FLORA Food Group™

Avoided Pressures-Methodology

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In collaboration with Quantis

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1. Introduction

Flora Food Group (Flora FG) commissioned Quantis, a leading environmental sustainability consultancy, to develop a comprehensive approach to assess avoided pressures across climate, land, and water impact categories for three key product groups. In 2025, Flora FG updated the assessment. This report outlines the methodology used, the main results and provides a qualitative assessment of data quality.

By measuring avoided pressures, Flora FG aims to understand and demonstrate how the products, whether plant-based or blended with dairy, help reduce environmental pressures compared to dairy equivalents and ultimately encouraging more sustainable everyday choices. This approach complements the company's SBTi-aligned emissions reduction targets for 2030 and 2050.

To enable this assessment, Quantis reviewed existing guidelines (Aboukrat et al., 2022; ADEME, 2024; WBCSD, 2023) to develop a robust formula and Excel model for calculating avoided emissions related to climate. This approach was then adapted for land and water, requiring additional groundwork and alignment on what constitutes avoided pressure for these two indicators. To complement this methodology, Quantis also conducted a benchmark analysis to evaluate how companies in the Food & Beverage sector, as well as other industries, communicate avoided pressures. This analysis was used to support Flora FG in defining credible claims and determining the assessment parameters.

2. Results

The avoided pressures assessment allows Flora Food Group to quantify the benefit of the products compared to a representative market mix of dairy and non-dairy counterparts resulting in reduced burden on climate and nature.

***Table 1**: Avoided Pressures Results for 2025 calendar year (based on 12-month Moving Annual Total as reported in June 2025)*

Avoided Pressure	Unit	Flora Food Group Portfolio	This is equivalent to …*
Avoided GHG Emissions	million tonnes CO2-eq	**2.8**	…the CO_2-eq emissions from over **two years** of **electricity usage in Amsterdam**.
Avoided Land Occupation	km^2a	**3,863**	….the land area the size of more than **1,100 New York City's Central Parks**.
Avoided Water Withdrawal	million m^3	**66.3**	...the water volume sufficient to fill more than **26,500 Olympic-sized swimming pools.**

* Climate equivalency is based on 1,190 kt CO2e emissions from electricity in the city of Amsterdam in 2022. Land equivalency assumes 3.41 km2 as the area of Centra Park in New York. Water equivalency assumes 2,500 m3 of water per 1 Olympic-size swimming pool.

3. Scope and Boundaries

The assessment scope aligns with Flora FG's 2025 corporate carbon footprint.

Reporting Period: For 2025 calendar year (based on 12-month Moving Annual Total as reported end of June 2025).

Product Categories:
The product categories and representative Stock Keeping Unit (SKUs) are outlined in Table 2 below. The geographies covered align with the regions where Flora Food Group holds market share.

Table 2: *Product categories covered in the assessment (Figures are rounded down to nearest 0 or 5)*

Product category	SKU coverage
Butter and spreads	Over 145 SKUS, representing ~50% of category sales revenue and volume
Creams	45 SKUs, representing ~50% of category sales revenue and volume
Cheeses	Over 135 SKUs, representing ~45% of sales revenue and ~35% of sales volume

Calculations were performed using ~50% of sales revenue and volume data from the full 12-month Moving Annual Total period (01 July 2024 to 30 June 2025). Based on this subset, values were extrapolated to represent 100% Net Sales Value (NSV). All SKUs with non-zero sales volume and NSV were included in the extrapolated dataset.

For the remaining 50% of data requiring extrapolation, regional averages were applied where available; where regional values were not available, global averages were used as proxy inputs. The final outputs in Table 1 present the aggregated avoided pressures across the three categories, with all results rounded down.

4. Approach and Considerations

4.1 Impact Categories

This assessment expands beyond conventional avoided emissions calculations, which typically focus only on climate change. In addition to climate, Flora Food Group's approach incorporates land occupation and water withdrawal (Table 3), reflecting Flora Food Group's critical role in addressing nature loss, enhancing biodiversity, and aligning with frameworks such as SBTN, TNFD, and CSRD (see Table 4).

By assessing these three impact categories, Flora Food Group demonstrates a more comprehensive understanding of its environmental performance, and alignment with global reporting requirements and corporate sustainability goals.

Table 3: Impact categories covered in Flora Food Group's avoided pressures assessment

Assessment categories	Mandatory pressure indicators to assess	Pressure indicators assessed	Definition of the indicator	Source (Tool/ LCA Method used)
Climate change	Greenhouse gas emissions	Radiative forcing as Global Warming Potential (GWP100): kg CO_2 eq	This indicator measures the contribution to the greenhouse effect of the various greenhouse gases (GHG) emitted during the life cycle.	EF method 3.1
Land occupation	Area (km^2 or ha) converted by ecosystem use	Land occupation: m^2 of land occupied	Sum of the surface used per year for the considered unit.	Based on EF method 3.1
Water withdrawal	m^3 of water withdrawn	Water withdrawn: m^3 of freshwater withdrawn	Sum of all the volumes withdrawn from groundwater or surface water, excluding the water used to drive hydroelectric turbines.	Quantis custom inventory method, freshwater withdrawal (excl. turbined), Quantis indicators 1.1)

The Life Cycle Assessment (LCA) analysis on which the avoided pressures assessment is based on captures both water consumption and water withdrawal. In an effort to be consistent with previous LCA analysis, Flora Food Group will continue to report on water consumption in comparative product LCA claims. Flora Food Group focuses on water withdrawal for avoided pressures.

