Biodiversity Impact and Risk Assessment

Coca-Cola HBC (CCH)

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HBC

The 3 scales of biodiversity
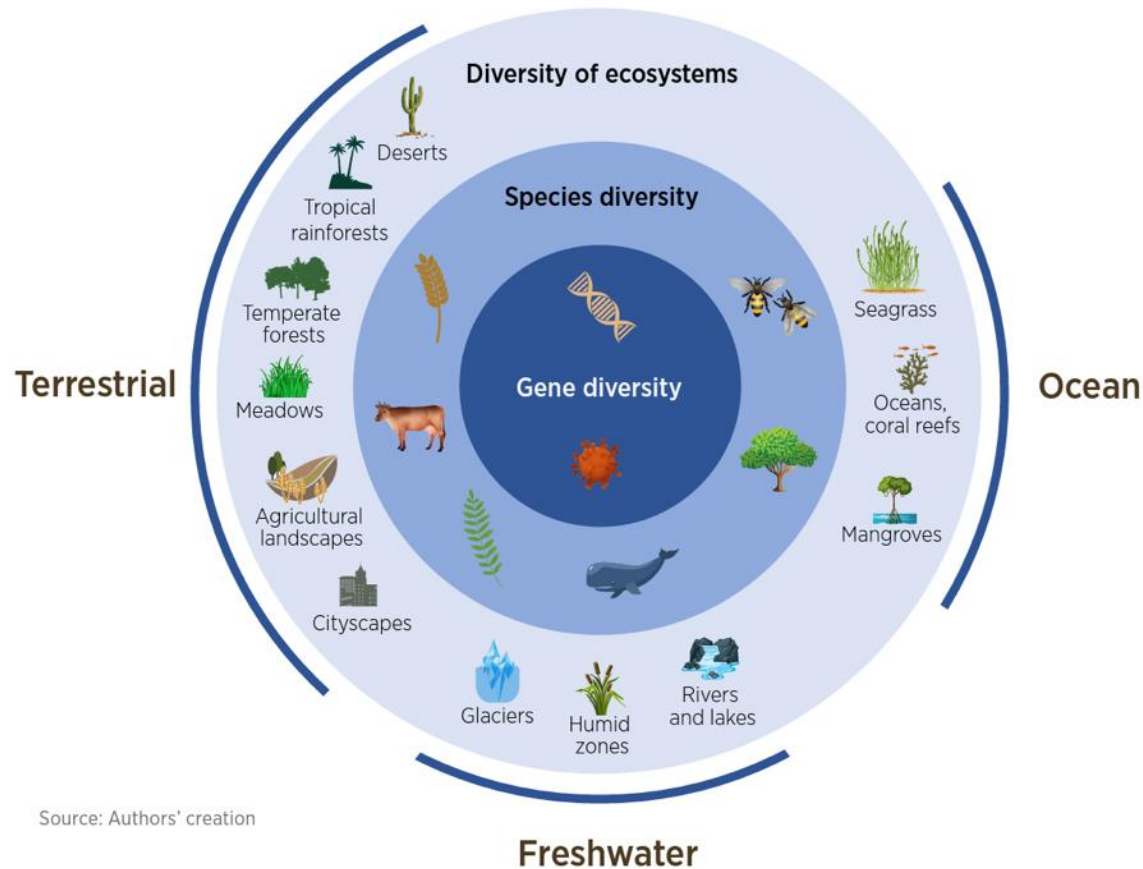
Source: Authors' creation

- + Biodiversity is embedded in people's mind through a few iconic species

- + It is **much broader** and refers to **all life on Earth** and the **richness and variability** observed among these living organisms on 3 types:

- + **Gene diversity** = The diversity within species made by the uniqueness of each individual genetic material

- + **Species diversity** = The diversity between species (ex. More than 20k different bees have been identified)

- + **Diversity of ecosystems** = The major realms that compose the natural world and that differ fundamentally in their organization, scale and function

Source: Quantis & HEC Report on Biodiversity, 2022

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Biodiversity is part of the natural capital which we rely on

The Natural Capital Model

STOCKS
Natural Capital

The natural assets (physical and biological) in the world around us, such as plants, rivers, soil and animals

- Renewable assets
- Depletable assets
- Biodiversity

FLOWS
Ecosystem services

The flow of benefits which we gain from this natural capital and healthy ecosystems

