Factsheet: Agriculture and Agrifood

Aim of the factsheet

The benchmark factsheet is designed for companies or investors to assess a sector's impact on biodiversity. Companies can use the factsheet to compare their impacts (e.g. assessed with the Global Biodiversity Score tool) to the sector average or to estimate their impact and main pressures on biodiversity. Also, investors can use it to screen their biodiversity impact, or rate specific companies' performance against sectoral benchmarks. Finally, factsheets will nourish the work of the EU Green Taxonomy by identifying low impact companies. It is supported by an explanatory appendix.

What does the sector include?

EXIOBASE industry	Code NACE rev 2
Crop and animal production, hunting and related service activities[1] **Manufacture of food products** **Manufacture of beverages**	**Division 01: Crop and animal production, hunting and related service activities** **Division 10: Manufacture of food products** **Division 11: Manufacture of beverages**

Sector's stakes

Biodiversity is essential for food and agriculture

Natural capital is fundamental to the food sector to promote resilience, improve livelihoods and support food security and nutrition.

- Natural capital is the basis for provisioning and regulating ecosystem services (crops pollination, climate and pest regulation, clean water, etc) that enable the reduction of external inputs and thus costs.
- Natural capital increases the resilience of the production systems to shocks and stresses, including the effects of climate change. Also, genetic diversity in crops and livestock enables to cope with diverse production environments and adapt to future challenges.

… but the current state of biodiversity jeopardizes the sector

The proportion of livestock breeds at risk of extinction is increasing, plant diversity is decreasing, a third of fish stocks is overfished and a third of freshwater fish species is threatened (FAO (2019)). Essential species contributing to agricultural production are in decline (pollinators, enemies of pests, soil organisms, wild food species); and key ecosystems which used to supply freshwater, protection against hazards and provision of habitats for species are degrading. Changes in the state of natural capital in agricultural fields are however hard to assess. Information gaps remain, especially about species, varieties and breeds not widely commercialized; also for micro-organisms and invertebrates which are often not identified and whose roles in supplying ecosystem services are poorly understood.

How does the sector contribute to changes in the state of natural capital ?

The sector strongly contributes to changes in the state of natural capital through land use change and overuse of natural resources. Indeed, over one third of the terrestrial land surface is used for crop production or animal husbandry, and three quarters of the available freshwater resources are devoted to crop and livestock production. These impacts are mainly caused by inappropriate agricultural practices.

These immediate drivers are enhanced by climate change, but also international markets, demography, urbanization, trade and consumer preferences that lead to decreasing crop diversity.

Opportunities

Consumers' preferences are currently a driver of changes in the state of natural capital. Yet, they are also an opportunity to make food systems more sustainable through the development of biodiversity-friendly products. Policy measures and advances in science and technology support the sustainable management of natural capital in agricultural fields. Sustainability-linked brands are growing at a rate 4 times higher than the others.

Biodiversity footprint[1]

Key figures

Scope 1 (S1) static terrestrial intensity

3 800 MSA.m²/kEUR (of turnover)

~ 28 000 MSAppb/bEUR

(S1 dynamic terrestrial 16 MSA.m²/kEUR ~ 120 MSAppb/bEUR)

Scope 1 static aquatic intensity

290 MSA.m²/kEUR ~ 28 000 MSAppb/bEUR

(S1 dynamic aquatic 1,3 MSA.m²/k€ ~ 130 MSAppb/b€)

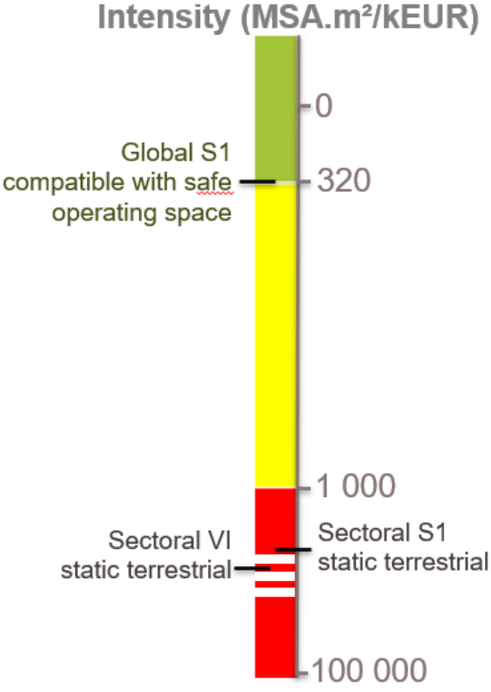
Aggregated Score /bEUR:

