hautier, Y., & Van der Plas, F. (2022). Biodiversity and temporal stability of naturally assembled ecosystems across spatial scales in a changing world. The ecological and societal consequences of biodiversity loss, 189-209; Hallett, L. M., Hsu, J. S., Cleland, E. E., Collins, S. L., Dickson, T. L., Farrer, E. C., ... & Suding, K. N. (2014). Biotic mechanisms of community stability shift along a precipitation gradient. Ecology, 95(6), 1693-1700.
154 Pimm, S. L. (1984). The complexity and stability of ecosystems. Nature, 307(5949), 321-326.

contributions to people they provide is also a pressing socioecological issue under ongoing climate change and land degradation.

Monitoring ecosystem stability at regional and global scales requires large-scale measurements of plant biomass over time. Satellite-based time series of aboveground biomass (normalized difference vegetation index, NDVI) have been used to infer ecosystem stability at large spatial and temporal scales. [155] The NDVI provides a global measure of the "greenness" of vegetation across the Earth's landscapes for a given composite period. We generated the metric of ecosystem stability here by extracting NDVI timeseries data from 2000 to 2023, transforming it to kNDVI, then calculating the ratio of the annual average kNDVI, to its annual standard deviation (SD) from that same period for each of our sampled points.[156]

Pre-processing:

Using Google Earth Engine (GEE) we extracted 1000 points per ecoregion across all of our data layers representing our indicator variables, response variable (ecosystem stability), and control variables to include in our subsequent model analyses. Ecoregions that are smaller than 1000 km^2 were precluded from analysis as there is a high likelihood extracting 1000 points from data layers within ecoregions smaller than 1000 km^2 would result in highly spatially autocorrelated data in such ecoregions and thus not provide valuable or reliable inference. In addition, all Antarctic ecoregions were removed prior to modelling as they are out of scope for the purposes of this work, and following best practice in similar types of ecoregion analysis.[157] Ecoregions that are considered hyper-arid (AI < 0.05 on the Aridity Index) were also precluded from analysis given the likelihood that our models would not be able to pick up reliable thresholds within these ecoregions[158]. Model analyses are described briefly below.[159]

Model Overview

Machine learning models

To explore the relationship between drivers of ecosystem change (state indicator variables above) and ecosystem state metric, ecosystem stability, representative of ecosystem functioning and long-term ecosystem stability, we developed a machine learning model from the "xgboost" package.[160] XGboost models are well suited for the high predictive power of the models they generate making it a suitable option for our purposes. The model examines changes in ecosystem stability as driven by our selected indicator state variables, in light of the potential influence of a set of carefully selected, relevant control variables[161], and uses a machine-learning algorithm to derive a tree classification model that results in a prediction of the value for the change in ecosystem stability in relation to each distinct indicator state variable.

SHAP value extraction

To assess the nature of the relationship between the indicator state variables on our response variable, ecosystem stability, we will use SHapley Additive exPlanations (SHAP) values. Traditionally, there has been a trade-off in regression models between interpretation and accuracy. Machine learning models such as random forest are often criticized because they are considered "black boxes" in that while they may be very precise, they are complicated to interpret. SHAP values is one of many approaches that is beginning to alter that trend, and we are progressively moving towards models that are highly complex and accurate as well as interpretable. SHAP values are therefore useful to make machine learning more interpretable and are based on using information theory to interpret machine-learning outcomes[162]. Essentially, they inform on the contribution of the value of a predictor (state indicator variables) to the prediction of change the response variable (ecosystem stability) for each observation. The sum of all SHAP values for a data point or observation results in the final prediction provided in the model output for that observation, in a process similar to partial dependence regressions. Plotting these SHAP values against the values of their respective explanatory variables for that observation allows us to characterize the effect of that predictor on the response variable, including potential existing thresholds between the predictor variable and response variable, as well as interactions between the predictor variables and control variables through their influence on the response variable. Thus, investigating the presence of thresholds between predictor variables and SHAP values of the response variable (ecosystem stability), rather than stability directly, allows us to filter out the

155 Oehri, J., Schmid, B., Schaepman-Strub, G., & Niklaus, P. A. (2017). Biodiversity promotes primary productivity and growing season lengthening at the landscape scale. Proceedings of the National Academy of Sciences, 114(38), 10160-10165; Van Rooijen, N. M., De Keersmaecker, W., Ozinga, W. A., Coppin, P., Hennekens, S. M., Schaminée, J. H., ... & Honnay, O. (2015). Plant species diversity mediates ecosystem stability of natural dune grasslands in response to drought. Ecosystems, 18, 1383-1394.

156 García-Palacios, P., Gross, N., Gaitán, J., & Maestre, F. T. (2018). Climate mediates the biodiversity–ecosystem stability relationship globally. Proceedings of the National Academy of Sciences, 115(33), 8400-8405.

157 Dinerstein, E., Joshi, A. R., Vynne, C., Lee, A. T., Pharand-Deschênes, F., França, M., ... & Olson, D. (2020). A "Global Safety Net" to reverse biodiversity loss and stabilize Earth's climate. Science advances, 6(36), eabb2824.

158 Trabucco, Antonio; Zomer, Robert (2019). Global Aridity Index and Potential Evapotranspiration (ET0) Climate Database v3. figshare. Dataset. https://doi.org/10.6084/m9.figshare.7504448.v4

159 Further details including list of included variables and sources will be described in the full methods manuscript to be included as a pre-print with final version of SBT for Land V2 methods in official launch

160 Chen, T., & Guestrin, C. (2016, August). Xgboost: A scalable tree boosting system. In Proceedings of the 22nd acm sigkdd international conference on knowledge discovery and data mining (pp. 785-794).

161 Series of control variables included in models will be detailed in comprehensive methodology within prep manuscript to be submitted

162 Lundberg, S. and Lee, S.-I. (2017). *A Unified Approach to Interpreting Model Predictions*. [online] arXiv.org. doi: https://doi.org/10.48550/arXiv.1705.07874.

effect of the other included control variable influence on the observed response variable. The use of SHAP values derived from machine learning models, thereby, makes interpretation of the influence of the predictor variable of interest, while considering the possible influence of other possible drivers of change (control variables) on our ecosystem state response variable (ecosystem stability) more accurate and comprehensive.

Identifying non-linear relationships and threshold models

Visual inspection of SHAP value plots can provide the first indication for the possible presence of thresholds (i.e., points in the gradient where there is a sudden change in either slope or intercept of the relationship between the indicator variable and its associated SHAP value). To verify this quantitatively, we first fitted a linear model and a non-linear GAM (Generalized Additive Model) to examine the relationship between the SHAP values for each indicator variable and each SHAP value of the associated indicator variables and ecosystem stability response variable in each ecoregion. We assessed whether a GAM model or linear model was a better fit for the data using AIC scores.

Threshold models

Threshold models (e.g., non-linear regression models such as step and segmented regressions) may force the existence of at least one threshold. Applying these methods to relationships that best fit linear regressions thereby will lead to overfitting of the data and potentially the detection of spurious thresholds between indicator and response variables. Therefore, only when the data was better fitted to GAM models than linear models, indicating the likelihood of the presence of a threshold relationship, were non-linear regression 'threshold" models, step and segmented regression models, fitted to the data using the packages *segmented*[163] in R. Each of these models renders a parameter describing the point or value in the indicator variable under consideration that evidences a sudden shift in its relationship with the response variable (represented by the SHAP value of ecosystem stability). This shift in the relationship will vary depending on the different type of threshold models described above. Discontinuous thresholds attain an overall change in the intercept, apart from the slope, and may be fitted to either step (linear regression that changes only intercept at a given point or threshold) or a combination of step + segmented regressions (segmented, exhibiting changes both in intercept and slope at a given point or threshold). We consider this point of abrupt shift in the relationship between the indicator and response variable as the threshold in the given non-linear relationship evaluated. To select among the most likely of the thresholds that may result from the step and segmented threshold models types for each indicator and ecoregion, we used the Bayesian information criterion (BIC) to choose the model that best fitted the data.

