HowGood's Research Methodology

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Who is HowGood?

HowGood is an independent research company with the world's largest database on food product sustainability. With data and analysis for more than 33,000 ingredients, chemicals, and materials, HowGood helps leading food brands, retailers and investors improve their environmental and social impact. Through in-depth, ingredient-level insights on factors ranging from greenhouse gas emissions to animal welfare to labor risk, HowGood data powers strategic decision-making for the sourcing, manufacturing, merchandising, and marketing of sustainable products. Brands identify opportunities to improve sustainability, drive greater transparency, and empower their consumers to make higher impact purchases. Visit howgood.com for more information.

What is HowGood's approach to research?

HowGood has 15 years of research on global food supply chains. The team consolidates and analyzes findings from over 600 accredited data sources and certifications. These include a range of resources such as international frameworks, NGO guidance and standards reports, peer reviewed life cycle assessment studies, journal articles, academic conference proceedings and texts, aggregated commercial databases, targeted industry studies, NGO research, government publications, and news reports from reputable outlets. HowGood employs the most industry-recognized methodologies and incorporates the latest scientific research. Metrics and impact assessments are updated on an ongoing, iterative basis, making HowGood's platform the leading-edge tool for product sustainability. In turn, HowGood is able to provide impact assessments that are accurate, comprehensive, and the most up-to-date. Through HowGood's sustainability intelligence platform, Latis, we are able to scale this approach across products, brands, and the entire food industry.

How does HowGood measure sustainability?

HowGood assesses the environmental and social impact of products across 8 core sustainability metrics.

1. **Greenhouse Gas Emissions**: *What is the carbon footprint (cradle-to-farm gate) of the ingredients in this product?*
2. **Processing**: *How much energy is used to process the ingredients in this product?*
3. **Blue Water Usage**: *How much blue water does it take to grow the ingredients in this product?*
4. **Biodiversity**: *Does the growing of the ingredients in this product help or harm biodiversity?*
5. **Soil Health**: *How does the growing of the ingredients in this product impact the soil?*
6. **Land Occupation**: *How much land is required to produce the ingredients in this product?*
7. **Animal Welfare**: *How do the ingredients in this product impact the welfare of animals?*

8. **Labor Risk:** *What is the overall labor risk involved in the ingredients in this product, considering both the severity of the working conditions and the number of people affected?*

These 8 metrics are evaluated on a spectrum from negative to positive impact, which can also be referred to as degenerative to regenerative. Products receive a score of 1-10 for each metric.

HowGood Impact Score

A product's individual metric scores are consolidated to produce a holistic product impact score. Each of the 8 sustainability metrics are weighted equally to yield a HowGood Impact score out of 100. The HowGood Impact score gives a comprehensive view of the impact of a product.

What is HowGood's process for measuring sustainability?

Through an ongoing process of exhaustive data collection, analysis of peer-reviewed science, and a progressive heuristic approach to mapping and assessing the data collected, HowGood has developed the world's largest food product and ingredient sustainability database.

Step One: Data Collection

The foundation of HowGood's data is a diverse and continuously updated collection of data sources, including peer reviewed journal articles, academic conference proceedings and texts, aggregated commercial databases, targeted industry studies, NGO research, and government publications.

HowGood Example Data Sources:

AGROBIODIVERSITY INDEX
ANIMAL WELFARE INSTITUTE
AQUACULTURE STEWARDSHIP COUNCIL
BIOVERSITY INTERNATIONAL
COSMOS ORGANIC
DEMETER CERTIFIED BIODYNAMIC
EUROPEAN COMMISSION
FAIR FOR LIFE
FAIRTRADE AMERICA
GLOBAL ANIMAL PARTNERSHIP (GAP)
SEAFOOD WATCH
USDA NATIONAL AGRICULTURAL STATISTICS SERVICE (NASS)
US DEPARTMENT OF LABOR
US DEPARTMENT OF STATE
U.N. FOOD AND AGRICULTURE ORGANIZATION (FAO)
USDA ORGANIC
U.S. FOOD AND DRUG ADMINISTRATION

We use a mix of qualitative and quantitative data sources and for each source, we perform an ongoing data certainty assessment that takes several factors into consideration. An example of farm-to-farm

gate GHG emissions considerations includes:

- **Source Quality** - Has the source been peer-reviewed?
- **System Boundaries** - Does the data cover the relevant stage of agricultural production, from cradle-to-farm-gate?
- **Agricultural Input Data Quality** - Is the data based on direct measurements, or secondary data?
- **Field Emissions Data Quality** - Is the data based on measurements and complex models?
- **Study Scale** - How many, and how large are the sites included in the study?
- **Temporal Relevance** - Does the source include the most up-to-date findings? How recent is the data?

