Performing an an environmental sustainability assessment of products and/or operations

In a nutshell

Summary
Best practice is to assess the environmental impact of products and operations using life-cycle assessment (LCA) tools[1] to identify priority areas for action, or 'hotspots', and define a strategy for reducing the environmental impacts.

Target activities				
All food and beverage manufacturing	Processing of coffee	Manufacturing of olive oil	Manufacture of soft drinks	Manufacture of beer
Production of meat products	Manufacture of fruit juice	Cheese making	Manufacture of bread, biscuits and cakes	Manufacture of wine

Applicability
When undertaking an environmental sustainability assessment, food and beverage manufacturers can face a number of challenges which include the complexity of the product and the accessibility of information; it can be expensive and time-consuming to undertake LCAs, and certain environmental impacts may also be beyond the control of the manufacturer and thus very difficult to act upon, even if they can be quantified.

Environmental performance indicators
• Percentage of sites or products[2] assessed using a recognised environmental sustainability assessment protocol (%). • Number of sites or products assessed using a recognised environmental sustainability assessment protocol.

Benchmarks of excellence
• A company-wide environmental sustainability assessment covering all operations is implemented. • An environmental sustainability assessment for all new products under development is carried out.

[1] With the aim of establishing a common method for measuring life cycle environmental performance, the European Commission developed the Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF) methods. The use of these methods was object

of a Commission Recommendation in 2013 (http://eur-lex.europa.eu/legal-content/EN/TXT/?uri= CELEX:32013H0179). The development of product- and sector-specific rules was tested (between 2013 and 2016) by more than 280 volunteering companies and organisations grouped in 26 pilot cases (see list on http://ec.europa.eu/environment/eussd/smgp/ef_ pilots.htm).

[2] The percentage of products can be calculated (here and in following similar indicators), for example, by considering the total different types of products manufactured and how many types of products are assessed using a recognised environmental sustainability assessment protocol or by weighting with sales volume each type of product manufactured.

Description

Food and drink manufacturing contributes to a range of environmental impacts including greenhouse gas emissions, air and water pollution, waste generation and biodiversity loss. In 2006, the JRC estimated that food and drink products accounted for 20 to 30% of the environmental impacts from total consumption in the EU-25 (European Commission, Directorate General Joint Research Centre, 2006). A more recent publication (Fassio, 2012) states that the EU food and drink industry is responsible for:

- 23% of global resource use
- 18% of greenhouse gas emissions
- 1.8% of Europe's total water use (excluding agriculture)
- 5.3% of industrial final energy use globally
- 90 million tonnes of food waste each year.

The same report adds that a third of food leaving the field is never consumed and points out that the food and drink sector is among the largest producers of waste water. This has not only impact on the receiving water bodies but also significant environmental impacts when treated (e.g. energy use and, when applicable, use of chemicals).

Figure 1 presents the relative contribution of the production and consumption of a range of food and drink products in Europe to various environmental impacts. It will be noted that meat and dairy products are especially significant.

Figure 1: The relative contribution of different product groups to eight environmental impacts in the EU-15