163 Muggeo, V. M. R. (2024). segmented: Regression Models with Breakpoints / Change-Points Estimation (Version 2.1-3) [R package]. Comprehensive R Archive Network (CRAN). https://cran.rstudio.com/web/packages/segmented/index.html

How thresholds are used within the target setting guidelines: Using the precautionary principle to inform threshold integration and support target ambition

There are a few cases where we might not be able define a reliable threshold for a particular indicator and ecoregion using our modelling approach. In these instances, we need to reference another reputable resource from peer-reviewed literature on critical thresholds or limits for each respective indicator to use in the place of a model derived, ecoregion level threshold to guide the ambition of our targets (Target 2, Land Quality). The reasons we may be able to generate a threshold from our modelling approach are due to several factors:

1 There simply isn't a detectable threshold or non-linear relationship detected between a particular indicator variable and the ecosystem stability variable for a specific ecoregion,

2 The ecoregion in question was determined to be too small for reliable inference in our models (<1000 km2), or hyper arid (AI <0.05 on aridity index) and was precluded prior to model analysis

3 The best available global layers used for our indicators are missing too many data points for a specific ecoregion for reliable inference of thresholds in our models (e.g. high levels of uncertainty) OR potentially unable to pick up a threshold if present due to too many gaps in data in that ecoregion

In each of these cases, we have determined that we will need to refer to the most reliable scientific resources available in place of our model derived, ecoregion level thresholds to provide the scientific underpinning of our targets (namely in Target 2, Land Quality).

In addition, we recognize that in generating our models to derive ecoregion level thresholds, as with all modelling procedures and analyses, many choices must be made in the modelling process. While these decisions are required in any analysis, they invariably influence the outcome of a given model. For example, the choice of our response variable, ecosystem stability, to represent the ecosystem state, the choice of data sources in our models, and the choice of model parameter, will also influence our outcome threshold results and the implications of what these thresholds represent, and how they are used. While all model parameters and variables were carefully chosen and reviewed to generate robust models, we recognize there can be nuance in resulting threshold value ranges based on the different choices that might be made when generating our models.

In recognition of this, and in order to be as comprehensive and cautious as possible to ensure that the actions companies take are ambitious, effective and avoid unintended or significant, continued environmental consequences, we have also employed a precautionary principle approach when delineating the final threshold value that will support and inform the ambition of each target for each land quality category (indicators) and each ecoregion under Target 2, Land Quality. This precautionary principal approach is outlined as follows:

- All threshold model checks are completed to determine which land quality categories and ecoregions have provided reliable thresholds from our models
- These model threshold values are compared against a reputable, reference value from carefully evaluated peer-reviewed scientific literature sources that represent a threshold, limit critical load or boundary that should not be exceeded for that given land quality category
- Whichever value (either from our models, or from peer-reviewed reference) denotes a stricter threshold value for that land quality category will be the final chosen threshold value that is used to support the target for that land quality category in that ecoregion

AND

- If an ecoregion has been precluded from analysis (due to size or level of aridity, reason 2 above) or land quality categories have not been evaluated (due to lack of data for model inference, reason 3 above), and thus there is not a threshold available from models for all land quality categories across that ecoregion, or for a particular land quality category in a given ecoregion, the appropriate respective reference value from reputable sources in the literature will be used for all relevant land quality categories within that ecoregion to support target-setting for Target 2

Reference values used for this cross-checking, precautionary principle approach were carefully evaluated through an extensive literature review process. In some cases, more general threshold or safe-guard values are used when more specific place-based inference was not available. Wherever possible, within the limits of this review for global application, more place-specific reference values have been used. The reference value sources, and the process or calculations required, as applicable, for each land quality category are indicated below.

Soil Organic Carbon (SOC)

For Soil Organic Carbon, there is a percentage range of soil organic carbon considered sufficient as a threshold or critical limit depending on the conservation or management goal, and characteristics of the soil, climate and location. A critical threshold for depends on several factors such as soil properties, environmental conditions and land management practices[164, 165]. Values of SOC between 1% and 2% are considered a major threshold below which

[164] Kiem, R., Knicker, H., Körschens, M. and Kögel-Knabner, I. (2000). Refractory organic carbon in C-depleted arable soils, as studied by 13C NMR spectroscopy and carbohydrate analysis. *Organic Geochemistry*, 31(7-8), pp.655–668. doi: https://doi.org/10.1016/s0146-6380(00)00047-4.
[165] Loveland, P., Webb, J. (2003). Is there a critical level of organic matter in the agricultural soils of temperate regions: a review. *Soil and Tillage Research*, 70(1), pp.1–18. doi: https://doi.org/10.1016/s0167-1987(02)00139-3.

potentially critical decline in soil quality may occur resulting in significant consequences for primary productivity[166,167,168,169,] .In addition, Lal (2015)[170] posits that the total SOC pool should be kept within threshold levels of at least 1.1%–1.5% by weight as this level is crucial to reduce serious risks to soil and environmental degradation. For our purposes, a value of 1.5% soil carbon was thus considered the appropriate reference value to use as Increasing the SOC pool to above the critical level of 10 to 15 g/kg or 1.0%–1.5% is deemed critical to support true restoration of soil.[171]

To translate how much SOC stock at 0-30 cm depth relates to 1.5% SOC in soil by weight for each ecoregion, we used data from Soil Grids[172].The calculation and explanation of each component is below, using Zeng et al. 2021[173] as reference:

% SOC = SOC stock / BD x H

Where, H is soil depth (30 cm); SOC stock is (t C/ha); BD is the average bulk density for that ecoregion (g cm–3); OC is soil organic carbon concentration in bulk soil (g kg–1)

All soil bulk density (BD) data was downloaded at 0-5, 5-15, and 15-30 cm depth from Soil Grids (2017). Bulk density (BD) data across 0-30 cm were then averaged at the ecoregion level using ArcGIS Pro. SOC stock thresholds from models were translated to SOC % and compared to the 1.5% SOC reference value using the precautionary principle as described. Whichever value was stricter was chosen as the threshold so support that SOC target for that ecoregion in Target 2, Land Quality.

For ecoregions missing thresholds from models (for previously described reasons), 1.5% SOC was used as the threshold for that ecoregion based on the reference critical SOC threshold. SOC stock threshold values were calculated from the 1.5% SOC reference threshold to maintain consistency with thresholds in SOC stock units. This was completed by transforming the 1.5% SOC reference threshold using the equation below:

SOC stock = H × BD × SOC %

Where, SOC stock is in t C/ha; H is soil depth (30 cm); BD is the average bulk density for that ecoregion from 0-30 cm (g cm–3); SOC % is the 1.5% critical reference threshold.