This process is completed on an ongoing basis for every impact metric in the HowGood system, and for every ingredient on which there is accurate and verifiable data.

One of these data sources is the USDA National Organic Program, which provides:

- Lists of specific synthetic and organic chemical fertilizers, pesticides, herbicides, and fungicides
- Detailed set of animal welfare & husbandry standards, including feed, access to pasture, housing, and disease treatment
- Data for derived tiers of organic material percentage in products, ranging from 0% - 100% (Levels 1-5) Organic
- Individual products, ingredients, suppliers, and manufacturers that achieve USDA Organic Certification

And that's just one of 600+ data sources that HowGood uses.

Step Two: Ingredient Mapping

Once the data is collected and analyzed, we map every single ingredient to its source crop, animal, or material (referred to below as raw material originating from a harvest location). When harvest location is not provided by the customer, HowGood uses import/export data to identify the likely harvest location for each raw material to account for specific on-the-ground practices, impacts, and risks in each locale. Some impacts depend on the amount of raw material required to produce the final ingredient, such as on-farm impacts of GHG emissions, land use and blue water usage. These impacts are multiplied by the ingredient concentration to account for the total amount of raw material required to grow or raise the processed ingredient.

Step Three: Aggregation and Heuristics

At this point in the process, we have a map of nearly every ingredient, chemical and material in the CPG industry and where and how it is produced. This map is used to aggregate data across geographic regions or ingredient categories and develop industry-average impact profiles for each metric and every ingredient.

Based on the ingredient mapping process, our platform assigns a default location and corresponding industry-average profile for every ingredient in a product. If deeper levels of data granularity are available (from a specific supplier, industry partner, or publication), these specifics can be applied to override the industry average values.

8 Levels of Data Granularity

1. **Basic Information**: Ingredient name and raw material feedstock(s) with % inclusions.
   Example: Feedstock = 80% Corn, 20% Stevia Leaf

2. **Country of Origin & Certifications**: Country of origin and 3rd-party certifications for raw material feedstock(s).
   Example: Corn – Germany, Stevia Leaf – China, Organic

3. **Production Practices**: Specific agricultural or raw material feedstock extraction/production practices.
   Example: Corn – No-Till & cover-cropping.

4. **Primary Data**: Detailed source location of raw material feedstock(s) and processing.
   Example: state/province OR a more granular geography accompanied by primary data collected on crop management.

5. **LCA Metric-Ready Results**: Functional units, methodologies, system boundaries.
   Example: 0.6 kg CO2e / kg. IPCC GWP 100yr, Cradle to Farm Gate

6. **LCA Model Details**: Brief written description of the LCA study, including agricultural production assumptions (location, scale, agricultural practices) and processing methodology.

7. **LCA Model Narrative:** Full written narrative report on the modeling approach, removing any confidential information.

8. **LCA Full Inventory**: Full Life Cycle Inventory including references for secondary or tertiary data.

With each new data partner, publication, or client relationship, we receive new insights that are then integrated into our larger systems map. As a result, HowGood's database becomes increasingly granular over time. If, for some reason, we are unable to find a perfect match for a particular ingredient, we use an internal proxying protocol to identify the most appropriate comparable data.

Step Four: Impact Spectrum

Perhaps the most important step in the HowGood methodology, we harmonize all the data collected on any single impact metric by plotting each practice along a single line: the impact spectrum. This is done

while keeping the entire CPG ecosystem in mind, enabling a clean transition from theoretical to practical application.

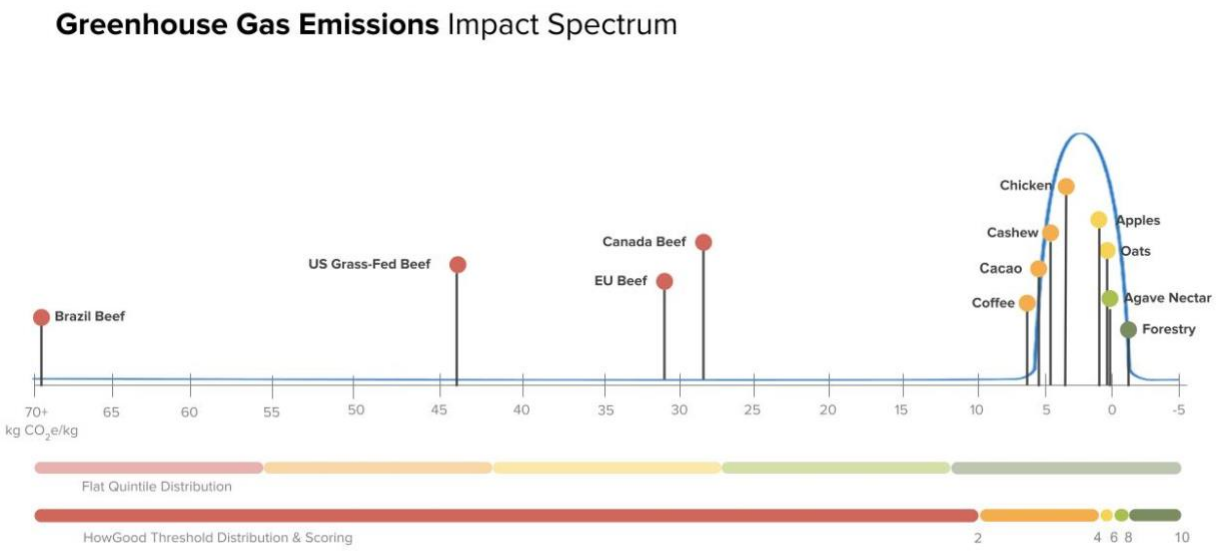
On the negative end of the spectrum, we find damaging, extractive, oppressive, and/or abusive practices. Sustainable, the mid-point, is a "net-zero" perspective, that doesn't cause harm but also doesn't improve. The positive end not only avoids harm, but it also improves, develops, and heals.