1 400 for Scope 1; 2 600 if vertically integrated (VI)

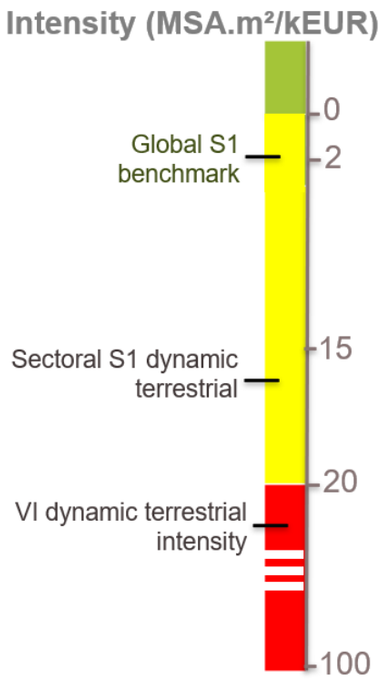
Ecosystem services Scope 1 dependency score:

Crop and animal production	65%
Manufacture of food	27%
Manufacture of beverages	29%

Static terrestrial performance of the sector



Dynamic terrestrial performance of the sector



1. Abbreviated "crop and animal production" in the rest of the factsheet

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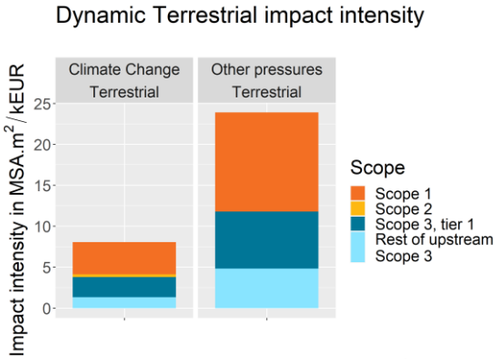
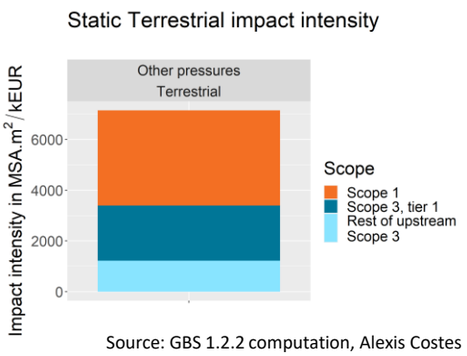
Biodiversity footprint (continued)

		Impact intensity - MSA.m²/kEUR	
		Scope 1	Vertically integrated
Terrestrial	Dynamic	16	32
	Static	3 800	7 100
Aquatic	Dynamic	1.3	2.8
	Static	290	550





Source: GBS 1.2.2 computation, Alexis Costes

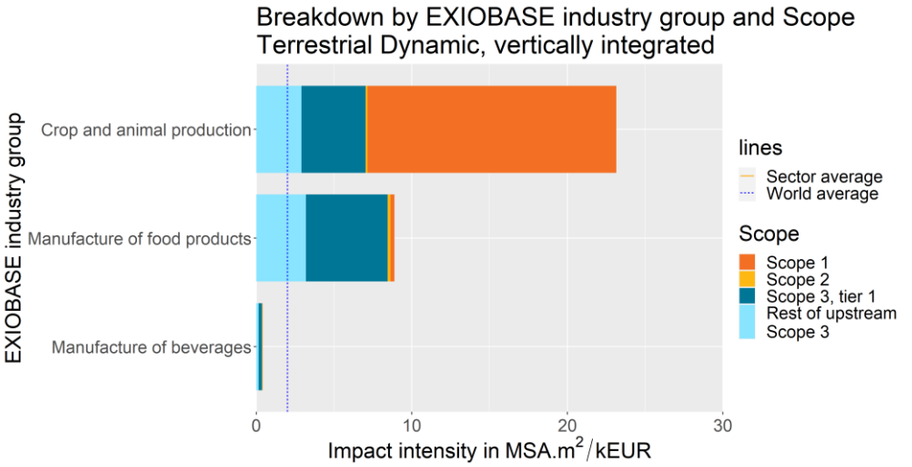
Scope and industry breakdown

The graph showing results per sub-sector and per Scope are displayed in MSA.m²/kEUR of turnover of the whole sector Agriculture and Agrifood.