Table 4: Flora Food Group indicators are aligned with core indicators from SBTN, TNDF and CSRD

	Flora Food Group indicators	SBTN	CSRD – ESRS 1, 3 & ESRS 4	TNFD
CLIMATE CHANGE	**GHG emissions (GPW 100) (CO_2 eq / kg)**	**GHG emissions (GWP 100)**	**Absolute gross GHG emissions classified as Scope 1, Scope 2, Scope 3 (GWP100)** Scope 1 and 2 GHG emissions disaggregated between emissions from the consolidated accounting group and the other investees (associates, joint ventures, unconsolidated subsidiaries) and Scope 2 emissions per location	**Gross Scopes 1, 2, 3 and Total GHG emissions - GHG emissions per scope (GWP100)** GHG emissions - by country, operating segments, economic activity, subsidiary, GHG category or source type
LAND FOOTPRINT	**Land occupation (m^2a / kg)**	**Land use intensity of agricultural products (m^2/kg)** **Agricultural land use for direct operations and**	**Total use of land area** Total sealed land Nature-oriented area on site Ecosystem area coverage and management	**Land-use intensity by production type** Total surface area controlled/managed by the organization, where the organization has control (km^2) Extent of land ecosystem that is sustainably

		upstream activities (m^2)		managed (km^2) by type of ecosystem and business activity
FRESHWATER QUANTITY	**Freshwater withdrawal (m^3 / kg)**	**Freshwater withdrawals (m^3/yr)** Freshwater availability max indicator from SBTN State of Nature layers	**Total water withdrawals (including freshwater withdrawal) (m^3/yr)** Total freshwater consumption (m^3/yr) Total water recycled and reused (m^3/yr) Total water consumption & sites located in areas at water risk, including areas of high-water stress (m^3/yr)	**Water use (including freshwater withdrawal)**

Note: **In bold**, are the framework indicators aligned with Flora Food Group indicators. This table is not exhaustive for CSRD and TNFD sector-specific requirements.

4.2. Conceptual foundations of this assessment

Environmental pressures — such as emissions, land use, and water withdrawal — can affect ecosystems differently, depending on their current state. A degraded ecosystem (poor state of nature) will be more vulnerable to further pressures, while a healthy, biodiverse ecosystem can better withstand disturbances and recover more easily. Evaluating the state of nature over time is critical for determining impacts and prioritizing mitigation efforts based on local ecosystem conditions –this is something Flora Food Group will address in the future under a TNFD aligned assessment and CSRD compliant disclosures.

The following definitions, based on the Science-Based Targets Network (SBTN), provide clarity on key concepts used in this assessment:

- ***Pressure*** refers to human activities that alter environmental and ecosystem states, encompassing ecosystem use and change, resource exploitation, climate change, pollution, and invasive species.
- ***Land occupation*** quantifies agricultural land used annually, expressed in hectares per year, for a company's production. In communications, the term land footprint is used synonymously.
- ***Land use*** includes the various human activities and purposes assigned to land, such as grazing, timber extraction, and conservation.
- ***Water withdrawal*** refers to the total freshwater taken from natural sources, excluding water used solely for hydroelectric power, while ***water consumption*** represents the net balance of water withdrawn versus water released.

For this assessment, the following terminology has been adopted:

- **Avoided emissions** specifically refers to avoided pressures related to climate change
- **Avoided pressures** refers to pressures from land occupation and water withdrawal, as well as an overarching term to encompass all three impact categories.

- The term ***Avoided impact*** has been intentionally excluded to maintain consistency with the broader definition of nature impact, which refers to changes in the state of nature caused by pressures exerted by an activity.

4.3 Considerations for avoided pressure assessment

While few guidelines currently exist for assessing avoided pressures beyond avoided emissions on climate, this assessment follows the principles outlined in the **Guidance on Avoided Emissions v2.0** (*WBCSD, 2025*). The eligibility criteria defined in these guidelines have been reviewed and applied to ensure a robust and credible methodology. Initially designed for avoided emissions, they are also applicable to avoided pressures for land and water.

4.3.1 General criteria for eligibility to account for product avoided emissions

WBCSD guidance states companies must follow the three eligibility criteria to make any avoided emissions claim. A company must demonstrate climate action credibility (Gate 1), alignment to the latest climate science (Gate 2), and the solution must have a direct and significant decarbonization impact (Gate 3).

