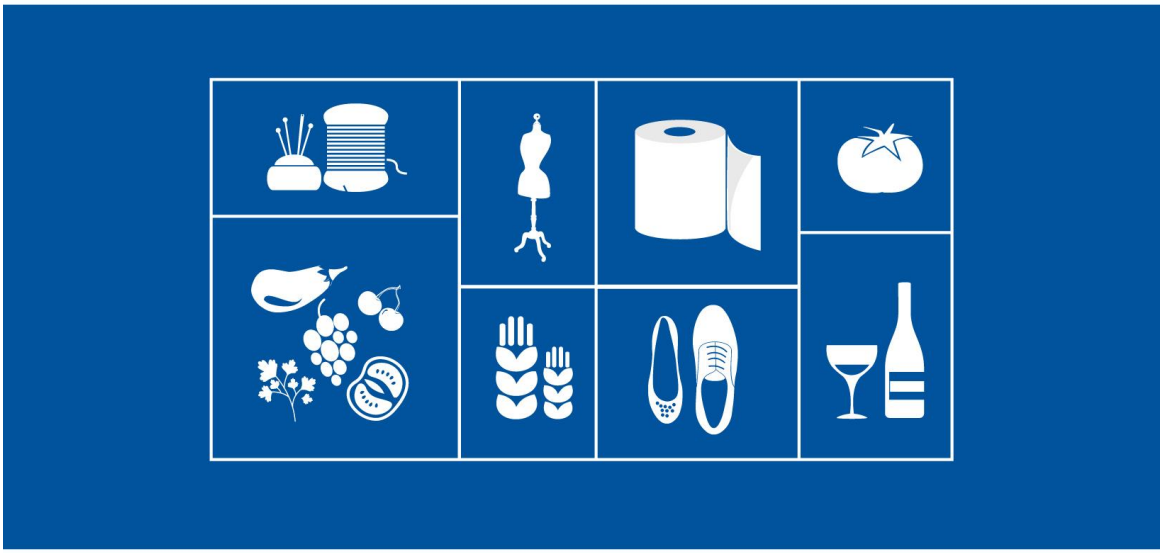
Product environmental footprint Enhanced by Regions



Overview of the past and on-going experiences dealing with PEF and LCA application (Action A.1)

Deliverable n.1

CON IL SUPPORTO DI
cartesio
COORDINATORE
ISTITUTO DI MANAGEMENT
Scuola Superiore Sant'Anna
PARTNER
ERVET
Regione Lombardia
ASTI D.O.C.G.
Distretto Industriale Agroalimentare Nocera Inferiore - Gragnano
CENTROCOT
Con il supporto del programma Life plus della Commissione Europea

INDEX

Summary

The action A.1 of PREFER project is aimed to analyze international experiences on Product Environmental Footprint and Life Cycle Assessment applied in a cluster.
The PEF/LCA applications through a cluster approach involve LCA applied to average products, groups of enterprises, productive sectors, industrial districts.
This overview permits to identify methods and good practices useful to develop PEF studies applied with a cluster approach in the pilot clusters involved by the project.
The overview has been carried out in two phases:

1) A research aimed to identify LCA studies developed in reference to different schemes: EPD, BPX30-323, water footprint, carbon footprint, PEF, Italian environment ministry methodology, other not certified LCA. This phase was useful to analyze differences and similarities among initiatives of LCA carried out across different countries and referred to different schemes, norms, productive sectors and type of applications.
2) An analysis of cases of excellence among initiatives identified during the first phase. The focus of the analysis has been on average products, groups of enterprises and other cluster approaches.

Considering that the EC Recommendation on PEF has been published in April 2013, it has been very difficult to identify experiences of PEF, in particular if applied with a cluster approach.
Only one concluded PEF experience has been detected, actually, with a level of development sufficient to define strengthens and weakness of the initiative.
Considered norms on LCA for the overview are: ISO14040, ISO14044, ISO14025, ISO/TS 14067, PAS2050, ISO/DS 14046.
During the first phase of the research, 50 initiatives have been analyzed. The results of this analysis are showed in the first part of the document.
Second phase has involved 9 study cases. Detailed descriptions of these initiatives of excellence are showed in the second part of the document.
The tables related to the 50 selected LCA initiatives are reported as annexes.