Soil erosion (indicated by soil loss by water)

There are similarly a range of values considered as critical thresholds for soil erosion (soil loss by water) depending on the circumstance. The generic tolerable soil erosion threshold is considered 10 t ha–1 yr–1[174,175,176] as it relates to the point where agricultural lands start to reach considerable declines in productivity at this level. Soil conservation programs tend to have a wider range of soil erosion threshold levels and consider threshold values of approximately 5–12 Mg ha–1 yr–1[177] with the strictest perspective indicating that a true 'precautionary principle' as it relates to avoiding catastrophic impacts on the environment from soil erosion is to keep yearly soil erosion rates as low as 1 or 2 t/ha as this is already deemed unsustainable over the long term in regard to maintaining conservation of healthy soils and ecosystems[178] . Due to this recommendation, we have opted to used 1-2 t of soil loss ha-1 yr-1 as our reference threshold to avoid potentially catastrophic ecosystem impacts with implications for long term conservation and ecosystem recovery due to soil erosion.

Using our precautionary principle, soil erosion values from our models were compared to our reference of 1-2 t soil loss ha-1, choosing the stricter value to support our soil erosion target for that ecoregion. Wherever thresholds could not be derived from our models, this reference value was used to support the soil erosion target for that ecoregion in Target 2, Land Quality.

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[166] Scirp.org. (2016). *Kemper, W.D. and Koch, E.J. (1966) Aggregate Stability of Soils from Western USA and Canada. USDA Technical Bulletin No. 1355, US Government Printing Office, Washington DC. - References - Scientific Research Publishing*. Available at: https://www.scirp.org/reference/ReferencesPapers?ReferenceID=1739920

[167] Effect of organic constituents and complexed metal ions on aggregate - https://bsssjournals.onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-2389.1977.tb02248.x

[168] Johnston, A.E. (1986). Soil organic matter, effects on soils and crops. *Soil Use and Management*, 2(3), pp.97–105. doi: https://doi.org/10.1111/j.1475-2743.1986.tb00690.x.

[169] Oldfield, E.E., Bradford, M.A. and Wood, S.A. (2019). Global meta-analysis of the relationship between soil organic matter and crop yields. *SOIL*, 5(1), pp.15–32. doi: https://doi.org/10.5194/soil-5-15-2019.

[170] Lal, R. (2015). Restoring Soil Quality to Mitigate Soil Degradation. *Sustainability*, [online] 7(5), pp.5875–5895. doi: https://doi.org/10.3390/su7055875.

171 Lal, R. (2015). Restoring Soil Quality to Mitigate Soil Degradation. *Sustainability*, [online] 7(5), pp.5875–5895. doi: https://doi.org/10.3390/su7055875.

[172] Hengl, T., Mendes de Jesus, J., Heuvelink, G.B.M., Ruiperez Gonzalez, M., Kilibarda, M., Blagotić, A., Shangguan, W., Wright, M.N., Geng, X., Bauer-Marschallinger, B., Guevara, M.A., Vargas, R., MacMillan, R.A., Batjes, N.H., Leenaars, J.G.B., Ribeiro, E., Wheeler, I., Mantel, S. and Kempen, B. (2017). SoilGrids250m: Global gridded soil information based on machine learning. *PLOS ONE*, 12(2), p.e0169748. doi: https://doi.org/10.1371/journal.pone.0169748.

173 Zeng, R., Wei, Y., Huang, J., Chen, X., & Cai, C. (2021). Soil organic carbon stock and fractional distribution across central-south China. International Soil and Water Conservation Research, 9(4), 620-630.

[174] Quinton, J.N., Krueger, T., Freer, J., Brazier, R.E. and Bilotta, G.S. (2011). *Handbook of Erosion Modelling*. Available At: doi: https://doi.org/10.1002/9781444328455.ch5.

[175] Panagos, P. and Katsoyiannis, A. (2019). Soil erosion modelling: The new challenges as the result of policy developments in Europe. *Environmental Research*, 172, pp.470–474. doi: https://doi.org/10.1016/j.envres.2019.02.043.

[176] Prăvălie, R., Patriche, C., Borrelli, P., Panagos, P., Roșca, B., Dumitrașcu, M., Nita, I.-A., Săvulescu, I., Birsan, M.-V. and Bandoc, G. (2021). Arable lands under the pressure of multiple land degradation processes. A global perspective. *Environmental Research*, 194, p.110697. doi: https://doi.org/10.1016/j.envres.2020.110697.

[177] *Montgomery, D.R. (2007) Soil Erosion and Agricultural Sustainability. PNAS, 104, 13268-13272. - References - Scientific Research Publishing*. [online] Available at: https://www.scirp.org/reference/ReferencesPapers?ReferenceID=2484172.

[178] F.G.A. Verheijen, Jeffery, S., Bastos, A.C., van and I. Diafas (2009). *Biochar Application to Soils – A Critical Scientific Review of Effects on Soil Properties, Processes and Functions*. [online] Available at: https://www.researchgate.net/publication/258842182_Biochar_Application_to_Soils_-_A_Critical_Scientific_Review_of_Effects_on_Soil_Properties_Processes_and_Functions.

Terrestrial eutrophication and acidification (indicated by total nitrogen deposition, NH3 and Nox)

For terrestrial eutrophication and acidification, we calculated thresholds on total nitrogen deposition to land (NH3 and NOx). We used the global total nitrogen deposition layer in kg N ha-1 yr-1 used an input file in Schulte-Uebbing et al., 2022.[179] In this work, this layer is an output from the TM5 model[180] used as an input as they describe "into the Integrated Model to Assess the Global Environment (IMAGE) Global Nutrient Model (GNM)[181] to calculate 'critical' agricultural N inputs and surpluses (levels at which thresholds are reached) at a 0.5° × 0.5° resolution for the year 2010. The spatial distribution of N deposition in IMAGE is derived from the TM5 model," corrected for the difference in emission estimates between TM5 and IMAGE at the level of world regions". The regional critical nitrogen inputs and surpluses calculated in this paper by Schulte-Uebbing et al. 2022 ultimately supported the Earth Systems Boundary on critical nitrogen inputs.[182] As we were primarily interested in the place-based level (ecoregion) inference on critical thresholds for deposition of nitrogen in natural ecosystems to evaluate its subsequent impacts on biodiversity through the processes of terrestrial eutrophication and acidification, we integrated the global nitrogen deposition layer into our models to derive nitrogen deposition thresholds at the ecoregion level wherever they could be detected.

To this end, when using a critical terrestrial nitrogen deposition threshold to guide the mitigation of impacts to terrestrial ecosystems including biodiversity decline, we used references found in Schulte-Uebbing et al., 2022 and their supplementary information for critical terrestrial N deposition thresholds. These were derived at the biome level for each of the 14 biomes represented in the IMAGE model[183] primarily based on a comprehensive synthesis of empirical studies on critical limits of nitrogen deposition by Bobbink et al., 2010.[184,185].Critical deposition rates range from 5 kgN ha–1 yr–1 to 20 kgN ha–1 yr–1 for the most and least sensitive biomes, respectively.[186]

Each biome was matched to the ecoregion under assessment, and the respective critical nitrogen deposition threshold for that biome was used as a reference for each corresponding ecoregion. When no threshold emerged from our threshold models, this reference value was used for the respective matching ecoregion for nitrogen deposition (aka terrestrial acidification for Target 2). Where thresholds were derived from our models, our threshold value were compared to this reference for critical nitrogen deposition threshold for the matching ecoregion, and the stricter value was chosen as the final threshold to support the Acidification target under Target 2.

Safe Distance 10% Target Buffer

Target values are based on integrating a 10% buffer around threshold values. While guidance on the exact distance to set nature targets based on critical thresholds is limited, this buffer is integrated to ensure that targets are set a safe distance from threshold points for land quality indicators following best practice for setting targets based on ecological thresholds.[187] This buffer distance is at the safer end of a suggested 5-10% buffer. For SOC, the target is set at 10% above the SOC threshold, and for both acidification and soil erosion, the target is set at 10% below the threshold.