- **Climate action credibility (Gate 1)**
  Flora Food Group has set science-based targets, approved by the initiative in 2024, and tracks emissions across scopes 1, 2, and 3. The company also reports its corporate carbon footprint annually aligned to CSRD requirements ensuring transparency and goes beyond basic climate impact reporting.
- **Solution action legitimacy (Gate 2)**
  Dietary shifts toward increasing consumption of foods with lower impacts on climate change, water and land, and reducing reliance on foods with higher impacts both play an important role in mitigation strategies aligned with 1.5°C pathways (IPCC, 2019; Poore & Nemecek, 2018; UNEP, 2025).
- **Contribution legitimacy (Gate 3)**
  Flora Food Group's LCA portfolio claim results demonstrate the lower-carbon profile of Flora Food Group products within the broader competitive market, supporting the legitimacy of using these improvements to calculate avoided emissions. In 2025, analysing about 50% of the product portfolio globally showed that, on average across butters and spreads, creams, and cheeses, Flora Food Group products have 70% lower climate impact, require 70% less land, and use 60% less water compared to the conventional equivalents. As this represents a weighted average across the assessed categories, individual products may perform above or below the portfolio-level results. The portfolio claim methodology is available on Flora Food Group's website.

4.3.2 General criteria for communication best practices

- **Reporting**
  Prior to this assessment, Flora Food Group has already reported avoided GHG emissions (referred to as "scope 4"). The company always did so separately from scopes 1, 2, and 3 and in line with the WBCSD criteria, it did not make any claims regarding carbon neutrality of the company or its products.

  Moving forward, the term "scope 4" should be avoided in future reporting, as it is

recommended in the WBCSD guidelines.

- **Scope of avoided pressures**
  As per WBCSD requirements, Flora Food Group's avoided pressures are associated with specific products (solutions) and are communicated as a percentage of total sales that those solutions generate. For 2025, total avoided pressures representing 100% of the portfolio are communicated in the Annual Summary & Sustainability Report. See the company website for the publication.
- **Tracking**
  Flora Food Group conducts its corporate footprint annually, incorporating any portfolio changes, and intends to use the Quantis-developed model for avoided pressures assessment to annually update those calculations, too.

5. Modelling and Calculation

5.1 General criteria for calculation

5.1.1 Quantification approach

Flora Food Group uses a "cradle-to-grave" approach, which is forward-looking, ensuring comprehensive coverage from the production phase to end-of-life of a product.

For short (< 1 year) lifetime products, as in the case of Flora Food Group, there is no need to integrate prospective modelling - a forward-looking approach that estimates future avoided pressures based on anticipated changes in production, markets, or technology - in the assessment of avoided pressures. However, it can be used for strategic insights, to anticipate the decline of avoided pressures over time.

5.1.2 Scenarios and rebound effect

Scenario analysis plays a central role in calculating avoided pressures. It should go beyond merely comparing Flora Food Group's products with other alternatives, aiming for a broader assessment. Flora Food Group has conducted several LCAs and uses this project to incorporate scenario analysis, which will enhance Flora Food Group's avoided pressures calculations by addressing various demand and supply conditions. The next sections provide explanations of how the reference scenarios were built.

Rebound effects are effects related to reducing environmental impacts in one area which could inadvertently increase them in another. In the case of Flora Food Group solutions (i.e. products), rebound effects (i.e. increased use of Flora Food Group's products because of their lower pressures on the environment, which partly or fully cancel out the initial avoided pressures intended by the solution), are not expected to be significant. A typical rebound effect is, for instance, the non-decreasing energy consumption following home insulation. What is observed in real conditions is the increase of home temperature (moving from 20 to 22 degrees) instead of the reduction of energy consumption. In the case of Flora Food Group products, we do not expect the consumptions of butter and spreads, creams or cheese to increase compared to usual patterns because of the plant-based or blend composition of the products. A robust analysis on rebound effects was not included in this analysis and could require further work in the future.

5.2 Considerations for climate change

The approach to calculating GHG emissions for Flora Food Group relies on market share data rather than a simple direct comparison with alternative products. This approach begins with defining a reference scenario that includes a percentage of conventional products and counterparts (non-dairy products and blends), estimating the emissions (in $kgCO_2eq$) produced per kilogram of a reference average scenario in a specific country for 2025. This is then contrasted with the emissions from Flora Food Group SKUs, also estimated in $kgCO_2eq$ per kilogram in the same country and year. The formula multiplies this emissions difference by the annual sales volumes of the product, expressed in physical units, to calculate the avoided pressure on climate.

5.3 Considerations for land and water

The proposed approach for calculating avoided land occupation and water withdrawal is designed to provide a clear method for Flora Food Group to quantify its avoided pressure on the environment by comparing conventional product with Flora Food Group's products.

The calculation considers a reference scenario that includes land pressure associated to a percentage of dairy and non-dairy products, alongside Flora Food Group's land pressure for production of their own products. The formula multiplies these factors by annual sales volumes, considering the land area (in square meters) occupied for producing one litre or kilogram of both the conventional product and the Flora Food Group counterpart product within a specified country for 2025. The result is an avoided land occupation figure, representing the land that Flora Food Group products would save without factoring in local ecosystem conditions.

This approach will similarly apply to water withdrawal calculations, allowing for a consistent method to assess the reduced water use by switching to Flora Food Group's products. Country-level – SKU-level results are then aggregated to determine a global avoided land occupation value.