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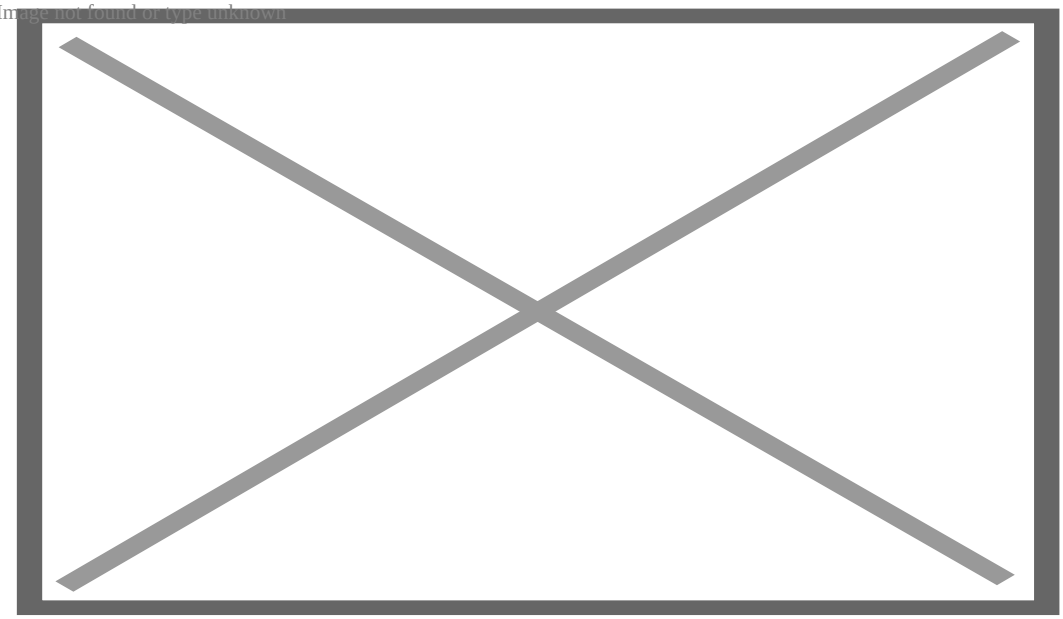


Source: Food SCP Round Table (2012)

Best practice is to assess the environmental impact of products and operations using life-cycle assessment (LCA) tools to identify priority areas for action, or 'hotspots', and define a strategy for reducing the environmental impacts.

A key consideration on how frontrunners use carbon footprinting and/or life-cycle assessments (LCAs) is the precise way in which such analyses are carried and the many assumptions upon which they rest. As FoodDrinkEurope (2012) points out:

'assessing the environmental performance of food and drink products is challenging due to their complex supply chains and diversity. Existing methodologies leave much room for interpretation, which has led to a wide variance in results and a proliferation of inconsistent communications about the environmental performance of food and drink products'

Table 1 gives an idea of the variability in results that can occur when assessing the environmental impacts of a food product. This uncertainty reflects different boundaries, regional differences and methodologies adopted.

Table 1: Literature review for beef

Year	Country	Kg CO_2eq/kg beef	Remarks	System boundaries
2011	Romania	33.0	Dairy cattle producing meat and milk	At slaughterhouse gate with packaging
2011	Ireland	21.2 19.2 18.3	National Steer beef Bull beef	
2006	UK	15.8 18.2 25.3 15.6 16.4	National Organic Suckler Lowland Upland	
2009	Sweden	28.0		
2010	France	30.5 26.6	Calf Integrated cow calf to beef	
2010	EU	27.3	Dairy bull calf / steer	

2012	Switzerland	24.9 27.8 43.3 41.9	Bull fattening PEP Organic bull fattening Suckler cow PEP Organic suckler cow	At slaughterhouse gate with packaging
2013	Switzerland	16.2 15.2	Conventional Organic	No packaging
2013	Argentina	11.3	Conventional	No packaging, no slaughtering waste in the LCI
2013	Global	24.5 90.4	Dairy herd Beef herd	

Source: SENSE (2013)

For this reason, the European Commission's *'Roadmap to a Resource Efficient Europe'* report stresses the need for a:

'*Common methodological approach to enable Member States and the private sector to assess, display and benchmark the environmental performance of products, services and companies based on a comprehensive assessment of environmental impacts over the life cycle'*

Several guidelines have been established for the environmental sustainability assessment of specific product categories and organisations through various processes. A number of these are discussed below and are product-focused tools, namely Product Environmental Footprint (PEF), Environmental product declaration and EcodEX, while others are focused on organisations, such as Orgnisation Environmental Footprint (OEF), the Global Reporting Initiative and CDP.

PEF/OEF (ENVIFOOD protocol)

The European Commission aims to address the issue of inconsistency in environmental impact assessment through the introduction of the Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF) (European Commission, 2013a; European Commission, 2013b). These Footprints are intended to be harmonised across the EU, science-based and founded upon internationally agreed standards. The ENVIFOOD Environmental Assessment Protocol forms the first tranche of pilot testing focused on food and drink products and was adopted by the multi-stakeholder Sustainable Consumption and Production Round Table (SCP RT). The 18 participants in the ENVIFOOD pilots are shown in Table 2.