[179] Schulte-Uebbing, L. F., Beusen, A. H., Bouwman, A. F., & De Vries, W. (2022). From planetary to regional boundaries for agricultural nitrogen pollution. Nature, 610(7932), 507-512.

[180] Dentener, F., Drevet, J., Lamarque, J.F., Bey, I., Eickhout, B., Fiore, A.M., Hauglustaine, D., Horowitz, L.W., Krol, M., Kulshrestha, U.C., Lawrence, M., Galy-Lacaux, C., Rast, S., Shindell, D., Stevenson, D., Van Noije, T., Atherton, C., Bell, N., Bergman, D. and Butler, T. (2006). Nitrogen and sulfur deposition on regional and global scales: A multimodel evaluation. *Global Biogeochemical Cycles*, 20(4), p.n/a-n/a. doi: https://doi.org/10.1029/2005gb002672.

[181] A. H. W. Beusen, Beek, V., Bouwman, A.F., Mogollón, J.M. and Middelburg, J.J. (2015). Coupling global models for hydrology and nutrient loading to simulate nitrogen and phosphorus retention in surface water - Description of IMAGE-GNM and analysis of performance. *Geoscientific Model Development Discussions*, [online] 8(12). doi: https://doi.org/10.5194/gmdd-8-7477-2015.

182 Rockström, J., Gupta, J., Qin, D., Lade, S. J., Abrams, J. F., Andersen, L. S., ... & Zhang, X. (2023). Safe and just Earth system boundaries. Nature, 619(7968), 102-111.

[183] E. Stehfest, Vuuren, van, Kram, T., Bouwman, L. and Prins, A. (2014). *Integrated Assessment of Global Environmental Change with IMAGE 3.0. Model description and policy applications*. [online] Available at: https://www.researchgate.net/publication/269687107_Integrated_Assessment_of_Global_Environmental_Change_with_IMA

[184] Schulte-Uebbing, L.F., Beusen, A.H.W., Bouwman, A.F. and de Vries, W. (2022). From planetary to regional boundaries for agricultural nitrogen pollution. *Nature*, [online] 610(7932), pp.507–512. doi: https://doi.org/10.1038/s41586-022-05158-2.

[185] Bobbink, R., Hicks, K., Galloway, J., Spranger, T., Alkemade, R., Ashmore, M., Bustamante, M., Cinderby, S., Davidson, E., Dentener, F., Emmett, B., Erisman, J-W., Fenn, M., Gilliam, F., Nordin, A., Pardo, L. and De Vries, W. (2010). Global assessment of nitrogen deposition effects on terrestrial plant diversity: a synthesis. *Ecological Applications*, 20(1), pp.30–59. doi: https://doi.org/10.1890/08-1140.1.

[186] See Schulte-Uebbing et al. 2022 Supplementary Table 2 for biome-specific critical deposition rates and Supplementary Fig. 4 for the resulting global distribution in critical deposition rates
Schulte-Uebbing, L. F., Beusen, A. H., Bouwman, A. F., & De Vries, W. (2022). From planetary to regional boundaries for agricultural nitrogen pollution. Nature, 610(7932), 507-512.

[187] Desmet, P. G. (2018). Using landscape fragmentation thresholds to determine ecological process targets in systematic conservation plans. Biological Conservation, 221, 257-260.

ANNEX 4: Introduction to Land Environmental Assessment Factors

Land Environmental Assessment Factors (LEAFs) are numerical factors that help translate companies' activities, including their operations, products and services purchases, into different environmental indicators and impacts, by using the elementary flows (e.g., land use, water consumption, emissions into air, water and land) collected for the company inventory. LEAFs represent the state a specific land quality indicator is, in the case of SOC or soil erosion, or the unit impact of a specific category, in this case terrestrial acidification, for each of the different relevant elementary flows. They are based on Lifecycle assessment characterization factors (CFs), which are calculated through characterization models, differing in scope, complexity, impact pathways, data used, and unit of measurement.

One of the most common set of CFs is used to calculate carbon footprints to estimate the contribution of a product or company towards climate change. In this case, the elementary flows are GHGs, which are emitted or captured from the atmosphere, and is measured in kg of CO_2 equivalent (kg CO_2e). Each GHG has a different characterization factor depending on their global warming potential compared to carbon dioxide. For example, 1 kg of carbon dioxide emitted to the atmosphere has a characterization factor equal to 1 kg of CO_2-eq., as it is used as reference, but 1 kg of methane from fossil fuel combustion has a value of 29.8 kg of CO_2-eq. according to IPCC's AR6 report.

Emissions CFs are usually calculated as the climate change one, with terrestrial acidification following a similar process but with SO_2 as the reference. Land use impacts characterization factors are created differently, though. In this case, it is calculated as the difference in an indicator between a reference state, usually what is called a quasi-natural state, and another land use. For example, for SOC, the characterization factor for grassland land occupation in a specific ecoregion would be the difference between SOC stock in that ecoregion's quasi-natural state (reference state), and the SOC stock grassland would have in that same ecoregion. The same can be applied to soil erosion.

Due to the differential nature of land use CFs, it would not be possible to easily compare occupation impacts to SOC and soil erosion ecoregional thresholds, and thus they are not used. Instead, the land use indicators state are used and compared to the ecoregion thresholds, comparing the maximum attainable SOC stock from a specific land use to the ecoregional SOC threshold, and the soil erosion rate from a specific land use to the soil erosion threshold.

How are LEAFs used within these target setting guidelines

Three land quality categories have been added to Target 2 – Working Land Regeneration and Restoration: soil organic carbon (SOC), soil erosion, and terrestrial acidification. Companies that need to set Target 2 can use LEAFs to estimate their contribution towards each impact category, if applicable, following the process described in AGILE chapter 6. A summary of each impact category and data needed is given on Table 23.

Table 23 : Summary of land quality indicators and data requirements

	Soil Organic Carbon	Soil Erosion	Terrestrial Acidification
Description	SOC stock) a land use can reach on a given ecoregion if maintained long-term	Soil erosion rate of a land use on a given ecoregion	Change in acidity in the soil due to a change in acid deposition coming from nitrogen and sulfur emissions
Unit of measurement	ton C / ha	ton soil/ha/year	kg SO_2-eq./kg
Data Needed	Land use and duration by location and intensity (ha*yr)	Land use and duration by location and intensity (ha*yr)	Emissions of NH_3, NO_x, and SO_x (kg)
Method	Teixeira, R. F., Morais, T. G., & Domingos, T. (2021). Global process-based characterization factors of soil carbon depletion for life cycle impact assessment. Scientific Data, 8(1), 237.	De Laurentiis, V., Secchi, M., Bos, U., Horn, R., Laurent, A., & Sala, S. (2019). Soil quality index: Exploring options for a comprehensive assessment of land use impacts in LCA. Journal of Cleaner Production, 215, 63-74.	Roy, P. O., Azevedo, L. B., Margni, M., van Zelm, R., Deschênes, L., & Huijbregts, M. A. (2014). Characterization factors for terrestrial acidification at the global scale: A systematic analysis of spatial variability and uncertainty. Science of the Total Environment, 500, 270-276.
Underlaying model	Rothamsted Carbon (RothC) model	Revised Universal Soil Loss Equation (RUSLE) as the basis for LANd use	Combination of GEOS-Chem, PROFILE, model and species

		indicator value Calculation (LANCA) model	richness – pH response curves.
Granularity	Ecoregion, Country	Ecoregion, Country	Map[++] (2° × 2.5° grid resolution), Country[++], Sub-Country[++], Ecoregion[++]

As outlined previously, the way each impact category is measured varies by characterization model. Methods were selected with the help of The Norwegian University of Science and Technology (NTNU) to best align with SBTN objectives, including availability at the ecoregion level, scientific community acceptance, and ease of use.