- Provisioning services (raw materials, food, water)
- Regulating services (water cycle, carbon capture)
- Supporting services (pollination, photosynthesis)
- Cultural services (health, wellbeing, recreation)
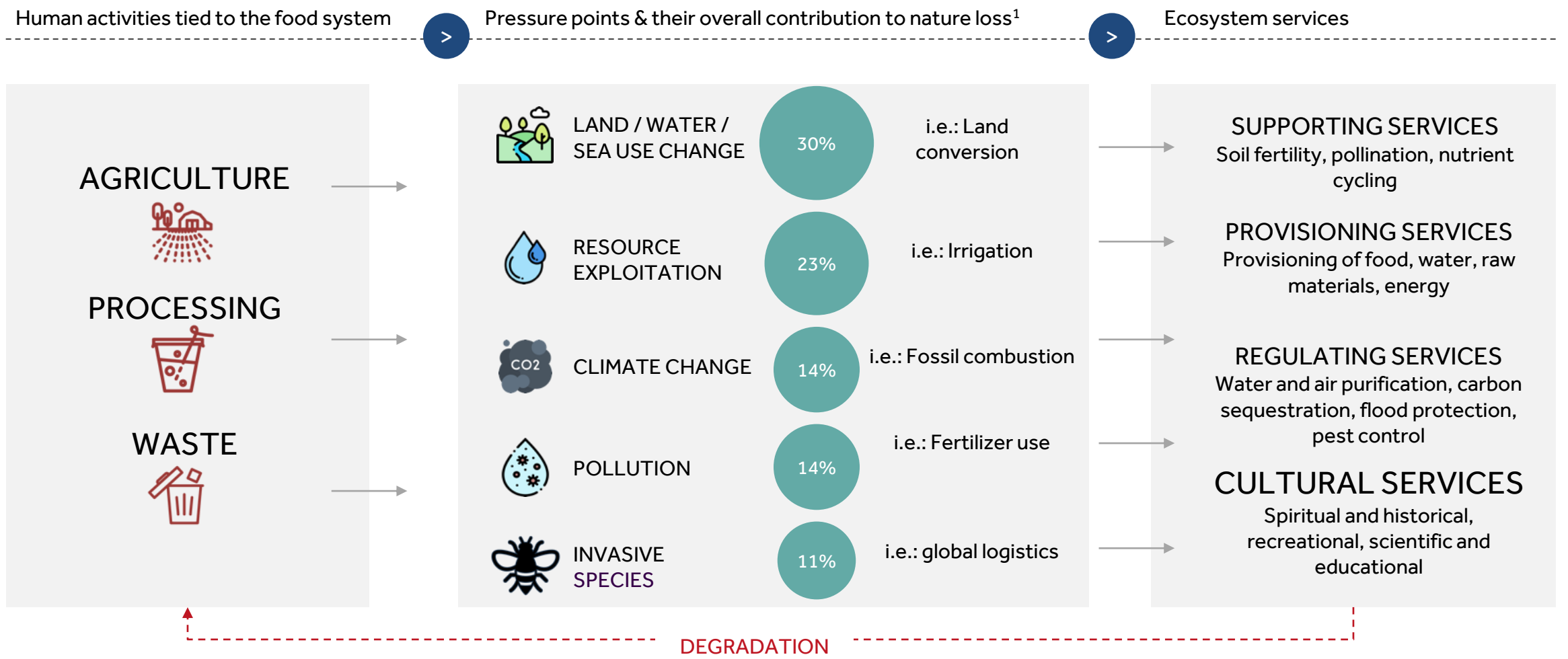
VALUE
Benefits to business and society

The economic value of Nature's benefits and services (considered today as "free")

- ~50% of global GDP
- ~$44 trillion of economic value

Sources: Millennium Ecosystem Assessment (2005), SwissRe Institute

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The food system exerts pressure on Nature's ecosystem services

Human activities tied to the food system > **Pressure points & their overall contribution to nature loss[1]** > **Ecosystem services**

Human activities tied to the food system

AGRICULTURE

PROCESSING

WASTE

Pressure points & their overall contribution to nature loss[1]

LAND / WATER / SEA USE CHANGE	30%	i.e.: Land conversion
RESOURCE EXPLOITATION	23%	i.e.: Irrigation
CLIMATE CHANGE	14%	i.e.: Fossil combustion
POLLUTION	14%	i.e.: Fertilizer use
INVASIVE SPECIES	11%	i.e.: global logistics

Ecosystem services

SUPPORTING SERVICES
Soil fertility, pollination, nutrient cycling

PROVISIONING SERVICES
Provisioning of food, water, raw materials, energy

REGULATING SERVICES
Water and air purification, carbon sequestration, flood protection, pest control

CULTURAL SERVICES
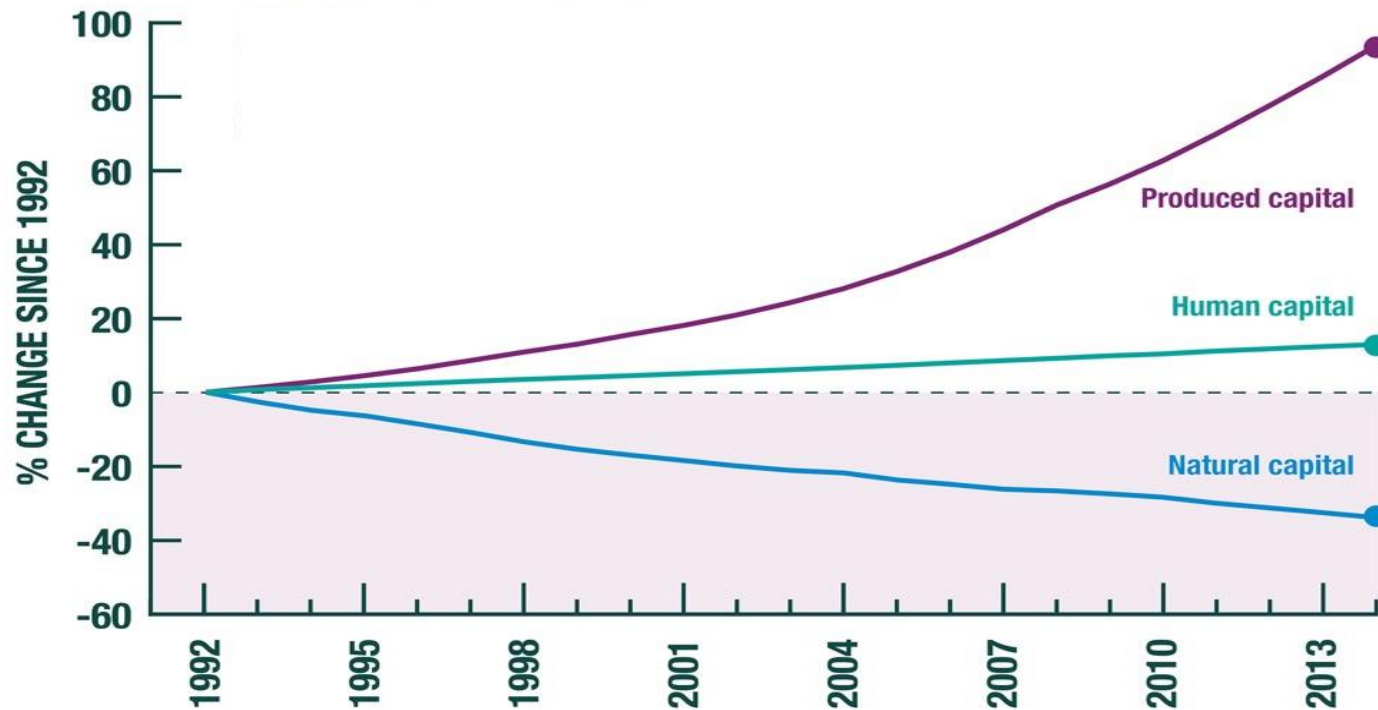Spiritual and historical, recreational, scientific and educational