Table 2: Participants in the ENVIFOOD pilot test

Organisation	**Product(s)**

Granarolo (Italy)	Mozzarella cheese packed in polyethylene bag
Carlsberg Italia	Beer products
Campden BRI (Research organisation, Hungary)	Soy and beef products
European Bottled Water Federation	PET and returnable glass bottles for still and sparkling water
Coop Italia	High quality milk (1lt)
Nestlé	Purina Gourmet Pearl Chicken (cat product), NaturNes (baby food product), Nescafé (coffee)
UNESDA	Non-alcoholic drinks
Federaci?n Española del Vino (Spain)	Wine
Barilla	American Sandwich Nature / Husman / Pasta/ Tarallucci / Tomato sauce
ReMa-MEDIO AMBIENTE, S.L. (LCA Consultancy, Spain)	5 wine products
CTME (Technology Centre Foundation, Spain)	Bottle of red wine
Swedish Institute for Food and Biotechnology	Meat, dairy or fisheries products
Primary Food Processors	Starch, sugar, oilseed crushing and vegetable oil refining, or a selection of these
Gallina Blanca Star	Chicken stock cubes
FEFAC	Compound feed for terrestrial species and aquafeed
FEDIAF	‘Concept’ dry and wet pet food products, followed by real products on the market
FERRERO	Lemon Ice The (ESTATHE LEMON T3x24) and chocolate praline (ROCHER T30x72)
Mondel?z International	Several coffee products

Source: Food SCP Round Table (2014)

The PEFs / OEFs are being developed using the methodologies detailed in ISO 14040 and ISO 14044. ISO 14040 was first published in 1997 and focuses on environmental management – life cycle assessment – principles and framework and ISO 14044 on the Requirements and Guidelines. These standards have four key steps:

1. Goal and scope definition
2. Inventory analysis
3. Impact assessment
4. Interpretation

The SENSE (Harmonised Environmental Sustainability in the European food and drink chain) project (2012-2015), coordinated by AZTI Tecnalia in Spain, has evaluated existing environmental impact assessment methodologies to deliver a new integral system which can be linked to monitoring and traceability data. The system integrates a data gathering system, a methodology for environmental impact assessment, a set of Key Environmental Performance Indicators to simplify the LCA development process for SMEs and has developed a certification scheme concept. The organisers acknowledge that (Ramos et al, 2014):

'*Nowadays the calculation of the potential environmental impact of products can lead to great benefits to the industries which, in most cases, can lead to brand differentiation. However, most of the industries in the food sector, especially SMEs, neither have a strong background nor the capability to assess the sustainability of their products'*.

The SMEs involved in the project are shown in Table 3.

Table 3: SMEs involved in the SENSE project

Organisation	**Product(s)**
Zumos Valencianos del Mediterráneo (Zuvamesa)	Fruit juice producer
Tunay Gida	Fruit juice producer
Provac Impex SRL	Meat producer
Calion Prod SRL	Dairy processing factory
Fjardalax	Seafood producer

Environmental Product Declarations

An Environmental Product Declaration, EPD®, is a means of communicating environmental performance. It is a verified document that reports environmental data of products based on life cycle assessment (LCA) and other relevant information and in accordance with the international standard ISO 14025 (Type III Environmental Declarations). The contents in the EPD must be in line with the requirements and guidelines in ISO 14020 (Environmental labels and declarations - General principles). Any environmental claims based on the EPD are recommended to meet the requirements in ISO 14021 (Environmental labels and declarations - Self-declared environmental claims) and national legislation and best available practices in the markets in which they will be used. The international standard ISO 14021 states that only environmental claims that can be supported by up-to-date and documented facts may be used. Vague claims, such as "environmentally

friendly" should be avoided.