As described in section 5.5, the key elements used in the calculation of avoided pressures of Flora FG products include the market share information and the emission factors of the products considered. The sections that follow provide more information on how these were addressed.

5.4 Product LCA Tool description

In 2022, in collaboration with Quantis, Flora Food Group developed a P*roduct Life Cycle Assessment (LCA) Tool* that allows the company to study the environmental impacts of its products from cradle to grave. The tool and the methodology used to perform the LCAs are aligned with PEF methodology and compliant with ISO 14040 and 14044 standards for public disclosure of results. The tool has been peer reviewed by a panel of three independent experts on topics such as LCA, agronomy and dairy production and is regularly updated to ensure alignment with latest scientific advancements.

The tool enables users to input key product-specific parameters, such as recipe composition, manufacturing location, packaging type, and distribution markets across Europe and North America, to generate accurate footprint calculations. In 2025, additional key markets outside Europe and North America were incorporated into the Product LCA Tool to enhance the global representativeness of the portfolio claim and

avoided pressure. The functional unit is defined as one kilogram of product, reflecting the typical one-to-one substitution of conventional products with Flora Food Group's counterpart products. It is also in line with previous Flora Food Group product footprint assessments.

It is the Product LCA Tool that generates the emission factors for products in the categories of butters and spreads, and creams. For cheeses, emission factors were derived from a dedicated ISO-compliant study, except for blended soft cheeses, which were assessed using the Product LCA Tool. You can find the Violife Study on Flora Food Group's website. In addition to providing the emission factors for the calculation of avoided pressures, the Product LCA Tool is used to calculate individual comparative LCA claims which may be viewed on Flora Food Group's brand websites and support a general portfolio claim. See Flora Food Group's Portfolio Claim document on Flora Food Group's website for more detail.

5.5 Avoided Pressure Tool description

In 2024, in collaboration with Quantis, Flora FG developed a comprehensive approach to assess avoided pressures across climate, land, and water impact categories for three key product groups. The resulting Excel-based tool was designed in accordance with the WBCSD Guidelines on Avoided Emissions and enables Flora FG to perform continuous avoided-pressure calculations. The tool allows users to input key parameters, such as market share, product sales, and impact data, to generate the reference scenario, quantify avoided pressures, and extrapolate the results to the full annual product portfolio.

5.6 Reference scenario

The market structure is made up of three key product segments:

- Dairy
- Non-dairy competitors (including blends that contain some dairy)
- Flora Food Group products.

Ideally, the reference scenario should represent, in a given country, the three product segments, Flora Food Group and non-Flora Food Group market shares, as well as their corresponding EFs as follows:

$$\textit{Reference scenario} = (\%\ \textit{Dairy Market Share} \times \textit{Dairy EF}) + (\%\ \textit{Non-Dairy Competitors Market Share} \times \textit{Non-Dairy EF}) + (\%\ \textit{Flora Food Group Market Share} \times \textit{Flora Food Group weighted EF})$$

Due to limited availability of certain data points for precise calculations, an alternative approach was adopted using assumptions based on market shares of counterpart products, rather than focusing solely on Flora Food Group products. This method involves calculating an average product profile based on market shares of counterpart products at the country level and incorporating region-specific EFs. A stepwise methodology was applied, prioritizing the most granular data available and progressively using less granular data where necessary for each product category.

5.6.1 Butters and spreads

- Flora Food Group possesses highly granular country-level data on its own market share, that of its competitors, and dairy companies, sourced from external market insight providers (such as Nielsen). While the data were generally sufficient, exceptions include Brazil, Mexico, and Colombia. For these countries, dairy and non-dairy market shares were reconciled using Statista volumes for 2025 volumes, covering butter, edible oils, and margarines
- The Product LCA Tool enables the development of emission factors specific to Flora Food Group product category x country combination. The Emission Factor (EF) is then weighted based on SKU volumes for a specific country.
- Flora Food Group EFs are applied to competitors (i.e. other manufacturers of spreads made from plant oils, including those blended with dairy). Dairy EFs are calculated in the Product LCA Tool and are based on the WFLDB 3.9 and ecoinvent 3.9 LCA databases.
- This Avoided Pressure calculation treats dairy butter as a substitute for spreads made with plant oils, including those blended with dairy based on their functional and market substitutability:
    - Regulatory classification: Under Regulation (EU) No 1308/2013, dairy butter, margarine, plant-based spreads, and blended spreads are all classified as “spreadable fats”. This shared classification places these products within the same regulated product group, indicating that they serve similar functions and can substitute for one another in the market.
    - Nutritional categorization: Within the Nutri-Score nutritional rating system, both dairy butter and margarine are assessed within the same food category “added fats” (Santé publique France, 2025). They are evaluated using identical category-specific scoring criteria, indicating their functional comparability for nutritional assessment.

5.6.2 Creams

- Flora Food Group has country level information for creams classified by company and product segment (cooking, crème fraiche, whipping). From this information, Flora Food Group market shares could be reconstructed. However:
    - Information was missing to reconcile product segments with dairy, blends and 100% non-dairy.
    - Information was missing to identify competitors (i.e. other manufacturers of counterparts to dairy cream).
- Assumptions were taken on market share split. The distinction between competitors and non-competitors was done through desk research based on company names. This new classification allowed us to get market shares for non-dairy products (including blends) and dairy products.