DEGRADATION

[1] The remaining 8% are linked to other drivers of nature loss
Sources : Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), Global Assessment Report on Biodiversity and Ecosystemic Services – Quantis, FAO, AQUASTAT, Poore & Nemecek (2018), Bar-on et al. (2018), Our world in Data

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Yet, human activities are depleting our natural capital and ecosystem services are declining

Global Capital Stocks per Capita, % change since 1992
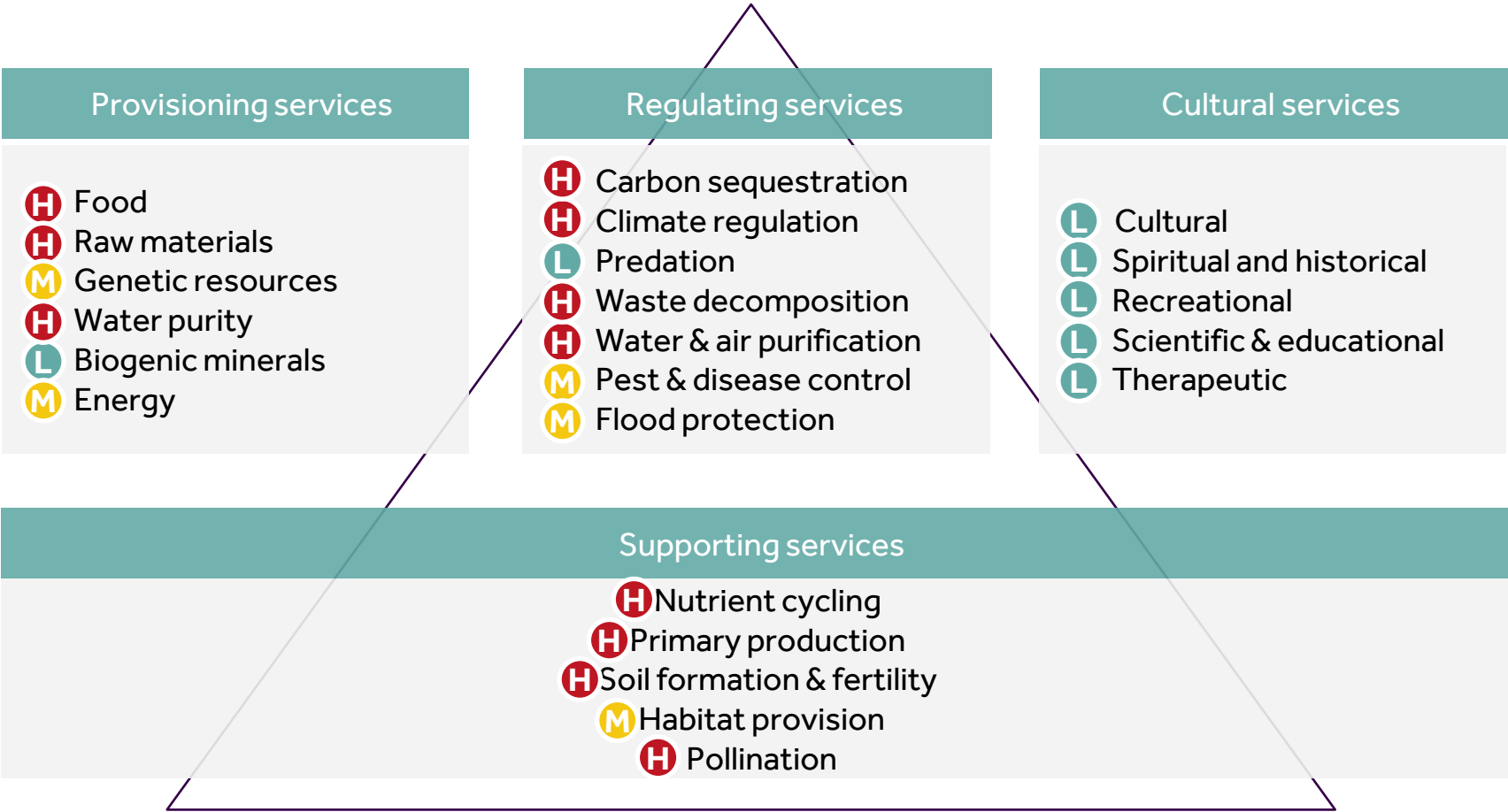## Natural Capital tipping points

Biodiversity

- 1,000,000: 1/8 species threatened with extinction
- 10-100X: ratio of current rate of global species extinction compared to the average of the last 10 million years (6TH global mass extinction)