The results show that the industry group “Crop and animal production, hunting and related activities” impacts of are more than twice larger than those of manufactured food products. Indeed, primary production consumes more land and water.
The sector exhibits substantial impacts in both Scope 1 and Scope 3. Among the industries of the sector, two patterns can be distinguished :

- The impacts of the industries related to Manufacture of food products and beverages fall mostly in Scope 3 (more than 96%), while those of the industries related to Crop and animal production are spread between Scope 1 (more than 68%) and Scope 3 (more than 25 %).

- These results are consistent with the structure of the value chain in the agrifood sector: food manufacturing activities are buyers of agricultural raw materials, their Scope 3 impacts thus corresponding to Crop and animal production Scope 1 impacts.



Source: GBS 1.2.2 computation, Oct 2021, Alexis Costes

Impact drivers breakdown: what are the main ones ?

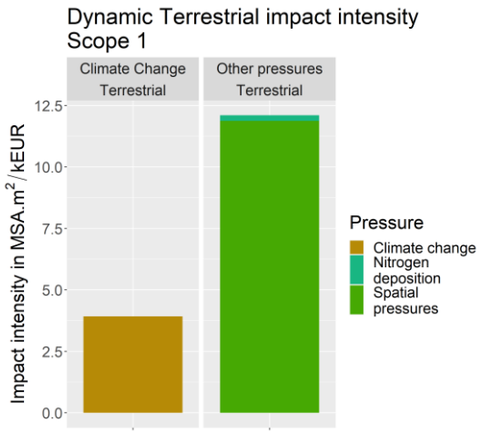
Globally, **climate change** and **spatial impact drivers** are the dominant drivers of changes in the sate of natural capital from the sector. Compared to the other sectors, the spatial impact drivers are particularly significant as the activities cover large areas. More specifically, concerning the Scope 1:

Terrestrial dynamic impacts are due to:
- Land Use : 72%
- Climate change : 25%

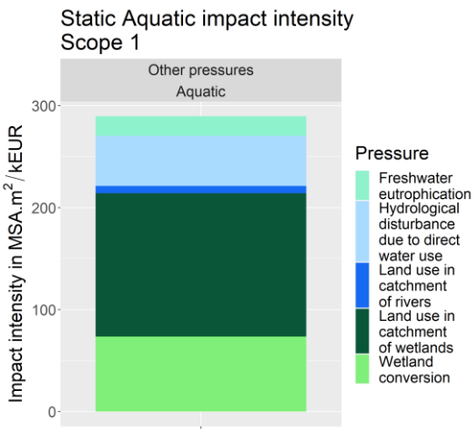
Aquatic dynamic impacts are due to:
- Hydrological disturbance due to climate change: 27%
- Wetland conversion : 33%
- Land use in watersheds : 32%

Terrestrial static impacts are due to:
- Land use : 74%
- Encroachment : 20%

Aquatic static impacts are due to:
- Wetland conversion : 25%
- Land use in watersheds : 48%
- Hydrological disturbance: 17%



Source: GBS 1.2.2 computation, Alexis Costes



Source: GBS 1.2.2 computation, Alexis Costes

The split by industry (see 3.2.B in the annex) shows that climate change accounts for a larger share of the impacts of the industries related to cattle breeding. This is consistent with the high contribution to climate change of these methane emitting activities.
The pressure “Ecotoxicity” is not fully included, the because the methodology calls for further work.