For labor risk, for instance, the negative end would be characterized by forced child labor, forced labor, bonded migrant labor, critical low pay, and permanent debt. Toward the middle of the spectrum, you might find the minimum viable income, critical debt, and consistent risk of loan default. The positive end of the spectrum would include living wages, strong and healthy unions/collective bargaining, and socioeconomic development.

Step Five: Threshold Setting

With the full spectrum of impacts in place, we determine the thresholds to set for each score. Most spectrums are not divided into even quintiles, but rather are carefully portioned out to avoid a bell curve of impacts with the majority of products falling into the middle. HowGood's threshold distribution is shown below.

The thresholds are set with one primary goal in mind: to deliver practical, actionable insights for differentiating between two ingredients or whole products. Each quintile represents a score bracket of 2, which adds up to a score out of 10 for each metric. Each metric is then weighted equally and rolled up into a HowGood Impact Score out of 100.



What methodologies and data sources does HowGood use to assess sustainability?

HowGood employs industry-recognized methodologies and incorporates data and findings from over 600 accredited data sources and certifications. Check out the links below for some of the top sources that HowGood's research team leverages for each metric.

Sustainability Metric	Methodology
GHG Emissions	GHG Protocol; IPCC GWP100a 2013
Processing	GHG Protocol; IPCC GWP100a 2013
Blue Water Usage	Global Water Footprint Standard 2011
Land Occupation	ReCiPe 2016
Soil Health	Bioversity International ABDI 2019
Labor Risk Exposure	UNGP Human Rights Risk Reporting Framework [SHIFT] 2015
Biodiversity	Bioversity International & HowGood Standard 2020
Animal Welfare	Global Animal Partnership Standard 2020

How are data sources and impact assessments updated?

HowGood employs an iterative approach to assessing and updating data sources and in turn, strengthening impact assessments for our customers. Our Research team is constantly reviewing the latest findings from scientific publications and assessing new data sources for inclusion in our product sustainability database. As our database expands, our impact assessments become more granular and our customers are given instant access to the most up-to-date scientific findings on food sustainability - a process that would be costly and time-consuming for them to undertake on their own. As a result, our customers are enabled with the tools and information they need to innovate, communicate and report on food sustainability, in line with industry-recognized methodology and thinking.

In the context of GHG emissions, this iterative approach is in line with international best practices and thinking around climate science.

"Companies should pursue an iterative approach to improve the accuracy of its scope GHG inventory by collecting more granular and accurate data for emission hotspots, using primary data where available. [...] Once a baseline GHG inventory is established, a company should formulate ambition through reduction targets, plan interventions towards achieving those targets, and finally, measure and track progress against the targets."

- Science Based Targets initiative (SBTi), 2018. Value Change in the Value Chain: Best Practices in Scope 3 Greenhouse Gas Management, p.11.

We conduct updates to our ingredient database in the following instances:

1. **Customer requests**

We partner with our customers to bring more specific data into our calculations if and when a customer can provide it. This may be in the form of data that has been collected from suppliers, commissioned or purchased. We also update impact assessments on specific ingredients by customer request. The insights that we gain from conducting this research are then made available to our broader customer base.

2. **Periodic audits of ingredients and sourcing locations**

We perform periodic audits of particular ingredients and crop origin locations and update the values for those ingredients accordingly. For GHG emissions, this process takes place by assessing individual LCAs and academic studies to find updated emissions factors for specific crops, locations and agricultural practices. For example, we recently updated GHG values for sugar beet:

For metrics that rely on a single, centralized data source, we look for newly released reports from NGOs and government organizations and update the data accordingly.

Updates to our ingredient database are published on our Research Updates log, which is made available to customers.