Ecosystem services

- -23%: Reduction in productivity of the global land surface due to land degradation

Source: The Dasgupta Review, The Economics of Biodiversity, 2021

CCH is dependent on key services provided by nature, mostly access to pure water and agricultural commodities

The 4 types of ecosystem services and their relationship to Coca-Cola HBC

Provisioning services

- (H) Food
- (H) Raw materials
- (M) Genetic resources
- (H) Water purity
- (L) Biogenic minerals
- (M) Energy

Regulating services

- (H) Carbon sequestration
- (H) Climate regulation
- (L) Predation
- (H) Waste decomposition
- (H) Water & air purification
- (M) Pest & disease control
- (M) Flood protection

Cultural services

- (L) Cultural
- (L) Spiritual and historical
- (L) Recreational
- (L) Scientific & educational
- (L) Therapeutic

Supporting services

- (H) Nutrient cycling
- (H) Primary production
- (H) Soil formation & fertility
- (M) Habitat provision
- (H) Pollination

To produce its beverages, Coca-Cola HBC is highly dependent on:

- **Access to pure water** (therefore to the water purification cycle, etc..)
- **Access to agricultural commodities** such as sugar and fruits (therefore to pollination, soil fertility, nutrient cycling, etc..)

Climate regulation in turn has an impact on food production and water accessibility

Level of Coca-Cola's activity dependence on nature:

(L) Low   (M) Medium   (H) High

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Biodiversity, Science Based Target Network and Coca-Cola HBC impact assessment

What is Nature & why is it important for Coca-Cola HBC?

- Biodiversity is **part of the natural capital** that we rely on and the flow of **benefits (called "services")** that we gain from healthy ecosystems (access to natural resources, water cycle, soil formation, pollination, and many more)
- Coca-Cola HBC depends strongly on Nature which supplies it with clean drinkable **water and key raw ingredients**
- Yet, human activities and especially the food system are depleting the natural capital and services are declining, reaching **tipping points**
- The IPBES (Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services) has identified **5 pressures on Nature:** 1) land / water / sea use change, 2) resource exploitation, 3) climate change, 4) pollution and 5) invasive species

What is behind the SBTN framework?

- The Science-Based Targets Network (SBTN) is developing the framework to **go beyond Climate Change to address Nature loss**
- The goal is to foster **corporate action to stop the loss of Nature** from a 2020 baseline and ensure its **full recovery by 2050**
- There are **5 main steps** in the SBTN guidance, and this project focuses on the first 2: **1/** identifying **most material impacts** and where they occur on Coca-Cola HBC's value chain**, and 2/ prioritize** a shortlist
- The SBTN addresses the major pressures on Nature by defining **directional targets on all ecosystems** (land, water and ocean) then translated into specific contextual targets based on outputs of steps 1 & 2
- We have selected **5 of them on which SBTN guidance is available or being developed and that are relevant for Coca-Cola HBC**: 1/ No conversion of natural habitats, 2/ Land Occupation reduction, 3/ Water withdrawals reduction, 4/ Water quality improvement and 5/ Plastics leakage reduction

How was the study performed?

- **Activity data** from CCH are collected, covering **1/ upstream activities** (volumes sourced & origin of raw materials), **2/ direct operations** (consumption of water & energy of all sites), and **3/ downstream** (packaging distribution by country)
- Quantis translated this activity data into **Pressures on Nature** across 5 metrics
- These Pressures on Nature were **weighted by Local Nature Vulnerability indicators** assessing the state of nature in the locations where the activity occurs
- The result is CCH's **Impact on Nature** across **1/ Land Conversion, 2/ Land Occupation, 3/ Water Quantity Impact, 4/ Water Pollution and 5/ Plastic Leakage.** The result shows only the **"clear picture"** without taking into consideration our mitigation actions such as **sustainable certification of our agricultural ingredients, the amount of water replenished from water stewardship projects etc.**
- X-functional team was working on the assessment and the results were integrated within our overall Enterprise Risk Management process

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Coca-Cola HBC tested the SBTN methodology, the corporate framework that goes beyond Climate

SCIENCE BASED TARGETS > SCIENCE BASED TARGETS NETWORK
GLOBAL COMMONS ALLIANCE

CLIMATE CHANGE		LAND / WATER USE CHANGE	RESOURCE EXPLOITATION	POLLUTION	INVASIVE SPECIES / OTHER

	CLIMATE CHANGE	LAND / WATER USE CHANGE, RESOURCE EXPLOITATION, POLLUTION, INVASIVE SPECIES / OTHER
FOUNDING MEMBERS	WWF, CDP, WRI, UNGC	Over 50 NGOs, consultancies and academic institutions (incl. all SBTi members)
SCIENCE FOUNDATION	IPCC reports (107 experts, 52 countries, 9k studies reviewed)	IPBES reports (145 experts, 50 countries, 15k studies reviewed)

Enable and push companies to respect planetary boundaries through a standardized and comparable approach

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We focused on Step 1 and 2 of the SBTN methodology

In scope

PRIORITIZE HOTSPOTS

+ Identify CCH's **most material impacts on Nature** and where they occur in the value chain

+ **Prioritize a shortlist** of key contributors by location for target setting

SBTN Steps 1&2

SET TARGETS

+ Measure a **baseline**

+ Set **contextual targets** on the shortlist of top contributors

SBTN Step 3

ACT & TRACK

+ Leverage guidance for action: **Avoid, Reduce, Restore & Regenerate, Transform**

+ Link **Climate and Nature**

+ **Monitor progress** towards targets

SBTN Steps 4&5

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We selected SBTN Nature indicators with data / guidance available