- Companies tagged as “private labels” could not be reconciled with non-dairy (blends included) or dairy. An average global split from Flora Food Group market shares at 85% dairy / 15% non-dairy split for companies with missing data was applied.
- Other options were considered but not pursued due to feasibility concerns:
    - Using market penetration values for alternative products, which would significantly overestimate avoided pressures, as these values are based on global revenues rather than specific countries where Flora Food Group operates.
    - Assigning product segments to non-dairy, blends, and dairy categories.
    - Assuming 100% market share is held by Flora Food Group.
- Flora Food Group EFs are applied to competitors (i.e. other manufacturers of counterparts to dairy cream). Dairy EFs are calculated in the Product LCA Tool and are based on the WFLDB 3.9 and ecoinvent 3.9 LCA databases.

5.6.3 Cheeses

- For cheeses, Flora Food Group possesses country-level data classified by market share for Flora Food Group, other non-dairy cheeses, and dairy.
- To obtain the EFs for Flora Food Group cheeses, the existing ISO compliant LCA study “*Violife 100% vegan alternative to cheese vs. dairy cheese in Europe, UK, US, Canada and Japan”* was used (and updated to WFLDB 3.9 and ecoinvent 3.9 EFs). For products not included in the Violife study, products that share similar core recipes were used as proxies. For blended soft cheeses that are produced in a manufacturing site incorporated in Flora Food Group’s Product LCA Tool, an LCA was created via the tool. The final EF is a weighted EF based on SKU volumes for a specific country.
- This Flora Food Group EF is also applied to competitors, i.e. other producers of cheese alternatives.

This methodology aims to provide a balanced view of avoided pressures by using a data-driven approach to reflect the broader market impact.

5.7 Equivalencies

To communicate the magnitude of the results, globally known references were used and multiplied to reflect the figure in the results table (Table 1).

- Climate equivalency is based on 1,190 kt CO2e emissions from electricity in the city of Amsterdam in 2022. (Source: https://assets.amsterdam.nl/publish/pages/943415/climate_report_2023.pdf)
- Land equivalency assumes 3.41 km^2 as the area of Centra Park in New York. (Source: https://www.centralparknyc.org/park-history)
- Water equivalency assumes 2,500 m^3 of water per 1 Olympic swimming pool. (Source: https://en.wikipedia.org/wiki/Olympic-size_swimming_pool)

6. Uncertainty Assessment

Table 5: *Uncertainty Assessment*

Modelling steps	Uncertainty description	Assessment implications
Product category split	Blend products in butter and spreads and creams are part of Flora FG's market share. Exact blend composition was unknown for competitors and proxies were taken to estimate competitor EFs in the reference scenario.	Competitors' blends were assigned the same EF as Flora FG's SKUs for each country. Assuming Flora FG emission factors are lower than competitors', this leads to conservative estimates of avoided pressures. The opposite could lead to some overestimation.
Fat content in dairy counterparts	Product fat content creates significant variations in impact, hence avoided pressures, comparing to dairy counterparts. Extrapolations for markets without primary data or assumptions made for the fat content of competing products create uncertainty.	Flora FG compiled market share insights on largest markets and made reasonable regional assumptions for a limited number of countries. The assessment could go further by using conservative assumptions on the fat content of competitors' products (e.g. higher fat content will reduce avoided emissions/pressures).
Packaging modelling	Packaging LCA custom models were built for the assessment, however not for all sizes for similar packaging. While the impacts were adjusted for volume, some packaging impacts (e.g. tubs) do not scale linearly with fill, and seals change little with fill. For new packaging formats, existing packaging models are used as proxies.	Only a small number of SKUs rely on proxy packaging models, and packaging contributes a relatively low share of the total corporate carbon footprint (approximately 10%). As a result, the uncertainty associated with the use of packaging proxies is estimated to contribute less than 1% to the overall corporate footprint.
Market share	• Butters and spreads: Country-level splits between dairy, non-dairy and blends were used. • Creams: Markets shares calculated based on desk-research on company names and main product lines (e.g. main volumes from non-dairy/blends or dairy). • Cheeses: Country-level splits between dairy and plant-based cheeses were used	Acceptable assumptions on market shares are essential to calculate an accurate reference scenario. Filling data gaps would be needed for any predictions on future pressures.
Volume	The analysis of avoided pressures was conducted based on a share of the total volumes sold by Flora FG. • Butters and spreads – Over 148 SKUS, representing ~50% of category sales revenue and volume • Creams – Over 45 SKUs, representing ~50% of sales revenue and sales volume • Cheeses – Over 139 SKUs, representing ~45% % of sales revenue and ~35% of sales	Calculations were performed using around 50% NSV and volume, and values for 100% NSV were extrapolated. For the extrapolation, regional averages were used where available; otherwise, global averages were applied as proxies. All SKUs that have larger than zero sales volumes and NSV are included in the extrapolated results. The extrapolated results are adequately marked in the claim and the accompanying text on the study background.
Communication claims	While the communication claims are as detailed as possible, they do not include a description of potential negative side and rebounds effects, and description of actions to mitigate these.	Although rebound effects are not expected to be significant for Flora FG products, current claim wording should still be used in full and avoided pressures should be calculated on a yearly basis (no claim on future predictions).