1. Overview methodology

The survey is aimed to identify methods and good practices useful to carry out the following actions of PREFER project.
The overview has been focused on different experiences, selected on the basis of multiple criteria.
Productive sectors directly involved by PREFER pilot clusters or related to them had a priority in the selection of the initiatives to study.
Moreover, applications of Life Cycle Assessment with a cluster approach have been favored. For cluster approach have been considered LCA studies applied to average products, typical products, groups of enterprises, productive sectors, geographic proximity.
Only concluded experiences have been considered, so an analysis of benefits and difficulties has been possible.
Among the case studies applied with cluster approach, not guidelines or manuals have been considered, only real LCA studies carried out by group of companies, big companies or category associations.
The research has been carried out in two phases: a preliminary overview, based on bibliography, and an in-depth analysis, based on direct interviews. Interviews have been carried out by phone, web conference or meeting.
In the preliminary overview a schematic chart for data collection has been used.
In the analysis of cases of excellence a detailed questionnaire has been used.
The selection of case studies started from existing schemes on LCA and footprint. The selected initiatives are located in Italy, Europe and out of Europe.
Considered schemes are:

- PEF scheme
- EPD scheme
- BPX30-323 scheme
- Water footprint scheme
- Carbon footprint scheme
- Italian Ministry of Environment protocol
- Other initiatives of not certified LCA

The filled tables related to 50 selected initiatives referred to the above mentioned schemes are showed as annexes of this report.
Among the 50 initiatives, 9 case studies have been selected. These are the most interesting LCA studies applied with a cluster approach in relation to PREFER project scope.
Also the complete questionnaire used for the interviews is an annex of the report.

2. Preliminary overview

During this phase of the research, 50 initiatives across Europe and extra Europe countries have been analyzed.
For every initiative, following items have been considered:

- scheme/methodology
- sector
- type of application
- scheme manager
- location
- year and project duration
- type of enterprises
- number of enterprises
- involved actors
- functional unit
- system boundaries
- phases of product's life
- indicators

The study cases are referred to:
PEF scheme
EPD scheme
BPX30-323 scheme
Water footprint scheme
Carbon footprint scheme
Italian Ministry of Environment protocol
Other initiatives of LCA

In the following pages a short description of these schemes will be exposed.
The last paragraph of this chapter contains an analysis of sectors, kind of products and type of applications.

Product Environmental Footprint (PEF)

DG Environment has worked together with the European Commission's Joint Research Centre and other European Commission services towards the development of a harmonised methodology for the calculation of the environmental footprint of products (including carbon).
The Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF) are Life Cycle Assessment (LCA) based methods to quantify the relevant environmental impacts of products (goods and services) and organisations. They build on existing approaches and international standards, even if using LCA for organisation-level assessment represents a relatively novel approach.
The PEF method is based on the life-cycle approach and aim at measuring and communicating the potential life cycle environmental impact of a product. The PEF is a multi-criteria measure of the environmental performance of a good or service throughout its life cycle. PEF information is produced for the overarching purpose of seeking to reduce the environmental impacts of goods and services taking into account supply chain and the activities (from extraction of raw materials, through production and use, to final waste management).
One important feature of the PEF method is that it sets the basis for comparability of the results. For this reason the PEF implementation follows the PEF Category Rules. PEFCRs aim at providing detailed technical guidance on how to conduct a PEF study for a specific product category. PEFCRs provide further specification at the process and/or product level. The methodological requirements set out in PEFCR shall also apply to PEF studies.
Potential applications of PEF studies may be grouped depending on in-house or external objectives:

- In-house applications may include support to environmental management, identification of environmental hotspots, and environmental performance improvement and tracking, and may implicitly include cost-saving opportunities;
- External applications (e.g. Business-to-Business (B2B), Business-to-Consumers (B2C)) cover a wide range of possibilities, from responding to customer and consumer demands, to marketing, benchmarking, environmental labelling, supporting eco-design throughout supply chains, green procurement and responding to the requirements of environmental policies at European or Member State level;
- Benchmarking could for example include defining an average performing product (based on data provided by stakeholders or on generic data or approximations) followed by a grading of other products according to their performance versus the benchmark.