TOPICS	ASPIRATIONAL TARGETS	NATURE PRESSURE METRIC	LOCAL NATURE VULNERABIILITY INDICATOR	TOOLS
LAND	**1** No conversion of natural habitats	• m² occupied	• Tree Cover Loss • Biodiversity Intactness Index • Key Biodiversity Areas	• Global Forest Watch
	2 Land occupation reduction	• m² occupied		• Biodiversity Risk Filter
	3 Working lands regeneration	•———	Ecosystem Integrity Index[1]	———•
WATER	**1** Water withdrawals reduction	• m³ withdrawn	• Water Stress & Scarcity	• Aqueduct • Water Risk Filter
	2 Water quality improvement	• N & P concentration	• Water Pollution levels	
OCEAN[2]	**1** Plastic Leakage reduction	• kg of plastic distributed (per type)	• Plastic Leakage	• Plasteax

[1] The Ecosystem Integrity Index was not used in this assessment as the guidance is not public yet.
[2] SBTN's ocean & plastics guidance is not mature yet
Source: SBTN & Quantis Analysis

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Hotspots were assessed along our value chain on a selection of Nature pressures

VALUE CHAIN STEP	Upstream	Operations	Downstream

CCH activity Data

- Raw materials (quantity & origin)
- Water & energy consumption of manufacturing sites
- Packaging distribution (quantity, type, country)

X

IMPACT	Land Conversion	Land Occupation	Water Withdrawals	Water Pollution	Plastic Leakage

Nature Pressure

Land Conversion	Land Occupation	Water Withdrawals	Water Pollution	Plastic Leakage
• m^2 occupied	• m^2 occupied	• m^3 withdrawn	• N concentration • P concentration	• kg of plastic distributed

Local Vulnerability Indicators

Land Conversion	Land Occupation	Water Withdrawals	Water Pollution	Plastic Leakage
• Tree Cover Loss • Biodiversity Intactness Index	• Key Biodiversity Areas + Protected Areas	• Water Stress & Scarcity	• Coastal eutrophication Surface water quality	• Plastic leakage into environment

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A Nature hotspot is a combination of 3 types of data

SBTN Impact calculation method

1 Activity Data

Inventory of CCH's **activity data across the value chain** from procurement to distribution

2 Pressure on Nature

Indicators based on environmental **metrics** representing the **pressure of activities on Nature**

3 Local Nature Vulnerability

Indicators representing the state of nature and its vulnerability in the locations where the activity occurs,

Impact

A combination of CCH's pressures on Nature from activities **weighted** by the local state of Nature vulnerability

Selection of indicators

Activity Data

- **Ingredients** (Quantity & Origin)
- **Manufacturing sites consumption** (Water, energy, etc.)
- **Packaging distribution** (quantity, by type, by country)

X

Pressure on Nature

- **m² of land occupied**
- **m³ of water withdrawn**
- **Kg of plastics distributed**

X

Local Nature Vulnerability

- **Deforestation**
- **Water scarcity**
- **Plastics mismanagement**

=

Impact

- **% of contribution to overall impact** (25%)
- **Prioritization of top contributors**

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The upstream & downstream activities contribute the most to overall Nature impacts

Contribution of each stage of the value chain to CCH's impact on nature, in %, FY22

LAND CONVERSION
(vulnerability-weighted m²)

LAND OCCUPATION
(m²)

WATER QUANTITY IMPACT
(vulnerability-weighted m³)

WATER POLLUTION
(vulnerability-weighted N&P)

PLASTIC LEAKS
(kg)