LEAFs can also help companies estimate how much each response option implemented will help them achieve Target 2. Due to the nascent nature of these targets and methods, it is possible that a specific production practice does not have a LEAF already calculated. For example, there currently are readily available LEAFs for maize production leaving or not leaving crop residues on-field for SOC depletion, but there isn't one for all crops where that practice can be applied or specific tillage practices for crops. AGILE chapter 6 provides detailed guidance where these might be used.

ANNEX 5a: Ecoregion Threshold Samples

Table 24: Example of Ecoregion threshold data for Soil Organic Carbon stock (t C/ha, 30 cm).

Ecoregion	Indicator (SOC stock in t C/ha (0-30 cm)	Ecoregion Threshold (SOC stock in t C/ha (0-30 cm)	Ecoregion Baseline (SOC stock in t C/ha (0-30 cm)	Ecoregion Target (SOC stock in t C/ha (0-30 cm) [188]	Difference between baseline and threshold [189]	Difference between baseline and target [190]
ECO A	SOC stock	26	51	28.6	25	22.4
ECO B	SOC stock	84	44	92.4	-40	-48.4
ECO C	SOC stock	80	44	88	-36	-44
ECO D	SOC stock	76.8	54	84.48	-22.8	-30.48
ECO E	SOC stock	81.6	29.6	89.76	-52	-60.16
ECO F	SOC stock	81.6	29.6	89.76	-52	-60.16
ECO G	SOC stock	72	70.3	79.2	-1.7	-8.9
ECO H	SOC stock	75.8	58.5	83.38	-17.3	-24.88
ECO I	SOC stock	79	50	86.9	-29	-36.9
ECO J	SOC stock	77	43.5	84.7	-33.5	-41.2
ECO K	SOC stock	75.4	61.6	82.94	-13.8	-21.34
ECO L	SOC stock	73.1	50	80.41	-23.1	-30.41
ECO M	SOC stock	83	57.5	91.3	-25.5	-33.8
ECO N	SOC stock	No data	No data	No data	No data	No data
ECO O	SOC stock	76	57.5	83.6	-18.5	-26.1
ECO P	SOC stock	78	65	85.8	-13	-20.8
ECO Q	SOC stock	80	52.2	88	-27.8	-35.8
ECO R	SOC stock	79	52	86.9	-27	-34.9
ECO S	SOC stock	79	41	86.9	-38	-45.9
ECO T	SOC stock	79	53	86.9	-26	-33.9
ECO U	SOC stock	78	44	85.8	-34	-41.8
ECO V	SOC stock	76	55	83.6	-21	-28.6
ECO W	SOC stock	75	87	82.5	12	4.5
ECO X	SOC stock	70	66	77	-4	-11
ECO Y	SOC stock	53	72	58.3	19	13.7
ECO Z	SOC stock	72	57	79.2	-15	-22.2
ECO AA	SOC stock	56	108	61.6	52	46.4
ECO AB	SOC stock	78	42	85.8	-36	-43.8
ECO AC	SOC stock	80	41	88	-39	-47
ECO AD	SOC stock	81	45	89.1	-36	-44.1
ECO AE	SOC stock	81	46	89.1	-35	-43.1
ECO AF	SOC stock	81	61	89.1	-20	-28.1
ECO AG	SOC stock	79	41	86.9	-38	-45.9
ECO AH	SOC stock	83	59	91.3	-24	-32.3
ECO AI	SOC stock	49	89	53.9	40	35.1
ECO AJ	SOC stock	62	48	68.2	-14	-20.2
ECO AK	SOC stock	61	48	67.1	-13	-19.1
ECO AL	SOC stock	78	34	85.8	-44	-51.8
ECO AM	SOC stock	58	47	63.8	-11	-16.8
ECO AN	SOC stock	61	54	67.1	-7	-13.1
ECO AO	SOC stock	47	66	51.7	19	14.3
ECO AP	SOC stock	48	57	52.8	9	4.2

[188] Targets are 10% **above** the threshold

[189] When the value in this cell is negative, it means the threshold has been exceeded. The number in the cell is by how much that indicator value's threshold has been exceeded. Positive values indicate the current safe distance between the baseline and the threshold in the positive (more favorable) direction

[190] When the value in this cell is negative, it means the target has been exceeded. The number in the cell is by how much that indicator value must be increased in the ecoregion to hit the target, based on the distance between the target (10% above the threshold) and the baseline. Positive values indicate the current safe distance between the baseline and the target in the positive (more favorable) direction

Table 25: Example of threshold data for soil erosion (soil loss by water in t ha^{-1} yr^{-1}).

Ecoregion	Indicator Soil erosion (Soil loss in t ha^{-1} yr^{-1})	Ecoregion Threshold (Soil loss in t ha^{-1} yr^{-1})	Ecoregion Baseline (Soil loss in t ha-1 yr-1)	Ecoregion Target (soil loss in t ha^{-1} yr^{-1}) [191]	Difference between baseline and threshold [192]	Difference between baseline and target [193]
ECO A	Soil erosion	1	1.83	0.9	-0.83	-0.93
ECO B	Soil erosion	1	No data	0.9	No data	No data
ECO C	Soil erosion	1	9.6	0.9	-8.6	-8.7
ECO D	Soil erosion	1	27	0.9	-26	-26.1
ECO E	Soil erosion	1.6	3.04	1.44	-1.44	-1.6
ECO F	Soil erosion	1	2.54	0.9	-1.54	-1.64
ECO G	Soil erosion	1	14.1	0.9	-13.1	-13.2
ECO H	Soil erosion	1	17.5	0.9	-16.5	-16.6
ECO I	Soil erosion	1	16.8	0.9	-15.8	-15.9
ECO J	Soil erosion	1	1.88	0.9	-0.88	-0.98
ECO K	Soil erosion	1	7.6	0.9	-6.6	-6.7
ECO L	Soil erosion	1	9.92	0.9	-8.92	-9.02
ECO M	Soil erosion	0.8	17	0.72	-16.2	-16.28
ECO N	Soil erosion	1	No data	0.9	No data	No data
ECO O	Soil erosion	1	7.62	0.9	-6.62	-6.72
ECO P	Soil erosion	1	1.53	0.9	-0.53	-0.63
ECO Q	Soil erosion	1	4	0.9	-3	-3.1
ECO R	Soil erosion	2	12	1.8	-10	-10.2
ECO S	Soil erosion	1	No data	0.9	No data	No data
ECO T	Soil erosion	1	2.4	0.9	-1.4	-1.5
ECO U	Soil erosion	1	10	0.9	-9	-9.1
ECO V	Soil erosion	1	12.5	0.9	-11.5	-11.6
ECO W	Soil erosion	1	1.1	0.9	-0.1	-0.2
ECO X	Soil erosion	1	17	0.9	-16	-16.1
ECO Y	Soil erosion	1	27	0.9	-26	-26.1
ECO Z	Soil erosion	1	10.5	0.9	-9.5	-9.6
ECO AA	Soil erosion	1	6.7	0.9	-5.7	-5.8
ECO AB	Soil erosion	0.5	5.8	0.45	-5.3	-5.35
ECO AC	Soil erosion	1	0.94	0.9	0.06	-0.04
ECO AD	Soil erosion	0.5	0.87	0.45	-0.37	-0.42
ECO AE	Soil erosion	1	1.4	0.9	-0.4	-0.5
ECO AF	Soil erosion	1	5.5	0.9	-4.5	-4.6
ECO AG	Soil erosion	1	3.4	0.9	-2.4	-2.5
ECO AH	Soil erosion	1	4.6	0.9	-3.6	-3.7
ECO AI	Soil erosion	2	11	1.8	-9	-9.2
ECO AJ	Soil erosion	1	2.5	0.9	-1.5	-1.6
ECO AK	Soil erosion	1	3	0.9	-2	-2.1
ECO AL	Soil erosion	1	22.3	0.9	-21.3	-21.4
ECO AM	Soil erosion	1	6.2	0.9	-5.2	-5.3
ECO AN	Soil erosion	1	1.4	0.9	-0.4	-0.5
ECO AO	Soil erosion	1	8.5	0.9	-7.5	-7.6
ECO AP	Soil erosion	1	4.7	0.9	-3.7	-3.8
ECO AQ	Soil erosion	1	3.7	0.9	-2.7	-2.8