The European Commission adopted a Recommendations 2013/179/EU *Commission Recommendation of 9 April 2013 on the use of common methods to measure and communicate the life cycle environmental performance of products and organisations*. This act defines the PEF method and explains the criteria to implement the method. Indeed some Pilot tests are on going to define the PEFCR for the method adoption in the main important fields of European economy.

Environmental Product Declaration (EPD)

An Environmental Product Declaration, EPD®, 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).
An environmental declaration, is defined, in ISO 14025, as quantified environmental data for a product with pre-set categories of parameters based on the ISO 14040 series of standards, but not excluding additional environmental information. An environmental declaration is created and registered in the framework of a type III environmental declarations programme, such as the International EPD® System.
The International EPD® System is based on a hierarchic approach following the international standards ISO 9001 (Quality management systems), ISO 14001 (Environmental management systems), ISO 14040 (LCA - Principles and procedures), ISO 14044 (LCA - Requirements and guidelines), ISO 14025 (Type III environmental declarations) and ISO 21930 (Environmental declaration of building products) upon which the General Programme Instructions are included as well as instructions for developing so-called Product Category Rules (PCR) for more detailed information on data collection and calculations for the EPDs.
The Swedish Environmental Management Council (SEMCo) acts as the Programme Operator and has the overall responsibility of the International EPD® System.
According to ISO 14025, an environmental declarations programme operator has a number of mandatory obligations when fulfilling the duties to manage the International EPD® System. These duties are divided between functions such as the Technical Committee (TC) and a Secretariat, which are further described on separate pages.
The Technical Committee (TC) consists of a group of at least five LCA/EPD experts that assist the Secretariat. The Technical Committees constituted in such a manner that their expertise cover as many product categories as possible. If there is need for additional expertise, independed experts may be consulted.
The Secretariat carries out the overall management of the International EPD® System. The Secretariat is staffed by the Swedish Environmental Management Council (SEMCo).

Creating an Environmental Product Declaration in the International EPD® System includes the following steps:

a) Find or create relevant PCR document for the product category

For comparability, an EPD is based on valid Product Category Rules (PCR) document. If a relevant PCR does not exist, it shall be created. The International EPD® System also includes the possibility for pre-certification of EPDs as a step in the process to develop PCRs.
Product Category Rules (PCR) are documents that define the requirements for EPDs of a certain product category. They are vital for the concept of environmental declarations as they enable transparency and comparability between different EPDs based on the same PCR.

b) Perform LCA study based on PCR

When creating an EPD, the environmental performance of the product/service shall be described from a life cycle perspective. Collecting LCA data to be included in the declaration is a core activity in the process of creating an EPD with the following for basic prerequisites:

- to comply with international accepted principles for life cycle assessment, LCA, according to the ISO standards 14040 and 14044,
- to follow the general purpose of EPDs, the collection of data, methods and assumptions used as advocated in the ISO standard 14025 and described in the General Programme Instructions of the system EPD,
- to be in line with the product-category rules, PCRs, for the product category of interest.

c) Compiling environmental information into the EPD reporting format

An EPD can encompass other types of relevant information in the EPD additional to the LCA-based data making the declaration a carrier of a much wide aspect of environmental information of specific value for an organisation.

The format for reporting LCA based and other information in an EPD is described in the relevant PCR. The common layout of EPDs is usually divided into separate parts, including:

- Programme-related information
- Product-related information
- Content declaration
- Environmental performance-related information
- Additional information
- Mandatory statements

d) Verification and certification

It is essential for the market acceptance of EPD that the data and other environmental information given are considered reliable and trustworthy. The underlying data, the data handling and the EPD itself should therefore be subject for an independent verification and official registration.

e) Registration and publication

After verification, EPDs shall be registered and published on the system web site (www.environdec.com). Registration is administered by the Secretariat.