99%

99%

80%

20%

90%

10%

100%
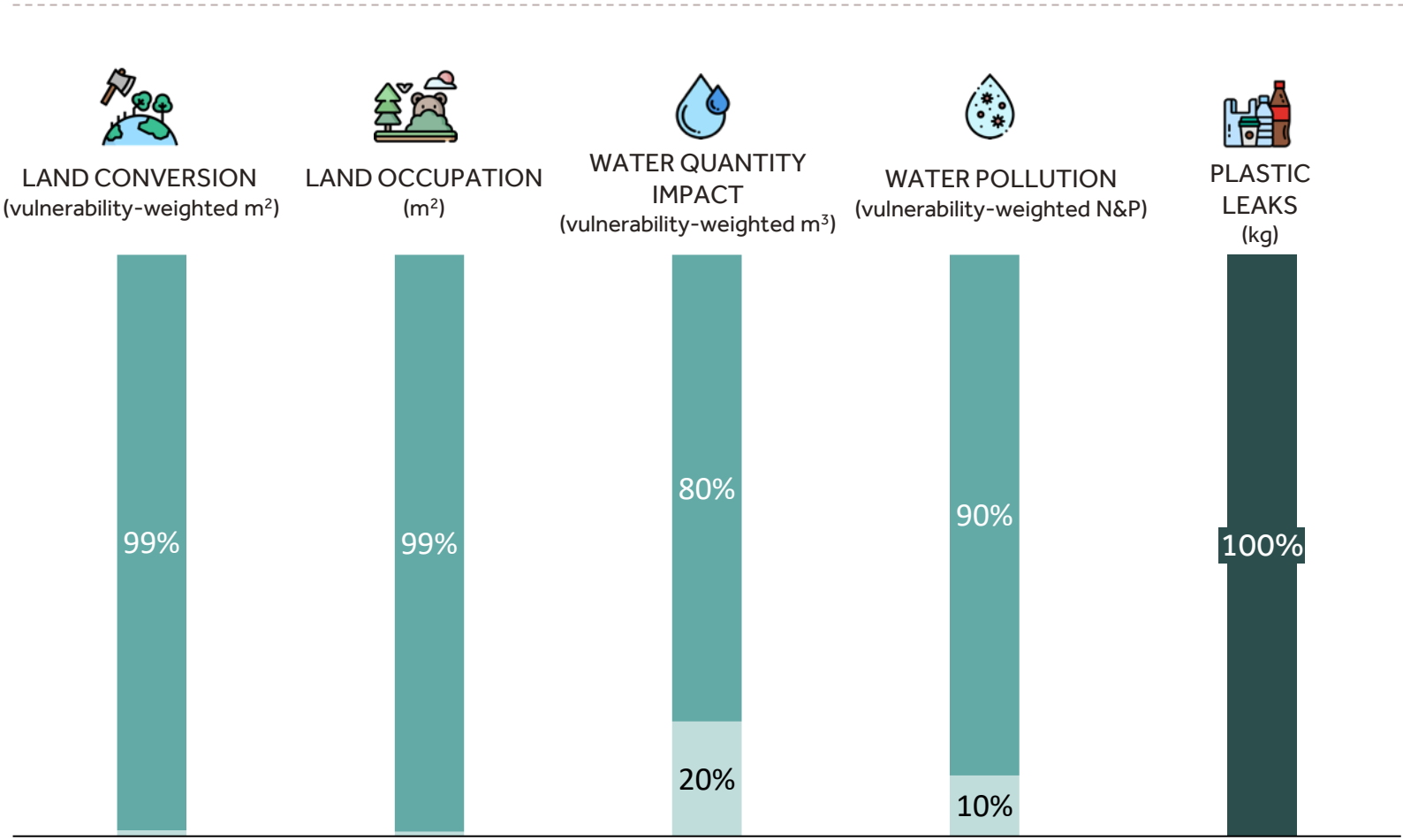
Legend

- UPSTREAM
- DIRECT OPERATIONS
- DOWNSTREAM

- Units shown on the graph are a combination of a pressure and a local vulnerability indicator (except for land occupation)
- Raw materials have a strong impact due to the associated agricultural practices which increase:
  - Conversion of natural ecosystems
  - Water withdrawals in water-stressed areas
  - Waterway pollution due to the use of agricultural inputs

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Land Conversion: Orange and Cane in Brazil are the top priority

Upstream

Land Conversion

Top 10 combinations of raw materials x countries of origin contributing to CCH's Land Conversion Impact
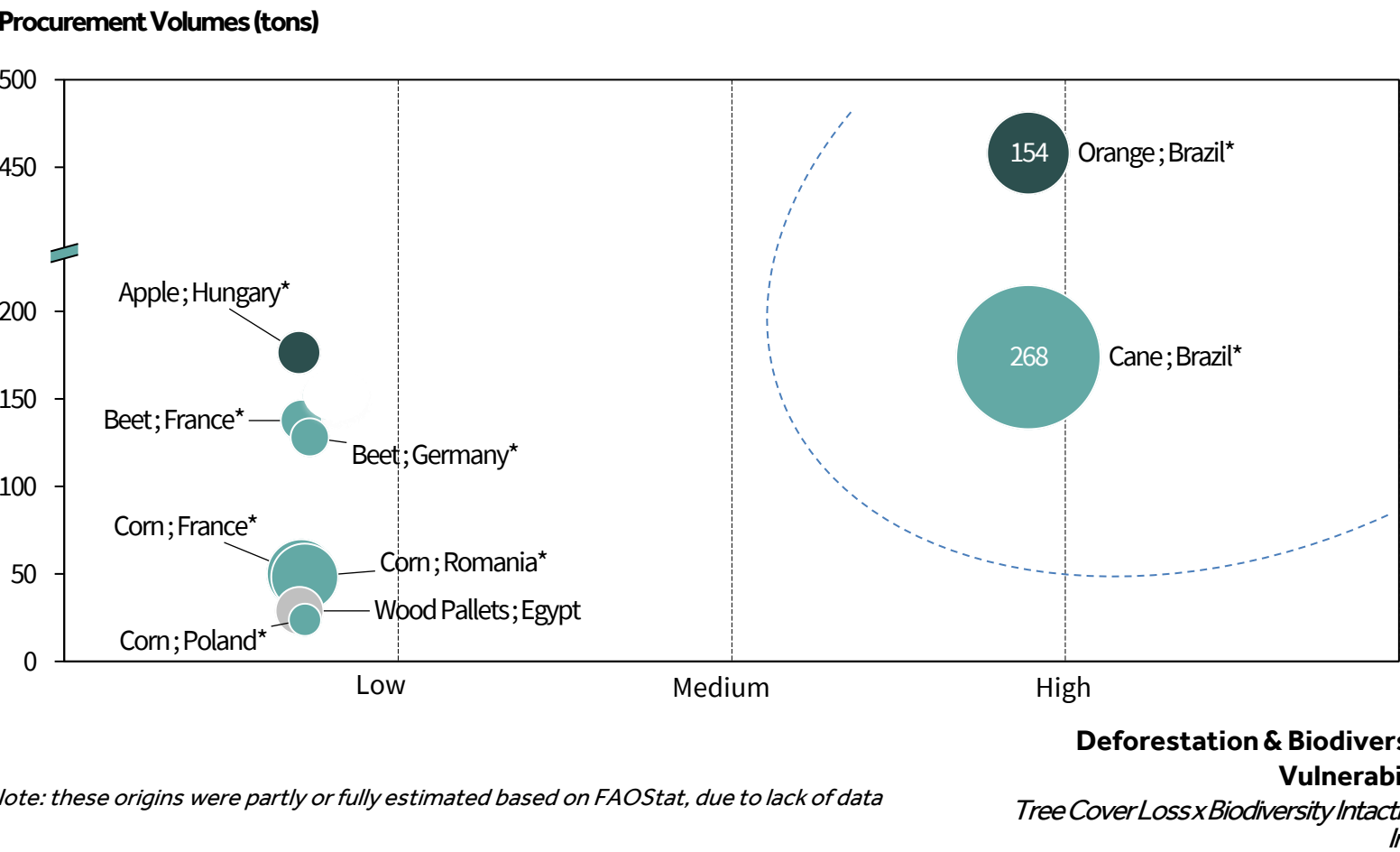
Legend