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ANNEX 1: Main differences between avoided pressure and comparative product claims

***Table 6**: Main differences between avoided pressure and comparative product claims*

Aspect	Avoided Pressures	Comparing LCA studies
Objective	Quantifies GHG emissions or pressures prevented by a solution compared to a baseline.	Examines environmental impacts of two systems to identify trade-offs or lower impacts.
Methodology	Establishes a reference (baseline) scenario and calculates net reductions.	Ensures functional equivalence and compares systems using life cycle analysis.
Data requirements	Data for the studied system and baseline, often using market-level or predictive data.	Detailed life cycle inventory (LCI) data for both systems being compared.
Scope of results	Expressed as absolute emissions/ pressure avoided (e.g. tons of CO_2e or water withdrawal) relative to a baseline.	Relative comparison across multiple impact categories (e.g. GHGs, water use).
Interpretation and use	Highlights benefits of a solution (e.g. renewable energy) in climate or policy contexts.	Guides decision-making for eco-design, product development, or policy planning.

ANNEX 2: Technical Summary Of The Product LCA Tool

FLORA FOOD GROUP PRODUCTS VS DAIRY EQUIVALENT

Flora Food Group is a world leading food company which owns a wide range of well-known brands, often made using plant oils, and sometimes dairy ingredients (including Country Crock, Flora, Becel, Rama, Tulipan, 'I Can't Believe It's Not Butter', Violife and many, many more). Flora Food Group, through the sale of its branded goods, offers a range of versatile food products in the margarine/spreads, cheeses and creams categories which provide functional counterparts to equivalent dairy products.

In 2022, Flora Food Group commissioned Quantis to develop a Life Cycle Assessment (LCA) Tool (the "Tool") to enable Flora Food Group to assess the environmental impacts of its products sold in Europe, the USA and Canada ("Flora Food Group Product") and compare these to the dairy equivalent products sold in the same regions.
In 2024, the tool was updated to maintain its relevance and alignment with the latest scientific advancements.

This Technical Summary presents the Tool methodology including the scope of the analysis, functional unit and system boundaries, method, and data sources which Quantis developed for Flora Food Group to support claims made on its branded products.

The Product LCA Results above are generated by Flora Food Group and include the results of defined products assessed, including the specifications of the assessment for each Flora Food Group Product reviewed and the results used for the relevant comparative claims.

LIFE CYCLE ASSESSMENT

LCA is a metrics-based methodology used to assess environmental impacts resulting from, for example, greenhouse gas emissions, waste production, water, land, and energy use. Environmental impacts are calculated over the life cycle of a product, from extraction of raw materials to the end-of-life.

METHOD

The Tool was developed following regionalized LCA methodology described by Liao et al. (2020) to compare the environmental impacts of Flora Food Group Products to the same amount (1 kg) of the dairy equivalent product sold in the same market. The Tool uses a cradle-to-grave approach requiring data collection of the product recipe, key ingredients sourcing countries, production factory, energy mixes, packaging designs, transportation, and end-of-life scenarios. Spatially differentiated agricultural life cycle inventory data is generated (archetypes), as well as land use change ("LUC") emissions for agricultural ingredients in all markets relevant to each system's supply chain, using an attributional approach as per PAS 2050 (BSI, 2012), aligned with the international standard for dairy products published by the European Dairy Association (EDA, 2016).

The Tool follows the ISO 14040 and 14044 standards. The product LCA results generated by the Tool based on assessments performed by Flora Food Group are reviewed by Quantis and respect and conform with ISO 14026 standards (Environmental labels and declarations — principles, requirements, and guidelines for communication of footprint information) for making comparative claims. The results can be found above for the respective Flora Food Group Products.

Note: Flora Food Group has made best efforts to align the tool with the general principles of the PEF method; however, it cannot be considered PEFCR-compliant, as no dedicated PEFCR exists for the company's specific categories.

CRITICAL REVIEW

The Tool and the underlying methodology used to perform the LCAs are consistent with the ISO 14040 and 14044 standards for the calculation of carbon footprints in accordance with recognized guidance. The Tool has been peer reviewed by a panel of three independent experts in LCA, agronomy, and dairy production; however, the results generated by the Tool should not be interpreted as ISO-compliant comparative assertions unless independently reviewed.

FUNCTIONAL UNIT

The functional unit ("FU") is a reference unit for which all results are calculated and presented. In respect of the Flora Food Group Products, the FU is to provide the same function (cooking, baking, frying, roasting etc.) of 1 kg of the equivalent dairy product and Flora Food Group branded counterpart product in a relevant country market, packaged, for the relevant consumer (domestic or professional).