An EPD is valid for three years after which the declaration must necessarily be revised and reissued.

When the EPD is published, the logotype of the system may be used.

If used correctly, EPD® logotype can be used in connection with e.g. advertisement, on products and their packaging materials. It is also possible to add more explanatory supplementary information if needed. The EPD® logotype can be used in many ways for different market applications.

BPX30-323 scheme

BP X 30-323 was prepared under the french law called “Grenelle I”, which establishes the prospect of regulatory communication of environmental information relating to product.
This work was developed with over 300 organisations representing all the various relevant stakeholders, sectors, and NGOs gathered in the ADEME (Agency for Environment and Energy Management) / AFNOR (French Association of Normalization) platform.
The ADEME-AFNOR stakeholder platform has published in September 2009 - revised in January 2011 and to be revised in 2013-2014 - a general methodology (BP X 30-323: General principles for communication of environmental information on mass market products) and a detailed methodological appendix were published. ADEME has also produced lecture guides (in French and English) for the BP X 30-323 and for at least 16 PCRs (other six coming).
BP X 30-323 provides information to consumers, allow comparison of product belonging to the same category and when relevant between product categories. It gives general principles for the environmental communication of products. The carbon footprint is required whatever the category of product. The environmental communication includes indicators limited in number and specific to a category of product. These indicators take into account the main relevant impacts generated by the product.
BP X 30-323 is thus in line with ISO 14040 and ISO 14044 and can evolve following international or European community normative evolution.
BP X 30-323 defines main principles for drawing up methodological guides specific to product categories (PCR). These methodological guides are developed by relevant stakeholders of different sectors and are validated by the ADEME / AFNOR platform.
ADEME has initiated the development of a public product life cycle database to provide generic data that will enable the calculation of these indicators and set up a Governance Advisory Committee who issues advisories on data quality.
A national experiment was conducted in 2011-12 requiring to a large panel of applicants (nr. 168) the quantification and communication of BPX 30-323 compliance product footprinting to the end consumer. Other requirements: carbon footprint with absolute figures and adoption of multicriteria (at least one more environmental criterion). Flexibility was given to the companies on communication formats and additional environmental indicators.
The experiment was quite positive according to the French Ministry of Ecology, Sustainable Development, and Energy, and useful to ask for an European and international harmonisation and standardization works.

Water footprint scheme

The water footprint is an indicator of the consumption of fresh water that includes both direct and indirect use of water by a consumer or producer.
The water footprint of an individual, a community or an enterprise is defined as the total volume of fresh water used to produce goods and services, measured in terms of water volumes consumed (evaporated or present in a product) and polluted per time unit.
For the definition of the water footprint the geographical location of the resource collection points is also important.
The water footprint assessment is developed in three phases:

1. quantification and location of a product or process water footprint in the reference period;
2. assessment of the environmental, social and economic sustainability of the water footprint;
3. identification of the water footprint reduction strategies.

The general computation of water footprint derives from the sum of three components:

- blue water: it refers to the sample of surface and ground water for agricultural, domestic and industrial use. The quantities of the fresh water that does not return to the valley of the production process at the same point where it was taken, or will return, but at different times;
- green water: it's the volume of rainwater that does not contribute to the surface runoff and mainly refers to evaporated-transpired water for agricultural use;
- grey water: it's the volume of the polluted water, quantified as the volume of water required to dilute the pollutants to the point that the waters quality comes back above the quality standards.

The use of the three components of virtual water affects differently on the hydro-geological cycle. For example, the consumption of green water has a less invasive impact on the environmental balance than the consumption of blue water. The water footprint thus offers a better and broader perspective on how the consumer or producer affect the use of fresh water. It is a volumetric measurement of water consumption and pollution. It does not then measure the severity of the impact at the local level, but it provides an indication of the space-time sustainability of the water resource used for anthropogenic purpose.