Organisations that have developed EPDs include:

- **Barilla**
- **Granarolo S.p.A**
- **Lantmännen**

The French food and drink industry association (ANIA[1]) has led on a national environmental declaration pilot. Working alongside the French Environment and Energy Agency (ADEME[2]) and the French Standards body (AFNOR[3]) they have developed a 'stakeholder platform' which offers a general environmental footprinting methodology (BPX 30-323) and product category rules enabling manufacturers to calculate the impact of their products in order to communicate this to consumers. One output from the study is the 'ProxiProduit' system allowing consumers to scan the barcode of products to obtain environmental information such as GHG emissions, biodiversity and water use.

The Global Reporting Initiative

The Global Reporting Initiative (GRI) was founded in 1997 and involved the development of a Sustainable Reporting Framework (including reporting guidelines and sector guidance) where companies report the economic, environmental, social and governance performance of their activities. The Food Processing Sector Supplement (FPSS) covers key sector-specific issues, including:

- Sourcing practices
- Community investment
- Impact of governmental support
- Labour and management relations
- Practices that promote healthy and affordable food
- Customer health and safety
- Product information and communication to consumers
- Animal welfare including breeding and genetic, animal husbandry, transportation, handling and slaughter

The Swiss multinational manufacturer Nestlé is among those reporting in GRI. Table 4 shows data submitted and the impacts of its products, including the packaging, since 2003.

Table 4: Direct and indirect GHG impacts reported to GRI by Nestlé

GHG emissions	**Year**				
	2003	2009	2011	2012	2013
Direct GHG emissions ($mtCO_2eq$)	4.7	4.0	3.81	3.71	3.99
Direct GHG emissions (kg CO_2eq per tonne of product)	142	97	84.2	77.7	76.5

Indirect GHG emissions ($mtCO_2eq$)	n/a	3.0	3.23	3.39	3.81
Indirect GHG emissions (kg CO_2eq per tonne of product)	n/a	73	71.5	71.1	73.2

Source: Nestlé, 2014 pers.comm

Other manufacturers that report into the scheme include:

- Barilla
- Coca Cola Enterprises
- Ferrero International
- PepsiCo
- Unilever

CDP

The CDP, formerly the Carbon Disclosure Project, is a global climate change programme benchmarking the performance of large corporations. Businesses involved in CDP include:

- PepsiCo: In 2009, the soft drinks and snacks manufacturer asked agricultural suppliers from the UK and continental Europe to report to them, through the CDP process, on their greenhouse gas emissions and climate change strategies. This initiative identified the best performing suppliers, such as Lantmännen, and a 'shared learning' programme of work (CDP, 2009).
- Diageo: A case study highlights that in 2013, the alcoholic drinks company had a disclosure score of 98 and a performance band rating of 'A' (CDP, 2013).

Additionally, within the CDP the Cool Farm Tool (CFT) was developed in 2008 by Unilever, the University of Aberdeen and the Sustainable Food Lab. The purpose of the CFT is to provide a decision support tool to help farmers measure, understand and manage greenhouse gas emissions from their farms and to measure progress over time (Unilever, 2010).

Sectoral initiatives

Some environmental assessment initiatives are specific to certain sub-sectors such as:

- A life cycle assessment of greenhouse gas emissions from the global dairy cattle sector (by the Food & Agricultural Organisation of the United Nations, FAO, and International Dairy Federation, IDF).
- Guidance on reporting GHG emissions in the beverage industry (by the beverage industry environmental roundtable, BIER).
- A carbon footprint study for yeast (by the Confederation of EU Yeast Producers, COFALEC)

Business initiatives

Additionally, large corporations may develop their own assessment methodologies. For example, **Nestlé** recently developed 'EcodEX', a multidimensional tool for assessing greenhouse gas emissions, as well as water, energy and biodiversity impacts from across the whole lifecycle of packaging and whole products. The tool is freely available for other manufacturers to use.

Other single impact initiatives

Systems addressing a single impact include ISO 14067 and, in the UK, PAS 2050 (latest version from 2011), both of which focus on carbon footprinting. Similarly, the World Resources Institute and World Business Council for Sustainable Development have developed the GHG Protocol Initiative 'Product Life Cycle Accounting and Reporting Standard'.