ENVIRONMENTAL IMPACT INDICATORS CONSIDERED

The Tool assesses a total of 19 indicators: 16 environmental impact indicators from the European Commission Environmental Footprint (EF) 3.1 method and three additional indicators: land occupation (m2.y), which reflects the total area of land used over one year (Nemecek et al. 2011, Milà i Canals et al. 2012), water consumption (m3), the total amount of fresh water consumed (ISO 14046), which includes, for example, evapotranspiration of irrigation water, and water withdrawal (m3), the amount of water that enters a system, from any water body.

FROM CRADLE TO GRAVE

The LCAs performed with the Tool consider all identifiable activities across the product life cycle (cradle-to-grave) for Flora Food Group Products in the different markets (see Fig. 1).

The assessments include impacts from:
- Farming (crop production or milk production)
- Packaging manufacturing of Flora Food Group Products
- Distribution
- Retail
- Consumer use
- Packaging end-of-life

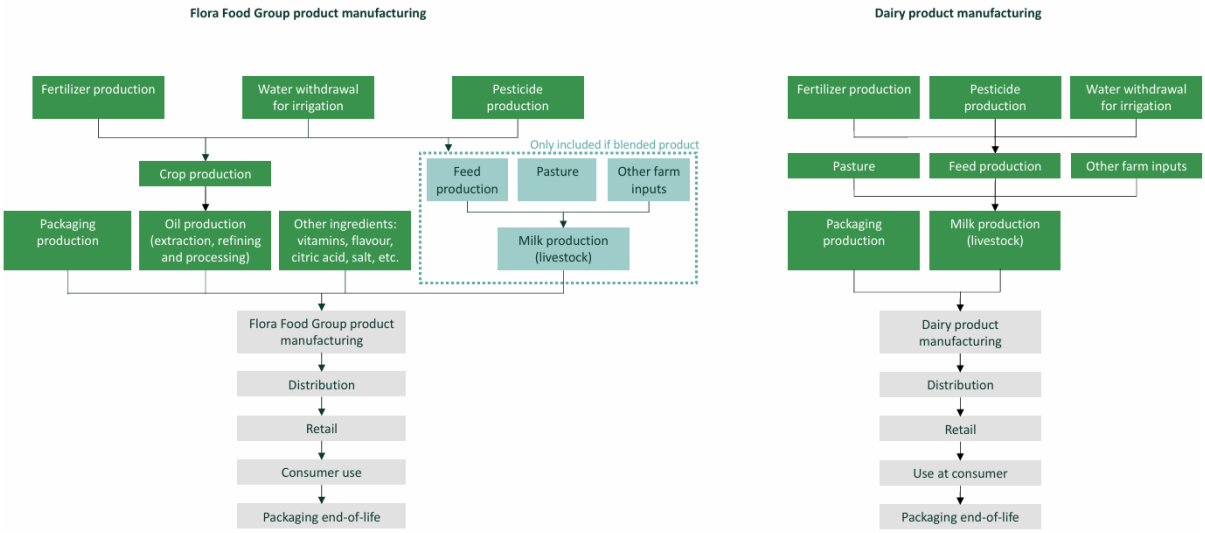

Figure 1. *Schematic of the systems evaluated*

The studies do not include impacts from:

- Capital goods at the distribution centre and at the point of retail.
- Labour, commuting of workers, administrative work, cattle insemination, and disease control processes.
- Food loss and food waste during distribution, at retail point and at the consumer's home

DATA COLLECTION AND MODELLING

- Flora Food Group Products: primary data for the recipes and ingredient sourcing were provided by Flora Food Group based on its supply chain and manufacturing operations
- Dairy products for European countries: Default dairy data (WFLDB) used to model dairy production, processing, packaging, and distribution and representative of country averages in Europe is based on guidelines published by the European Dairy Association and the European Commission (see Note 1 and 2 below)
- For those European countries for which no direct national dairy datasets were available, the country with the lowest dairy climate impacts in Europe (in this case, Finland) was chosen for the comparison to ensure a conservative approach.

LCA database of Emission Factors (EFs) used:

WFLDB v3.9; ecoinvent v3.9

These database versions were the latest available at the time of the last tool update.

Choice of dataset based on data quality criteria

The data quality of all inputs in the Tool was assessed using the Pedigree Matrix approach in the original study of Flora FG products published in Liao, et. al. 2020, and in line with ISO 14044 and PEF guidance. Each dataset is evaluated according to five criteria, which are scored and used to quantify uncertainty through the Pedigree Matrix:

- Technological representativeness: ensure that the EFs used by Flora Food Group are reflective of the information provided by Flora Food Group and that they are recent.
- Geographical representativeness: align modelling datasets with product sourcing regions specific to Flora Food Group
- Time-related representativeness: ensure data is current and based on the latest database versions available at the time of the update
- Precision: apply the most fitting and relevant dataset to the Flora Food Group products, using proxies when the exact match is not available
- Completeness: include all relative data defined within the system boundaries.

The overall data quality rating determines whether results can be used to make comparative or declarative claims. To ensure robustness and transparency, datasets with high uncertainty must not exceed 3% of total recipe mass; otherwise, comparative environmental claims cannot be substantiated.

This systematic assessment ensures that all modelled data are current, geographically relevant, and representative of Flora Food Group's sourcing and manufacturing practices, consistent with the ISO 14040/14044 framework.