Procurement Categories

- Sugar
- Juices
- Wood-Based

Land Occupation (km²)

100

Procurement Volumes (tons)

500

450

200 — Apple ; Hungary*

150 — Beet ; France*

Beet ; Germany*

100

Corn ; France*

50 — Corn ; Romania*

Wood Pallets ; Egypt

0 — Corn ; Poland*

154 Orange ; Brazil*

268 Cane ; Brazil*

Low   Medium   High

Deforestation & Biodiversity Vulnerability
Tree Cover Loss x Biodiversity Intactness Index

Note: these origins were partly or fully estimated based on FAOStat, due to lack of data

- Addressing Brazil sourcing is key to ensure SBTN target 1 on land: **Zero conversion of natural habitats**

- 80% of oranges in Brazil are certified FSA Silver or FSA Gold, but only 3% of sugar cane is certified, mainly Bonsucro & Redcert 2 (not accounted for in this step)

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Summary of top material impacts in the whole value chain

Material impact criteria	LAND CONVERSION (based on land conversion impact)	WATER WITHDRAWALS (based on water quantity impact)	WATER POLLUTION - Marine (based on water pollution impact, N)	WATER POLLUTION - Freshwater (based on water pollution impact, P)	PLASTIC LEAKAGE (based on potentially leaked PET into the environment)
Upstream Top 2 combinations Raw materials x origin	1. Cane (Brazil*) 2. Orange (Brazil)	1. Cane (Brazil*) 2. Apples (Hungary*)	1. Beet (Germany*, France*) 2. Cane (Brazil*)	1. PET (China) 2. Corn (France*)	n/a
Direct operations	Total area of CCH sites: 670.8ha #plants: 62*** Sites adjacent to protected areas and areas of high biodiversity value: 7** sites with total area of 38.7ha (in Poland, Cyprus, Hungary, Serbia, Czech Rep.	TBD and aligned with our water risk assessment	Qalioub (Egypt) Work in progress: additional potential impact areas are under validation	Qalioub (Egypt) Work in progress: additional potential impact areas are under validation	n/a
Downstream	n/a	n/a	n/a	n/a	1. Nigeria 2. Egypt

(*) These origins were partly or fully estimated based on FAOStat, due to lack of data.
(**) Final confirmation will be done during the next steps of the project.
(***) In the 2023 IAR we report 62 manufacturing plants, 60 of them are bottling plants and produce beverages. The bottling plant acquired in 2022 in Serbia is still under integration and it is excluded from the numbers presented. There are two small manufacturing plants producing snacks and they are not considered bottling plants. Excluding the snacks plants and the Serbian plant under integration, the number of plants is 59

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Certifications already address nature topics, but their mitigation effect is not assessed at that stage (will be reviewed in Step 3 & 4)

	Land Conversion	Water Withdrawals	Water Pollution	Validation method
Bonsucro & BMP Smartcane[2]	✅ "Protect High Conservation Value Areas"[1]	✅ "Increase water-use efficiency"[1]	✅ "reduce fertilizer use over time"[1]	• Outcome-Based
Rainforest Alliance	✅ "Field intervention to protect & restore forests"[3]	✅ "Increased efficiency in water use"[3]	✅ "Optimized Fertilizer use", leaning towards organic[3]	• Outcome & means-based
FSA Silver / Gold		≈ Methodology Unclear		

[1] Source: Bonsucro Production Standard v5.1
[2] To simplify, BMP Smartcane and Bonsucro were analyzed together, as Bonsucro has endorsed BMP Smartcane in 2017
[3] Source: Rainforest Alliance Farm Requirements, v1.3

Legend:

✅ Topic addressed ≈ To be refined ❌ Not addressed

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Summary and next steps

What are the most impactful steps of CCH's value chain?	▪ CCH's overall impact on Nature is mainly due to **1/ the upstream activities** (80% to 99% of impact across 4 of the 5 studied Impact indicators), and **2/ the downstream activities** (100% of CCH's Plastic Leakage) ▪ Direct operations only amount to 10% and 20% of CCH's Water Quantity Impact and Water Pollution, respectively ▪ Raw materials have a strong impact due to the associated **agricultural practices** which increase conversion of natural ecosystems, water withdrawals in water-stressed areas and waterway pollution due to the use of agricultural inputs ▪ The distribution of packaging in countries with **limited collection, sorting & recycling** infrastructures leads to plastic leakage
Next steps	▪ Confirm the results of the impact and risk assessment and continue with more detailed 2023 data ▪ Build internal knowledge and capabilities in the complex topic of biodiversity ▪ Launch the next steps from the SBTN methodology: measure a baseline, set contextual targets on the shortlist of top contributors ▪ Assess the current mitigation activities (such as sustainable agricultural certification, packaging collection, water stewardship projects with water replenishment, coastal clean up etc.) and their effect ▪ Setting specific actions for direct operations