Note: Eco IDs are anonymized here in order to maintain focus on an example of the process and not distract focus on specific details of the ecoregions analyzed.

[191] Targets are 10% **below** the threshold

[192] When the value in this cell is negative, it means the threshold has been exceeded. The number in the cell is by how much that indicator value's threshold has been exceeded. Positive values indicate the current safe distance between the baseline and the threshold in the positive (more favorable) direction

[193] When the value in this cell is negative, it means the target has been exceeded. The number in the cell is by how much that indicator value must be decreased in the ecoregion to hit the target, based on the distance between the target (10% below the threshold) and the baseline; positive values indicate the current safe distance between the baseline and the target in the positive (more favorable) direction

Table 26: Example of Threshold data for Terrestrial acidification (Total Nitrogen Deposition (NH_3 and NO_x) in Kg N ha^{-1} yr^{-1}.

Ecoregion	Indicator (Total Nitrogen deposition in kg N ha^{-1} yr^{-1})	Ecoregion Threshold (kg N ha^{-1} yr^{-1})	Ecoregion Baseline (kg N ha^{-1} yr^{-1})	Target (10% below threshold in kg N ha^{-1} yr^{-1})[194]	Difference between baseline and threshold[195]	Difference between baseline and target[196]
ECO A	Nitrogen deposition	20	14	18	6	4
ECO B	Nitrogen deposition	20	12	18	8	6
ECO C	Nitrogen deposition	10.5	12	9.45	-1.5	-2.55
ECO D	Nitrogen deposition	20	7.6	18	12.4	10.4
ECO E	Nitrogen deposition	8.4	8.81	7.56	-0.41	-1.25
ECO F	Nitrogen deposition	20	7.5	18	12.5	10.5
ECO G	Nitrogen deposition	20	11.7	18	8.3	6.3
ECO H	Nitrogen deposition	8.25	7.7	7.425	0.55	-0.275
ECO I	Nitrogen deposition	8.5	8.72	7.65	-0.22	-1.07
ECO J	Nitrogen deposition	9.8	10.23	8.82	-0.43	-1.41
ECO K	Nitrogen deposition	20	6.5	18	13.5	11.5
ECO L	Nitrogen deposition	20	7.65	18	12.35	10.35
ECO M	Nitrogen deposition	5.96	5.95	5.364	0.01	-0.586
ECO N	Nitrogen deposition	20	No data	18	No Data	No Data
ECO O	Nitrogen deposition	20	8.5	18	11.5	9.5
ECO P	Nitrogen deposition	20	4.5	18	15.5	13.5
ECO Q	Nitrogen deposition	20	7.6	18	12.4	10.4
ECO R	Nitrogen deposition	7	6.95	6.3	0.05	-0.65
ECO S	Nitrogen deposition	20	7.2	18	12.8	10.8
ECO T	Nitrogen deposition	20	12.6	18	7.4	5.4
ECO U	Nitrogen deposition	20	8.9	18	11.1	9.1
ECO V	Nitrogen deposition	20	9.8	18	10.2	8.2
ECO W	Nitrogen deposition	5	5.4	4.5	-0.4	-0.9
ECO X	Nitrogen deposition	7.8	8.6	7.02	-0.8	-1.58
ECO Y	Nitrogen deposition	20	5.9	18	14.1	12.1
ECO Z	Nitrogen deposition	20	6.95	18	13.05	11.05
ECO AA	Nitrogen deposition	12.5	1.6	11.25	10.9	9.65
ECO AB	Nitrogen deposition	15	11.9	13.5	3.1	1.6
ECO AC	Nitrogen deposition	9.2	8.8	8.28	0.4	-0.52
ECO AD	Nitrogen deposition	15	13.5	13.5	1.5	0
ECO AE	Nitrogen deposition	9.7	10.3	8.73	-0.6	-1.57
ECO AF	Nitrogen deposition	15	12.5	13.5	2.5	1
ECO AG	Nitrogen deposition	15	7.9	13.5	7.1	5.6
ECO AH	Nitrogen deposition	15	8.4	13.5	6.6	5.1
ECO AI	Nitrogen deposition	17.5	5.5	15.75	12	10.25
ECO AJ	Nitrogen deposition	5	9	4.5	-4	-4.5
ECO AK	Nitrogen deposition	5	8	4.5	-3	-3.5
ECO AL	Nitrogen deposition	4	3.96	3.6	0.04	-0.36
ECO AM	Nitrogen deposition	5	11.6	4.5	-6.6	-7.1
ECO AN	Nitrogen deposition	20	6.5	18	13.5	11.5
ECO AO	Nitrogen deposition	5.8	6.4	5.22	-0.6	-1.18
ECO AP	Nitrogen deposition	7	8.2	6.3	-1.2	-1.9
ECO AQ	Nitrogen deposition	20	8.1	18	11.9	9.9

Note: Eco IDs are anonymized here in order to maintain focus on an example of the process and not distract focus on specific details of the ecoregions analyzed.

[194] Targets are 10% **below** the threshold

[195] When the value in this cell is negative, it means the threshold has been exceeded. The number in the cell is by how much that indicator value's threshold has been exceeded. Positive values indicate the current safe distance between the baseline and the threshold in the positive (more favorable) direction

[196] When the value in this cell is negative, it means the target has been exceeded. The number in the cell is by how much that indicator value must be decreased in the ecoregion to hit the target, based on the distance between the target (10% below the threshold) and the baseline. Positive values indicate the current safe distance between the baseline and the target in the positive (more favorable) direction