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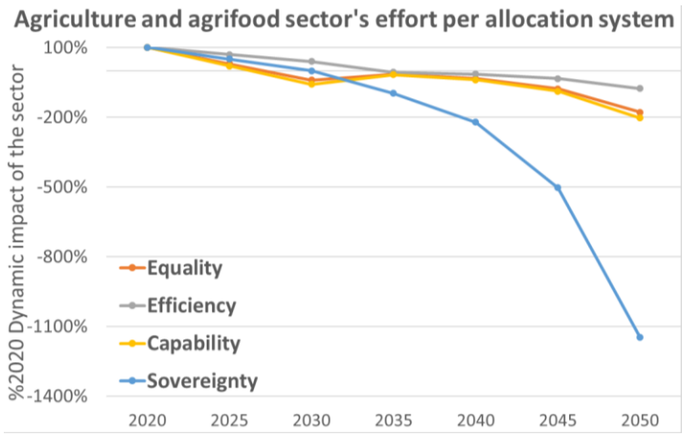
Science-Based Target for Biodiversity

Different effort distribution methods have been defined to draw different trajectories of reducing global impact on biodiversity. The trajectories are designed for the whole world (not only the Agriculture and Agrifood's sector) to:

- Reach a global no net loss in 2030, meaning a world dynamic impact of 0 in 2030
- Return in the "zone of functional integrity of the Earth system" by 2050[1]

Allocation	Approach	Data used
Equality	Everyone has the same right	Number of employees in the sectors (2010)
Efficiency	Cost-effectiveness	Cost of restoration (€.MSA/m²) (2020)
Capability	Industries' ability to pay	Turnover (M€) (2011)
Sovereignty	Grandfathering	2020 dynamic impact (MSA.km²/year)



Possible actions to reduce the impact on biodiversity

Those actions are non exhaustive and should be adapted on a case-by-case basis

	Raw material production	Processing and manufacturing
Scope 1	Practice of precision agriculture to reduce the use of chemicals and water, e.g. drop irrigation systems Maintain genetic diversity of seeds, plants and livestock Integrated pest management Low-input farming systems Integrated landscape approaches including restoration Agroforestry practices Climate smart agriculture practices which help increase carbon sequestration in soil and biomass (fallow land, agroforestry, intermediate crops and intercropping, pasture management,…) Minimise food loss and waste Optimisation of animal feed choices (to minimize nitrogen excretion or methane production)	Minimise food waste in manufacturing operations Less energy-consuming manufacturing processes
Scope 2	Use renewable electricity with demonstrated low-impacts on biodiversity Increase energy efficiency of equipment	Use renewable electricity with demonstrated low-impacts on biodiversity Increase energy efficiency of buildings and processes through redesign (and equipment improvement)
Upstream scope 3	Switch to a lower impact, mainly plant-based diet in order to reduce the consumption of agricultural commodities	Minimise food loss and waste across the system by reducing supply chain inefficiencies
Downstream scope 3	Repurpose agricultural waste Industrial usage of compost	Addressing the recyclability and degradability of the packaging Shift diets: support consumers to make healthy and sustainable dietary choices, while shaping demand through new product formulations and effective marketing

Environmental safeguards

Some impacts and impact drivers are not yet covered by the GBS methodology. They should not be ignored when defining the biodiversity action plan. For example:

- Avoid locating activities on or near sites of high environmental value or establish a specific management plan. For instance, avoid deforestation and encroachment on protected areas for livestock or crop production (in Brazil, Congo, etc.);
- Take measures to limit the spread of invasive species, particularly during the transport of marine species. Implement measures to detect and eradicate such invasions;

The **green taxonomy** describes Do No Significant Harm for ecosystems (DNSH) for the growing of perennial crops, the growing of non perennial crops and livestock production. The activities:

- should "ensure the protection of soils, particularly over winter, to prevent erosion and run-off into water courses/bodies and to maintain soil organic matter."
- "should not result in a decrease in the diversity or abundance of species and habitats of conservation importance or concern or contravene existing management plans or conservation objectives."
- "where activities involve the production of novel non-native or invasive alien species, their cultivation should be subject to an initial risk assessment and on-going monitoring in order to ensure that sufficient safeguards are in place to prevent escape to the environment."
- "should not lead to overgrazing other forms of degradation of grasslands."