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Appendix

The Local Nature Vulnerability Index per indicator

	LAND CONVERSION		**LAND OCCUPATION**	**WATER QUANTITY IMPACT**	**WATER POLLUTION**	**PLASTIC LEAKAGE**
Vulnerability Indicators	Tree cover loss over 20y	Biodiversity Intactness Index	Share of key biodiversity areas	Water Stress & Scarcity*	Water Pollution*	Plastic Leakage
Tools	*Global Forest Watch*		*Biodiversity Risk Filter*	*Aqueduct & Water Risk Filter*		*PLASTEAX*
Baseline year	2001-2021	2005	2021	2019	2019	2021
VERY HIGH	>15%	>97%	>4.2	>4.2	>4.2	>60%
HIGH	10%-15%	90-97%	3.4-4.2	3.4-4.2	3.4-4.2	40%-60%
MEDIUM	6%-10%	75-90%	2.6-3.4	2.6-3.4	2.6-3.4	20%-40%
LOW	3%-6%	<75%	1.8-2.6	1.8-2.6	1.8-2.6	10%-20%
LIMITED RISK/ NO DATA	0%-3%	–	1-1.8	1-1.8	1-1.8	0%-10%
SBTN Position on the tool	*Recommended by the SBTN (part of its tools database)*			*Mandatory*		*Quantis recommendation (no SBTN development on oceans)*

Source: Local Nature Vulnerability index from SBTN tools,
(*) Only specific indicators chosen by the SBTN are used.

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Definition of Local Vulnerability Indicators

Impacts studied	Nature pressure metric	Local Vulnerability Indicator	Definition of Local Vulnerability Indicator
Land Conversion	m^2 occupied	Tree Cover Loss	• Removal or mortality of all vegetation greater than 5m in height, linked to permanent sources of deforestation such as urbanization, shifting agriculture and commodity driven deforestation
		Biodiversity Intactness Index	• Average loss in species from terrestrial environments since 2005 linked to land pressures - the higher the BII the more pristine the ecosystem
Land Occupation	m^2 occupied	Key Biodiversity Areas & Protected Areas	• Minimize exposure of Key Biodiversity Areas & Protected Areas to manufacturing sites in order to protect natural habitats around sites
Water Quantity Impact	m^3 withdrawn	Water Stress & Scarcity	Built as the maximum value of 3 water quantity indicators. • Blue water scarcity from Water Risk Filter: blue water footprint / total blue water availability • Water depletion from Water Risk Filter: surface and ground water consumptive use / available renewable water • Baseline Water Stress from Aqueduct: total water withdrawals / available renewable surface and groundwater supplies (domestic, industrial, irrigation, and livestock)
Water Pollution	N concentration	Marine eutrophication	Impact of excess nitrogen nutrient emissions in marine water, stimulating excessive algae growth and affecting other species
	P concentration	Freshwater eutrophication	Impact of excess phosphorus nutrient emission in freshwater, stimulating excessive algae growth and affecting other species
Plastic Leakage	kg of plastic distributed	Plastic leakage	Plastics Leakage into the environment is composed of uncollected waste and collected waste sent to unsanitary landfills or littering

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Definition of Land Vulnerability Indicators

TREE COVER LOSS SENSITIVITY INDICATOR

+ Tree cover loss: "tree cover" is defined as **all vegetation greater than 5 meters in height** and may take the form of natural forests or plantations across a range of canopy densities (reference 30%).

+ **"Loss" indicates the removal or mortality of tree cover and can be due to a variety of factors**, including forestry activities.

+ Forestry does not necessarily lead to permanent tree cover loss. To avoid biases, only tree cover loss linked to permanent sources of deforestation are included in the index: urbanization, shifting agriculture and commodity driven deforestation.

+ The sensitivity scale has been generated based on the distribution of the tree cover loss values for all countries.
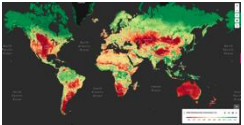
BIODIVERSITY INTACTNESS INDICATOR

+ The Biodiversity intactness index measures the average loss in species from terrestrial environments since 2005 linked to land pressures.

+ The higher the BII the more pristine the ecosystem. The risk index computed using the BII thus gives an indication of the risk of impacting a pristine ecosystem that should be preserved. → Companies should focus on preserving these areas.

+ A low score corresponds to an ecosystem that is already very degraded where little biodiversity is left. → Companies should focus on restoring these ecosystems.

+ Score of 0 - 120%. 0% - no species originally present are left , 100% - all species originally present are still there, >100% - more species now than in 2005

Definition of Water Vulnerability Indicators

Water Risk Filter

AQUEDUCT BETA

The water quantity sensitivity indicator is built as the maximum value of 3 water quantity indicators.

+ **Blue water scarcity from Water Risk Filter** measures the ratio of the blue water footprint to the total blue water availability.

+ **Water depletion from Water Risk Filter** measures the ratio of surface and ground water consumptive use to available renewable water.

+ **Baseline Water Stress from Aqueduct** represents the ratio of total water withdrawals to available renewable surface and groundwater supplies (domestic, industrial, irrigation, and livestock).

Water Risk Filter

AQUEDUCT BETA

The water quality sensitivity indicator is the maximum value of 2 water quality indicators.

+ **Surface water quality index from Water Risk Filter:** comprises three water quality parameters with **direct and indirect negative effects on water security for both humans and freshwater biodiversity:** biological oxygen demand (BOD) as a widely used umbrella proxy for overall water quality; electrical conductivity (EC) as proxy for salinity balance and pH alteration; and nitrogen, to capture nutrient loading in water.

+ **Coastal eutrophication potential from Aqueduct:** measures the potential for riverine loadings of nitrogen (N), phosphorus (P), and silica (Si) to stimulate harmful algal blooms in coastal waters. The CEP indicator is a useful metric to map where **anthropogenic activities** produce enough pollution to **potentially degrade the environment.**

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