An important subject in the development of Water Footprint is the Water Footprint Network WFN.
The WFN is a dynamic, international learning community, a platform for connecting diverse communities interested in sustainability, equitability and efficiency of water use.
The WFN makes data, methods and tools available for free. In 2011 WFN write "The Water Footprint Assessment Manual".
The book offers a complete and up-to-date overview of the global standard on water footprint assessment as developed by the Water Footprint Network. More specifically it:

- Provides a comprehensive set of methods for water footprint assessment
- Shows how water footprints can be calculated for individual processes and products, as well as for consumers, nations and businesses
- Contains detailed worked examples of how to calculate green, blue and grey water footprints

- Describes how to assess the sustainability of the aggregated water footprint within a river basin or the water footprint of a specific product
- Includes an extensive library of possible measures that can contribute to water footprint reduction

Also certification can play an important role in the development and diffusion of WFP.

ISO/DIS 14046 is the new standard for water footprinting that will provide this consistency and give water footprint results credibility. This standard will specify the principles, requirements and guidelines of assessing and reporting water footprints. This will apply to products, processes and organizations based on life cycle assessments. ISO 14046 will provide requirements and guidance for calculating and reporting a water footprint as a standalone assessment – or as part of a wider environmental assessment.
There are various benefits associated with the future implementation of the standard:

- Assess and prepare for the future risks to your water use
- Identify ways to reduce the environmental impacts of your water use
- Improve efficiency at product, process and organizational levels
- Share knowledge and best practice with industry and government
- Meet customer expectations of increased environmental responsibility.

Carbon footprint scheme

A carbon footprint has historically been defined as:
"*A measure of the total amount of carbon dioxide (CO2) and methane (CH4) emissions of a defined population, system or activity, considering all relevant sources, sinks and storage within the spatial and temporal boundary of the population, system or activity of interest. Calculated as carbon dioxide equivalent (CO2e) using the relevant 100-year global warming potential (GWP100*)."
[Wright, L.; Kemp, S., Williams, I. (2011). "'Carbon footprinting': towards a universally accepted definition"]
Greenhouse gases (GHGs) can be emitted through transport, land clearance, and the production and consumption of food, fuels, manufactured goods, materials, wood, roads, buildings, and services. For simplicity of reporting, it is often expressed in terms of the amount of carbon dioxide, or its equivalent of other GHGs, emitted.

Measuring carbon footprint

PAS 2050

Specification for the assessment of the life cycle greenhouse gas emissions of goods and services

Revised from its 2008 edition, PAS 2050:2011 is a publicly available specification (PAS) providing a method for assessing the life cycle greenhouse gas (GHG) emissions of goods and services (jointly referred to as "products").
It can be used by organizations of all sizes and types, in any location, to assess the climate change impact of the products they offer.
Originally published in 2008 as the world's first framework methodology for product carbon footprinting, PAS 2050 is now parent to an expanding family of specifications, providing tailored guidance for individual sectors to enable most effective application of carbon footprinting.
The PAS 2050:2011 revision was coupled with the publication of a guidance document. Also free to download, it assists organizations in better understanding the uses of the specification by offering practical advice to organizations wanting to assess the carbon footprint of their products, identify hotspots and reduce emissions in their supply chain.
The PAS 2050:2011 specifies requirements for the assessment all life-cycle GHG emissions associated with the life cycle of goods and services ("products"), based on life cycle assessment techniques and principles (i.e. ISO14040/44). Requirements are specified for identifying the system boundary, the sources of GHG emissions that fall inside the system boundary, the data requirements for carrying out the analysis,
and the calculation of the results. It includes the six GHGs identified under the Kyoto 16 protocol and covers the whole life cycle of products, including the use phase and emissions from direct land-use changes thathave taken place overthe past 20 years.

GHG Protocol

The Greenhouse Gas Protocol (GHG Protocol)

GHG is the most widely used international accounting tool for government and business leaders to understand, quantify, and manage greenhouse gas emissions. The GHG Protocol, a decade-long partnership between the World Resources Institute and the World Business Council for Sustainable Development, is

working with businesses, governments, and environmental groups around the world to build a new generation of credible and effective programs for tackling climate change.
It provides the accounting framework for nearly every GHG standard and program in the world - from the International Standards Organization to The Climate Registry - as well as hundreds of GHG inventories prepared by individual companies.