EU Technical Expert Group on Sustainable Finance (2020)

1. Please refer to the technical appendix for more details

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Key messages

- **One of the most impacting industries** (the Scope 1 terrestrial dynamic impacts are on average 8 times higher than the world average).
- Two types of industries to distinguish: **crops and livestock husbandry with very significant Scope 1 impacts**, and **processing & manufacturing** which purchase crops and animal products and thus have **very large Scope 3 Upstream impacts**.
- The key impact drivers to monitor and reduce are mainly **land use** and **climate change**. For the aquatic impacts, the key drivers include also **wetland conversion** and **land use in catchments of wetlands (linked to pollution).**

Biodiversity Footprint Assessment

General objectives of a GBS-based assessment

- **To assess quantitatively the biodiversity footprint** generated by the activity of the company or portfolio and **to assess the contribution of the company to global biodiversity erosion**;
- To understand what are the main pressures on biodiversity the company is responsible for;
- To provide elements for a **short-term** and a **mid-term action plan to reduce the footprint** on biodiversity and alleviate the contribution of the company to biodiversity erosion

To **anticipate future mandatory biodiversity footprint disclosure** in France and in the European Union (action 30 of the French National Biodiversity Plan, post-2020 Biodiversity Agenda)

Limitations: The assessment does not consider some pollution pressures nor the existence of invasive species, the impacts on genetic and marine biodiversity

Data: Calculation based on data from the input-output table and the environmental extensions of EXIOBASE 3.8.1 and the impact factors developed by CDC Biodiversité

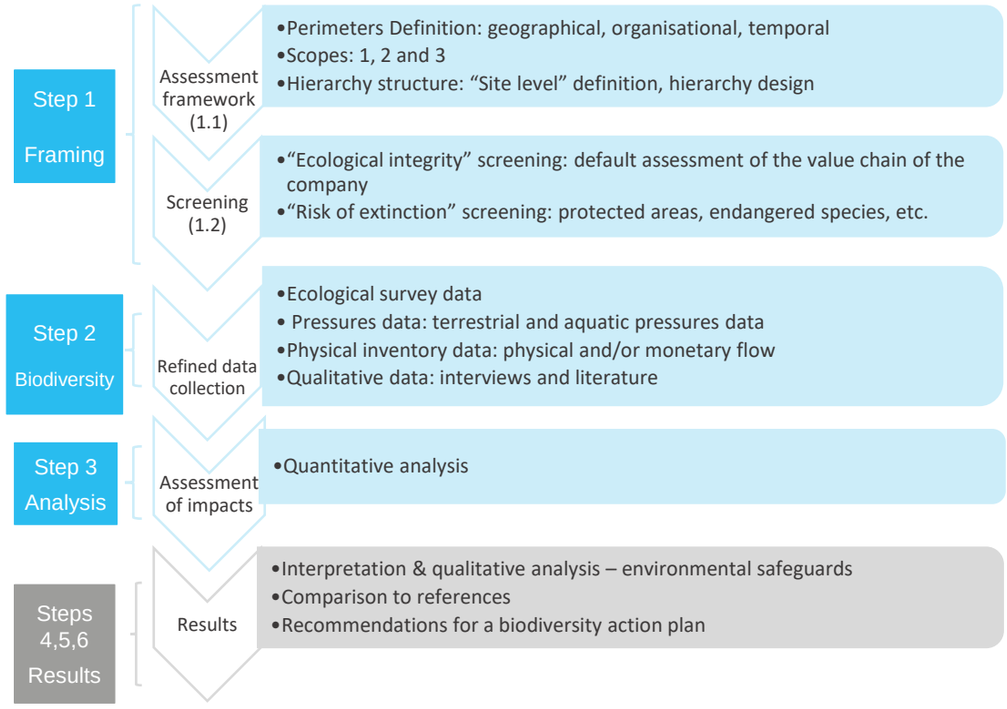
How to lead a Biodiversity Footprint Assessment based on the Global Biodiversity Score?

A GBS-based assessment can be led by various organisms:

- The company itself
- A service-provider, instructed by the company
- A non-financial rating agency

The relevance of the assessment depends on:

- The inclusion of direct operations and value chain impacts on natural capital
- The consistency and transparency of the data and methodology used
- The appropriate quality assurance and complete disclosure of the results



Factsheet version 1.0 October 2021. GBS computations : GBS 1.2.2, October 2021, Alexis Costes.

More information
About the GBS: https://www.cdc-biodiversite.fr/gbs/
About the factsheets: https://www.mission-economie-biodiversite.com/actualites/fiches-benchmark-benchmark-factsheets
Global Biodiversity Score: a tool to establish and measure corporate and financial commitments for biodiversity (CDC Biodiversité, 2019)
Measuring the contributions of business and finance towards the post-2020 global biodiversity framework (CDC Biodiversité, 2020)
The sources are referenced in the section « Agriculture and AgriFood » of the technical appendix.