ANNEX 5b: LEAFs Sample data

Table 27: Example of LEAFs data from anonymised realm

Ecoregion	Land Environmental Assessment Factors						
	Acidification Potential (kg SO2-eq./kg)			MaxSOC (ton C/ha)		Soil Erosion (ton soil/ha)	
	NH_3	NO_x	SO_2	Grassland	Sugarcane	Grassland	Sugarcane
3213	1.12	0.20	0.94	66.68	132.69	1.46	25.88
7133	0.78	0.13	0.39	97.69	312.24	0.48	7.76
6301	1.09	0.18	0.56	70.53	187.58	0.81	12.80
8162	0.84	0.14	0.77	111.93	835.53	2.86	50.54
4486	0.64	0.11	0.23	115.35	116.56		66.60
3354	3.00	0.35	2.72	311.10		2.21	
1646	0.71	0.16	0.49	72.25	59.68	0.15	2.44
7963	2.19	0.32	1.20	71.93	43.55	0.88	13.86
3136	0.96	0.11	0.30	68.95	37.47	0.44	6.60
1611	0.83	0.09	0.25	258.45	41.48	0.49	10.02
9031	1.12	0.22	0.69	113.03	195.05	3.07	43.69
4088	1.40	0.25	0.91	146.04	324.76	4.07	62.52
9813	1.06	0.12	0.44	78.65	38.50	0.72	7.88
6311	1.37	0.15	0.50	56.61	66.55	2.72	34.03
5674	0.62	0.08	0.24	97.48	490.23		34.31
2084	1.12	0.24	1.60	77.69	80.90	0.50	7.44
1660	1.73	0.28	1.94	96.69	368.94	5.27	109.89
7082	1.43	0.28	1.91	83.97	739.06	9.89	142.20
1130	1.13	0.20	0.67	90.61	60.70	0.73	10.76
3690	0.51	0.12	0.35	102.69	50.24	2.39	49.17
1460	1.73	0.28	1.04	70.19	536.94	2.43	44.60
6681	1.18	0.15	1.09	57.63	117.78	0.93	16.22
2087	0.58	0.06	0.16		114.02		
8521	0.54	0.09	0.25	68.81	115.27	4.41	48.71
1097	1.30	0.12	0.41	98.67	275.79	6.43	70.45
7605	1.40	0.14	0.47	61.99	169.20	14.85	277.86
3607	0.54	0.07	0.21				
4071	0.58	0.08	0.22	154.04	205.26	3.20	71.32
1164	0.55	0.07	0.23	98.93	268.45	1.42	42.06
3604	0.54	0.07	0.22	145.30	318.13	2.70	90.72
8546	0.68	0.08	0.25	63.18	1210.38	3.92	89.36
3195	2.27	0.29	2.07	153.63	356.10	0.53	
4146	2.22	0.32	2.01	119.32	343.95	1.76	65.08
4447	3.20	0.44	2.37	144.31	356.10	1.79	1.95
9940	1.55	0.26	1.13	72.12	78.50	1.23	18.56
6666	0.84	0.10	0.30	44.93	208.74	0.92	36.54
2160	0.83	0.09	0.28	55.07	2239.44		128.25
8407	1.70	0.23	1.22	197.83		0.45	

Note: Eco IDs are anonymized here in order to maintain focus on an example of the process and not distract focus on specific details of the ecoregions analyzed.

ANNEX 6: Landscape engagement roadmap

Companies must prepare the Landscape Initiative Roadmap as a formal document to facilitate implementation and in the future enable audits. Therefore, it should be presented as such during validation. SBTN validators will check the completeness for all items. At this stage validators will not be able to provide a standardized judgment on the integrity or quality of the information submitted by the company. The roadmap does not necessarily need to provide evidence against all of the requirements, rather show the intent to achieve them before the target date.

Specifically for **scenario 1,** the landscape engagement roadmap information needs to be comprehensive in showing the structure and governance, but most importantly it needs to document how the company is planning to contribute to improvements in ecological and social conditions.

For **scenario 2**, the roadmap information needs to include: How to improve the governance and structure of the initiative, in order to meet the key criteria and how to achieve ecological and social conditions.

In **scenario 3**, for a current initiative, the roadmap information needs to include all the steps the company will take to meet the key criteria. For a new initiative, the roadmap information needs to include the steps the company is working on to set up a new initiative that will meet the key criteria.

Information	Scenario	Details	Desired outcome
Actions and timelines (across key criteria)	1, 2	Documentation with list and description of actions and/or investments the company has made and is making, together with: • Expected outcome for each action/investment. • Timeline to measure progress.	Collective action plan showing how the company intends to improve ecological and social conditions in the landscape.
	3	Documentation with list and description of actions and/or investments the company has made and is making, together with: • Expected outcome for each action/investment. • Timeline to measure progress.	Documentation showing how the company is planning to establish the initiative, create the structure, and improve to meet the key criteria.
Funding for actions (across key criteria)	1, 2	Explanation and quantification of investments and funding supporting the implementation of any investments the company is making in improving the landscape initiative overall.	Financial plan for the landscape.
	3	Explanation and quantification of investments and funding supporting the implementation of any investments the company is making in improving the landscape initiative overall.	A financial plan for the landscape within 6-12 months
Landscape selection (Key criteria 1)	1, 2	Clear description of how material landscapes have been selected, based on Approach 1 or Approach 2 from the Land guidance.	Company engages in a landscape or jurisdiction where it is well placed to have positive impacts.
	3	Clear description of how the company has selected the location where the initiative will be established.	Company selects a landscape or jurisdiction where it is well placed to have positive impacts.
Landscape selection—additional (Key criteria 1)	1, 2, 3	Additional description of selection of landscapes based on: • Current or future sourcing risks. • Priority issues or regions for the company's broader strategy. • Existence of other collective action initiatives. • The company's potential to drive positive outcomes beyond its supply chain.	Company engages in a landscape or jurisdiction where it is well placed to have positive impacts.

Information	Scenario	Details	Desired outcome
		• Regulatory environment.	
Stakeholder engagement (Key criteria 2)	1, 2	Documentation showing: • Evidence that an adequate assessment of needs of local communities has taken place with stakeholder consultation. • Stakeholder map, with key stakeholders. • Documentation of formal support of stakeholders for the company's involvement in the landscape collective action plan.	Key stakeholders in the jurisdiction, including local government and producing enterprises, are actively engaged and committed to any action plans and their stated outcomes.
	3	Documentation showing: • Plan for assessment of needs of local communities. • Plan for stakeholder mapping.	Plan on how the company intends to engage key stakeholders in the landscape/jurisdiction.
Stakeholder engagement (Key criteria 2)	1, 2, 3	Evidence that corporate actions are aligned with community needs and objectives.	
Governance (Key criteria 2)	1	Documentation showing: • Formal collaboration agreements (e.g., memorandums of understanding). • Governance structure.	Clear and transparent operating procedures define the legal standing of the initiative and the governance roles, responsibilities, and decision-making for different stakeholders in that initiative.
	2	Documentation showing how the company plans to support a governance structure to meet the key criteria: • Formal collaboration agreements (e.g., memorandums of understanding). • Governance structure.	Clear and transparent operating procedures define the legal standing of the initiative and the governance roles, responsibilities, and decision-making for different stakeholders in that initiative.
	3	Documentation showing how the company plans to create the governance structure to meet the key criteria: • Formal collaboration agreements (e.g., memorandums of understanding). • Governance structure.	Clear and transparent operating procedures define the legal standing of the initiative and the governance roles, responsibilities, and decision-making for different stakeholders in that initiative.
Governance (Key criteria 2)	1, 2, 3	Documents showing: • Terms of reference and membership of governance bodies. • Operating procedures/codes of conduct. • Dispute resolution and grievance processes.	
Goals and linkages (Key criteria 3)	1, 2, 3	Documentation showing details of the theory of change, with intended outputs of the actions and steps by which those outputs will lead to positive landscape outcomes. A context assessment that determines: • Who is doing what. • Critical risks and their root causes. • Levers of change. • Priority actions.	Company communicates how it is supporting the achievement of landscape objectives and how it monitors its investments and impacts.