ISO/TS 14067:2013
Greenhouse gases -- Carbon footprint of products -- Requirements and guidelines for quantification and communication
ISO 14067 is being prepared by Technical Committee ISO/TC 207, Environmental management, Subcommittee SC 7, Greenhouse gas management and related activities.
The International Standards Organization has published a draft standard aimed at measuring the carbon footprint for the lifecycle of products.
The proposed standard, ISO 14067, will be used to calculate the greenhouse gas emissions from companies and their activities.
This International Standard specifies principles and requirements for studies to quantify the carbon footprint of a product (CFP), based on life cycle assessment (LCA) specified in ISO 14040 and ISO 14044. Requirements and guidance for the assessment of a partial carbon footprint (partial CF) are also provided. ISO 14067 is applicable to CFP studies and partial CF studies with or without the intention to be publicly available.
This International Standard provides for the adoption of product category rules (PCR), where they have been developed in accordance with ISO 14025 and are consistent with ISO 14067.
This International Standard addresses the single impact category of climate change and does not assess other potential social, economic and environmental impacts arising from the provision of products. Product carbon footprints assessed in conformity with this International Standard do not provide an indicator of the overall environmental impact of products.

The Italian Environmental Footprint Program

Companies' voluntary commitment for the evaluation of the environmental footprint and for the reduction of the GHG emissions are increasingly becoming an important tool to enhance the measures foreseen in the norms and governmental policies of the Kyoto Protocol and of the "Climate and Energy package" adopted by the Council of the European Union in 2008. In this context the Ministry for the Environment, Land and Sea, already involved in support of the voluntary initiatives of the Italian private sector, has lead off an intensive program on environmental footprint of goods/services (carbon footprint and water footprint) to experiment on a large scale and optimize different evaluation systems of environmental performance, taking into account the differences of each economic sector, in order to harmonize and make them repeatable. Moreover, the initiative aims at identifying the companies' procedures of carbon management and at supporting the use of low-carbon content technologies and good practices in the manufacturing processes. These activities represent: - an environmental driver but also a competitive tool for the whole system of Italian companies, that nowadays takes into account the importance of the "eco-friendly" requisites of products on the market;- an important mean in favor of economic development toward a more and more sustainable economy; - an opportunity to create a new awareness for users, to encourage increasingly responsible choices and good practices.

Starting from 2011, the Ministry selected 187 companies from the main sectors of the Italian industry. In addition, also 4 universities and 6 municipalities were involved in the project. The project co-financing, both as contribution to the companies and agreements with universities, is 6.5 millions of Euro.

The companies involved in the Italian Environmental Footprint Program test the international approaches and methodology to identify the main environmental impacts of their production. In order to ease the realization of the project, specific sectorial working groups of companies were organized according to the nature of the product under study and a technical expert for each sector was appointed. The projects are in progress and the companies are implementing one or more of the methodology included in:

- UNI EN ISO 14040:2006 Environmental Management - Life Cycle Assessment - Principles And Framework
- •UNI EN ISO 14044:2006 Environmental Management - Life Cycle Assessment - Requirements and guideline
- •UNI ISO/DIS 14067 Carbon footprint of products - Requirements and guidelines for quantification and communication
- •ISO/CD 14046 Life cycle assessment - Water footprint - Requirements and guidelines
- •ISO 14064-2:2006 Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements
- •ISO 14025:2010 Environmental labels and declarations - Type III environmental declarations - Principles and procedures
- •GHG Protocol
- •PAS 2050, for the assessment of the life cycle greenhouse gas emissions of goods and services.

Other initiatives of LCA

In this section have been analyzed initiatives of LCA applications not ascribable to national or international certifiable schemes as the reported previous ones. In particular, local projects or promotional initiatives have been considered. Every selected LCA study has been carried out in accordance with international standard ISO14040.