The original PAS 2050:2008 was written to create a consistent way of assessing the greenhouse gas emissions associated with the full life cycle of goods. Businesses who have undertaken LCAs using the PAS 2050 methodology include:

- Innocent
- PepsiCo (e.g. for its Walkers crisps brand in the UK)

[1] 'ANIA' stands for 'Association Nationale des Industries Alimentaires'

[2] 'ADEME' stands for 'Agence de l'Environnement et de la Maîtrise de l'Energie'

[3] 'AFNOR' stands for 'Association Française de Normalisation'

Environmental benefits

The carrying out of an environmental sustainability assessment cannot itself lead directly to environmental benefits, but for frontrunner manufacturers the exercise is a critical first step in a strategy to enhance the sustainability of products and operations. Simply put, an organisation cannot reduce its negative impacts without first understanding what they are and where they occur in its processes.

The Italian company Barilla, which makes products such as pasta and snacks, uses the Environmental Product Declaration tool to calculate the environmental impacts of its products. In order to improve the accuracy of its assessments Barilla requests actual, or 'real world', impacts data from suppliers rather than relying on secondary / generic LCA databases. This proactive approach then allows Barilla to work with suppliers in various ways to lower these impacts (EPD, nd). Barilla also seeks to reduce impacts in the consumption phase of products, e.g. by recommending that customers reduce the time they cook their pasta for, and the amount of water used.

The Clemens Härle brewery in Germany performed an LCA to identify hotspots in its processes. It later became the country's first brewery to produce all of its beer from 100% renewable energy, achieving annual savings of 900 tCO_2 (The Brewers of Europe, 2012).

Applicability

When undertaking an environmental sustainability assessment, manufacturers may need to grapple with a number of challenges, and not every company will be able to resolve these. Key factors to consider include:

- **Complexity of the product:** Many products, such as frozen ready meals, may be made using a wide variety of ingredients from different suppliers. Gathering supplier-specific impacts data for each raw material may not be practical, or indeed appropriate since the supplier of a particular ingredient may change frequently. In such cases, it may be more appropriate to focus only on the major materials, processes or parts of the supply chain likely to be responsible for the greatest environmental impacts.
- **Cost, time or expertise constraints:** As noted below, it can be expensive and time-consuming to undertake full LCAs, particularly for more complicated products which may dissuade smaller companies from trying. However, in these situations it may still be feasible to focus on 'hotspots' or use simplified LCA approaches.
- **Manufacturer's influence in the supply chain:** Certain environmental impacts may also be beyond the power of the manufacturer to change, even if they can be quantified. This is especially true for smaller processors who may have little chance to influence their suppliers. Similarly, a manufacturer's influence may be low for certain product types. For instance, anecdotal evidence suggests that for many chilled ready meals, the consumer's decision whether to heat the product in a conventional oven or a microwave will have the greatest bearing on the product's lifetime energy impacts, significantly outweighing the effect of any low-energy measures implemented during manufacture (Chilled Food Association, 2014 pers. comm.). As mentioned above, the manufacturer Barilla has tried to address a similar issue for its pasta products by seeking to influence the consumer's behaviour. The extent of a manufacturer's influence should be considered when setting the assumptions upon which an environmental sustainability assessment is based.

Economics

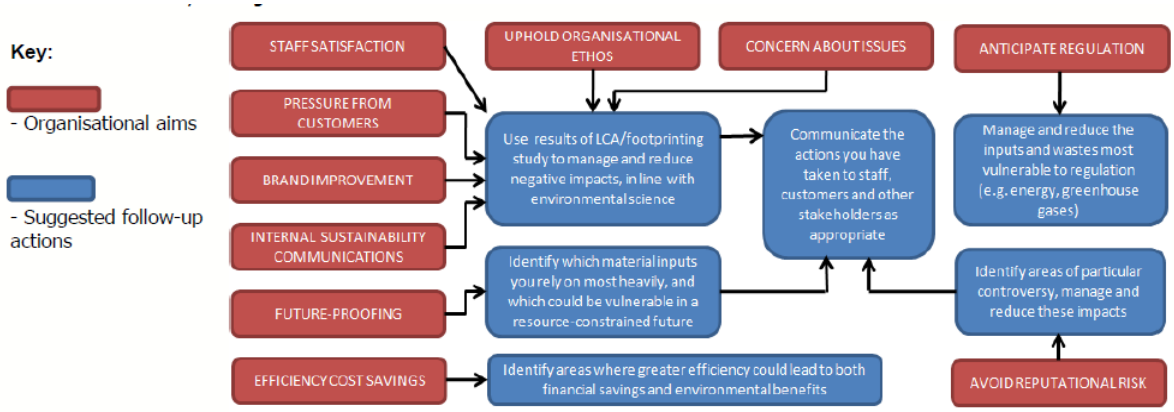
Implementing a comprehensive LCA can be expensive. According to one source (Grilli, 2013), the EC's PEF costs EUR 50,000 per product. In the UK, the retailer Tesco abandoned a project to calculate (and publish) the carbon footprint of all its products. The company instead undertakes a hotspot analysis.