Information	Scenario	Details	Desired outcome
Unintended consequences and safeguards (Key criteria 3)	1, 2	• Assessment of unintended negative consequences of proposed actions. • Implementation plan for environmental and social safeguards.	An effective landscape initiative should act on multiple objectives, addressing sustainable production, human wellbeing, and landscape conservation.
	3	• Assessment of unintended negative consequences of proposed actions. • Implementation plan for environmental and social safeguards.	An assessment and implementation plan within 6-12 months:
Metrics and indicators (Key criteria 3)	1, 2	• Selection of a set of metrics that are suitable to measure both progress and impact of planned actions, and improvement in ecological and social conditions at landscape scale. • Calculation of the baseline corresponding to each indicator. • The list of metrics can be selected from the proposed list of metrics in the guidance (ecological and social conditions), Table 15, or from other sources. • Justification for the use of each metric has to be provided.	A framework is in place to monitor performance improvements in the landscape, in conjunction with the capacity to manage and analyze the data and accurately communicate the results.
	3	• Selection of a set of metrics that are suitable to measure both progress and impact of planned actions at the landscape level. • Calculation of the baseline corresponding to each indicator. • The list of metrics can be selected from the proposed list of metrics in the guidance (ecological and social conditions), Table 15, or from other sources. • Justification for the use of each metric has to be provided.	A framework is in place to monitor performance improvements in the landscape, in conjunction with the capacity to manage and analyze the data and accurately communicate the results.
Data sources (Key criteria 3)	1, 2	Developing a list of data sources used to derive the baseline values of each of the selected metric and indicator. This can include primary and secondary sources.	
	3	Developing a list of data sources used to derive the baseline values of each of the selected metric and indicator. This can include primary and secondary sources.	Within 6-12 months, a list of data sources used to derive the baseline values of each of the selected metrics and indicators. This can include primary and secondary sources.
Transparency (Key criteria 4)	1, 2, 3	Information on the structure, agreements, financing, and actions of the initiative are publicly and easily accessible.	
Data management system (Key criteria 4)	1, 2	Documentation showing how the company, in the landscape initiative, has in place data governance systems and protocols to credibly gather, store, analyze, and use the data collected in the landscape initiative.	
	3	Documentation showing how the company is creating data governance systems and protocols to credibly gather, store, analyze,	Within 6-12 months, documentation showing how the company, in the landscape initiative, has in place data governance systems and protocols to credibly gather, store, analyze

Information	Scenario	Details	Desired outcome
		and use the data collected in the landscape initiative.	and use the data collected in the landscape initiative. Note, the most important component of this roadmap requirements relates to the protection of sensitive data.
Reporting progress (Criteria 4)	1, 2	Clear reporting framework and strategy for communicating accessible information about results, partners, and future actions on a regular and recurring basis.	
	3	Clear reporting framework and strategy for communicating accessible information about results, partners, and future actions on a regular and recurring basis.	Within 6-12 months, evidence of a clear reporting framework and strategy.

Table 28: Landscape Engagement Roadmap

Implementation and validation guidance

Companies must prepare the Landscape Initiative Roadmap as a formal document to facilitate implementation and in the future enable audits. Therefore, it should be presented as such during validation.

SBTN validators (The Accountability Accelerator[197]) will check the completeness for all items.

At this stage validators will not be able to provide a standardized judgment on the integrity or quality of the information submitted by the company. However, validators may require additional information or clarification for the purpose of validation for the pilot. This will help the SBTN Land Hub develop more precise evaluation criteria in future iterations of the SBTN Land methods

[197] Accountability Accelerator - https://accountabilityaccelerator.org/

1
2
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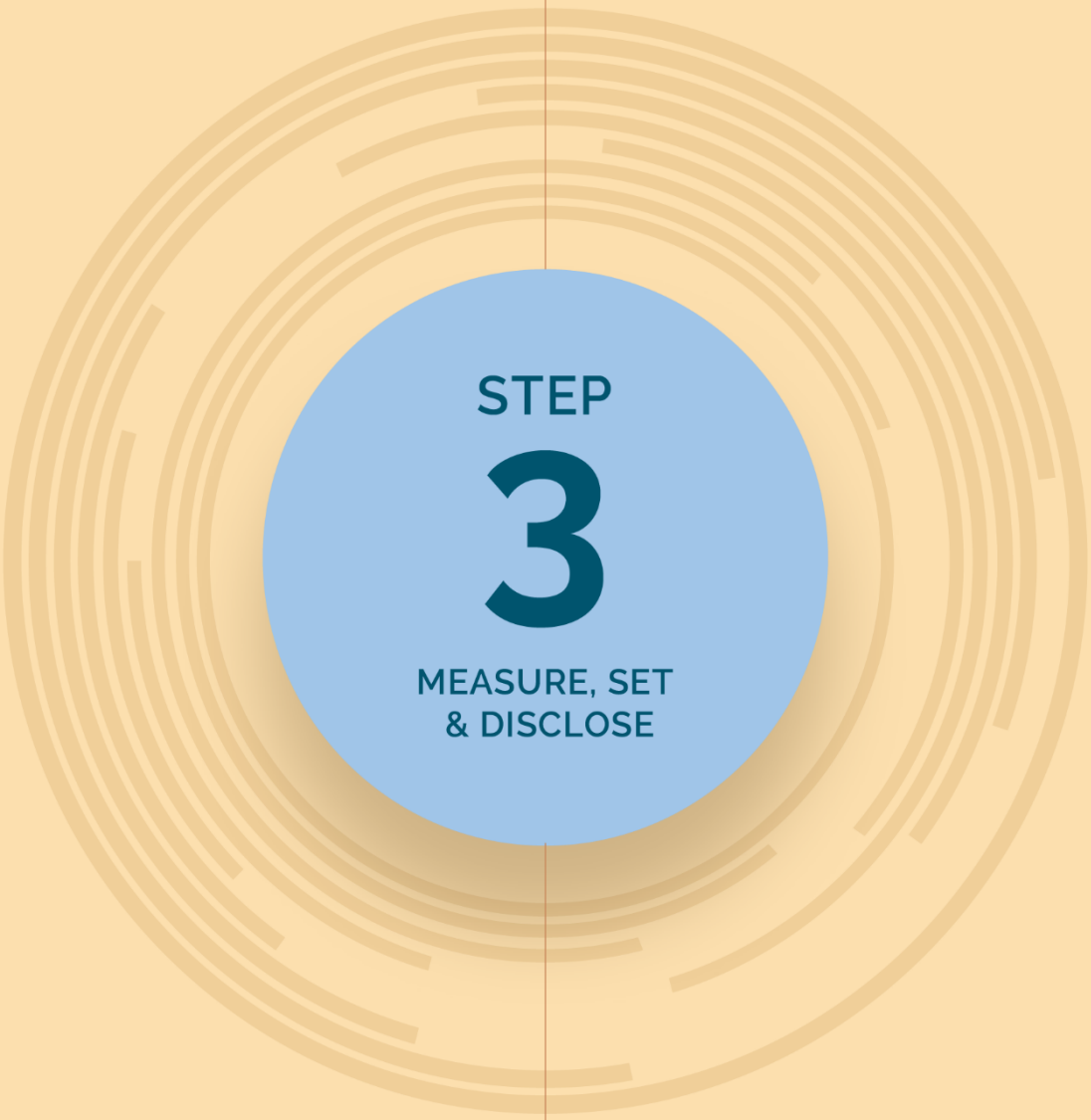
4

SCIENCE-BASED TARGETS FOR LAND
VERSION 2.0 DRAFT FOR PUBLIC CONSULTATION
APRIL 2025



LAND

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