LCA essentially comprises a systematic evaluation of environmental impacts arising from the provision of a product or service.

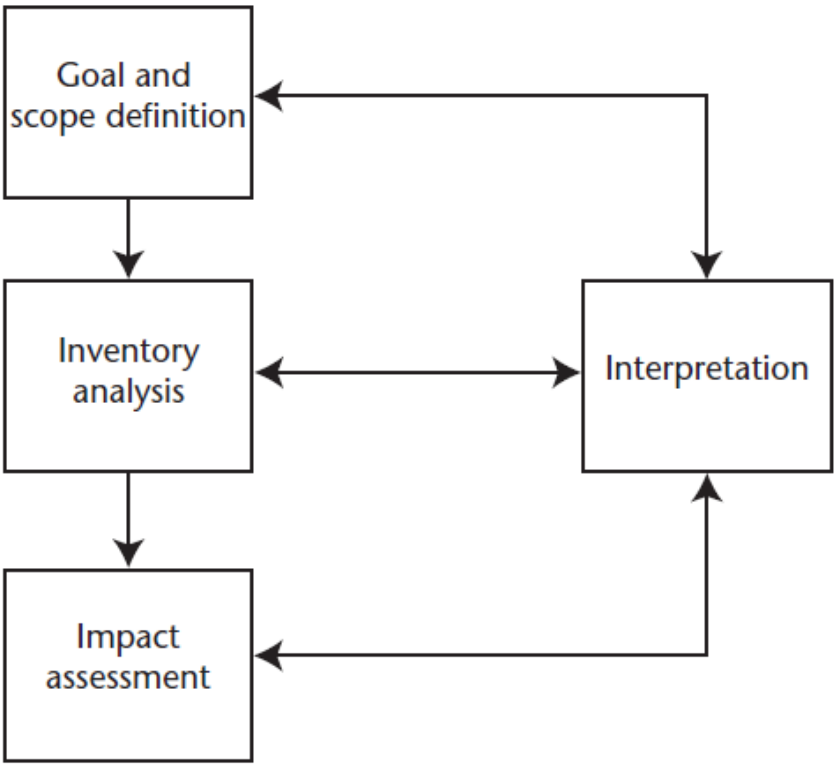
The original International Organization for Standardization (ISO) definition provides some indication, although it is self-referencing: “compilation and evaluation of the inputs and outputs and the potential environmental impacts of a product system throughout its life cycle”.

Generic LCA method requires that all the main inputs to the processes that provide the service are taken into account, as well as the processes and materials that feed into those processes, and so on back ‘up’ the supply chains of the various materials in the product to the raw resource inputs.

These raw inputs are invariably energy-based rather than simply raw materials.

International standards assist in the specification, definition, method and protocols associated with undertaking, reviewing and reporting LCA studies.

ISO 14040 describes the principles and framework for life cycle assessment. The original standard (produced in 1997) was updated in 2006. This ‘core’ standard includes guidance on defining the goal and scope of an LCA study, development of the life cycle inventory, the life cycle impact assessment, and interpretation.



It also indicates reporting and critical review parameters and limitations of LCA. However, it does not describe the LCA technique in detail, nor does it specify how to undertake individual phases of the LCA. More detail is provided in ISO 14044 (ISO 2006b), which together with ISO 14040:2006 replaces other former LCA-related standards (ISO 14040:1997, ISO 14041:1999, ISO 14042:2000 and ISO 14043:2000).

For any LCA, appropriate framing of the key 'question' forms part of the definition of the goal and scope, including setting the functional units of the study.

The most well-known application of LCA is in comparing the 'total' environmental impact of a product or service with an alternative (comparable) product or service. UNEP refers to LCA as a tool to reveal 'the world behind the product' (Fava 2002). Hence, LCA is often considered a tool that provides 'the answer' to the question of which product has least environmental impact. However, LCA can reveal things other than the answer. It can also fail to reveal the answer at all, if the question is not precisely and appropriately framed.