For this reason, FoodDrinkEurope (2013) reports that the development of the sectorial ENVIFOOD Protocol *'has created more user-friendly and affordable tools for the assessment and voluntary communication of environmental impacts along the food chain'.*

Driving forces for implementation

WRAP (2013) suggests a number of reasons for food and drinks businesses undertake a sustainability assessment– as well as ways the results can be used (Figure 2).

Figure 2: Drivers for carrying out an LCA or footprinting study



Source: WRAP (2013)

Which of these driving forces are most important will vary with each company but given that many if not most environmental impacts (e.g. water, energy and raw material consumption, waste disposal.) entail a financial cost, a key driver for carrying out a sustainability assessment is to identify and reduce any unnecessary costs ('Efficiency Cost Savings' in Figure 3.2).

For larger organisations with a significant public profile, aspects such as 'Brand improvement', 'Reputational Risk' and CSR concerns will also be important. Companies that can demonstrate that they take their environmental impacts seriously will maintain a positive image in the eyes of consumers, NGOs, investors and other stakeholders. Countless studies demonstrate the importance of being seen by customers to be 'green'; one example is a recent survey by the European Commission (2013c) which reports that 54% of respondents occasionally buy environmentally-friendly products and 26% often buy them.

Security of supply is another key driver, especially for larger manufacturers relying on vast quantities of raw material, energy, water or other inputs which may be procured from multiple locations around the globe. Frontrunners are more mindful of future risks to supply, such as the changing availability of inputs, tightening regulatory regimes, and geopolitical instability, and will want to identify and address potential vulnerabilities ('Future proofing' in Figure 3.1). A good example comes from Nestlé which enters an inflated 'notional' price for water into the EcodEX tool when deciding whether to make an investment in a new manufacturing process. This is to hedge against potential future shortages in supply and hikes in the water prices (Nestlé, 2014).

While smaller frontrunners will also consider future risks to supply, in general they are more likely to be motivated by procurement pressure, particularly from larger retailers - or larger manufacturers – upon whom they might depend for business. These larger customers may themselves be assessing and improving their own supply chains and thus expect suppliers to provide data on environmental impacts.

Regulation, actual or anticipated may be another factor, with laws requiring manufacturers to measure and report on the sustainability of their operations.

Reference organisations

Table 5 provides a summary of companies that are active in the environmental sustainability assessment of their products and/or operations.

Table 5: A summary of companies active in the environmental sustainability assessment of their products and/or operations and their initiatives

Organisation	ENVIFOOD	SENSE	EPD	GRI	CDP	Business Initiatives
Granarolo (Italy)	*		*			
Carlsberg Italia	*					
Nestlé	*					
UNESDA	*					
Barilla	*		*	*		
Gallina Blanca Star	*					
FEFAC	*					
FEDIAF	*					
FERRERO	*			*		
Mondel?z International	*					
Zumos Valencianos del Mediterráneo (Zuvamesa)		*				
Tunay Gida		*				
Provac Impex SRL		*				
Calion Prod SRL		*				
Fjardalax		*				
Lantmännen			*			
Nestlé				*		*
Coca Cola Enterprise				*		
Pepsico				*	*	

Unilever				*	*	
Diageo				*	*	
Innocent						

Literature

nd = no date

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