Quantitative parameter uncertainty assessment
The pedigree matrix is used to quantitatively assess the time-related coverage, geographical coverage, technology coverage, completeness, and reliability for foreground processes and data sources by the practitioner. The description of the pedigree matrix can be found in Weidema et al. (2013), with a score of one being most favorable and five being least favorable. The analytical uncertainty assessment is used to propagate the uncertainty to the functional unit, and Monte Carlo simulation is used to quantify the parameter uncertainty related to dairy products in SimaPro. Based on this approach, for Flora Food Group products, the error factor is 14 %, whereas for dairy butter, the error factor related to parameter uncertainty is 15 % based on a 95 % confidence level (Liao et al., 2020).

Meta-analysis of dairy emission factor
In addition to the quantitative parameter uncertainty, a meta-analysis was performed. The error factor for dairy products was calculated based on the minimum value reported from 18 studies compared to the baseline value from the WFLDB v3.9.1 database. In this study, we use 36 % from the USA as the default global error factor to be conservative.

Additional criteria to make general claims based on the uncertainty level of the ingredient datasets
The quality of the data was assessed based on the uncertainty of the dataset selected to match with the Flora Food Group sourced ingredient. The data uncertainty scale goes from 1 to 3, with the score of "1" being a perfect or close-to-perfect match (e.g., refined rapeseed oil is sourced in Canada so it is matched with the WFLDB dataset "rapeseed oil, refined /CA") and "3" attributed to general proxy matching (e.g., all flavorings are matched with the ecoinvent v3.9 dataset "Chemical, organic {GLO}").

To account for this uncertainty in the proxy used, the model requires a maximum of 3 % of the product weight to be of datasets with uncertainty level 3. If this requirement is not fulfilled, general claims that the Flora Group product is better than its dairy equivalent are not possible.

Uncertainty threshold	Definition	Example dataset
1	Exact or Close match of the product	“Rapeseed oil, refined, EU” is matched with “Rapeseed oil, refined /DE U”
2	Proxy is similar to the product but with uncertainty on parameters (p.ex. Concentration)	“FABA BEAN Dextrose Mix” is matched with “Faba bean protein, 60% protein /GLO”
3	Proxy is generic	All flavourings are matched with “Chemical organic {GLO}

The total mass of ingredients with high uncertainty must be less than 3% for the general claims criterion to be satisfied.

NOTE 1: *EDA (2018) Product Environmental Footprint Category Rules for Dairy Products. Version 1.0 (April 2018). The European Dairy Association. Brussels, Belgium*
NOTE 2: *Raw milk datasets are based on the World Food Life Cycle Assessment Database (WFLDB), Nemecek et al. 2015*

EXTERNAL COMMUNICATIONS

In order to make comparative assertions, and specific claims (e.g., climate impact comparisons), the overall environmental performance of the Flora Food Group Product must be favourable, overall, compared to its dairy counterpart in each country, based on the 18 indicators assessed. Climate change, land occupation, and water consumption have a high relevance for Flora Food Group product categories and the food industry and therefore are recommended to be used in product footprint environmental communications.

Throughout the development of the Tool, conservative assumptions in favour of dairy have been used for comparisons. For example, the packaging chosen for the dairy comparison is a common format with lowest climate impacts (i.e., for butter, the packaging chosen for retail consumption is 250 g paper parchment wrapper). These conservative approaches ensure further robustness when making comparative claims.

To make comparative claims on climate, land, or water, the overall environmental performance of the Flora Food Group product must be demonstrably better than that of the dairy counterpart across all indicators assessed. No indicator may show a significantly worse result, and the Flora product must perform significantly better for key indicators such as climate change, land use, and water use. To ensure robustness, the total share of ingredients modelled with high-uncertainty datasets must remain below 3 % of the recipe mass; otherwise, comparative environmental claims cannot be substantiated.

For communication purposes Flora Food Group uses “climate impacts” to communicate the products’ impacts on climate change. Globally, terms like “climate impacts”, “carbon emissions”, “carbon footprint” or “greenhouse gas emissions” are used interchangeably for communication purposes when communicating about the impact on climate change of products, although there are some technical nuances and differences.

For any given indicator, in order to make public comparative assertions, savings must be considered significantly lower. For some assessments and for some indicators (e.g., water

consumption), results may appear favourable, however, as the Tool considers the level of uncertainty for individual metrics, unless there is a significant difference, a reliable comparative conclusion cannot be drawn to support external communications.

ABOUT QUANTIS

Quantis, a BCG company, is a leading sustainability consultancy pioneering approaches to solve critical environmental challenges. We partner with leading consumer goods and financial services organizations who are serious about reducing their environmental impacts to future-proof their businesses and prosper in a new planetary economy. Our unique approach combines deep environmental expertise, strategic business knowledge, and enterprise transformation skills to help organizations shape policies, practices and business models that align with the planet's capacity while building resilience, unlocking innovation, and optimizing performance.

Our dynamic and visionary team of environmental, business and communications experts will guide you on the journey from business as usual to business at its best.

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