Defining the scope involves determining the appropriate limits of the analysis. This includes identifying the entire production and disposal or recycling process of the materials and services involved in the life cycle of the product or service being studied (and any comparative product or service). The components involved in delivering the product or service should be included, as well as all inputs to those components, and the inputs to those inputs, and so on. It also includes the outputs, emissions and wastes produced at all stages of the product or service delivery – both 'pre-consumption' and 'post-consumption'. Decisions may be taken to 'truncate' the system for practical purposes, and quick estimates of impacts more distant from the

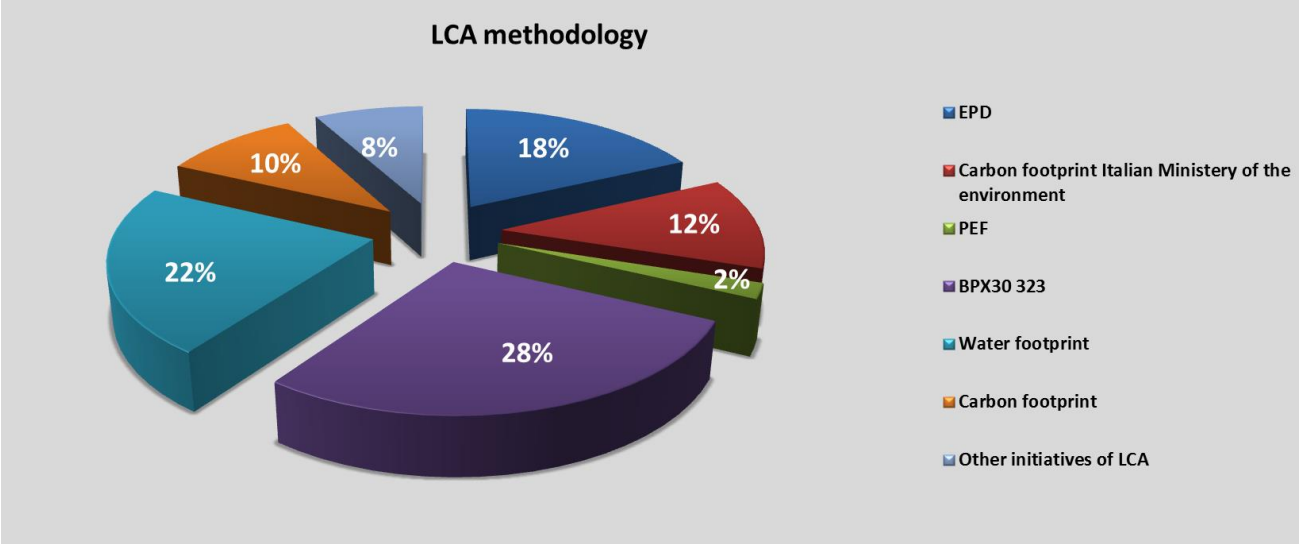
central processes may be undertaken to check that they are negligible and can be disregarded from a detailed assessment.

The resultant 'process chains' in the products or services under comparison may be significantly different.

The inventory is the result of compiling all environmental 'flows', including resource use inputs and waste or pollution outputs. This inventory provides a lower estimate of the environmental burdens that the product or service places upon the environment. However, the relative importance of these burdens requires some measure or indicator of impact. Inventory data can only be converted into impact results through the use of appropriate algorithms or indicators of environmental burden related to damage or importance. This is where primary fossil fuel energy used in delivering the product or service is converted into climate impacts, local air pollution, and so on. A range of eco-indicator and related environmental impact factors have been developed for use in LCA. However, ISO 14040 acknowledges that these must not be blindly applied to different temporal, spatial and product or service conditions. Hence, all results must be subject to reflective interpretation by an experienced LCA practitioner.

Statistical analysis of identified experiences of LCA

Considering each of the previous described schemes, a total of 50 experiences located in Europe and extra Europe countries have been analyzed. In the following graph it is represented the percentage distribution of the selected experiences for each scheme.



The experiences are related to different product categories, belonging to different economic sectors. The following graphs and tables show different kind of data elaboration.

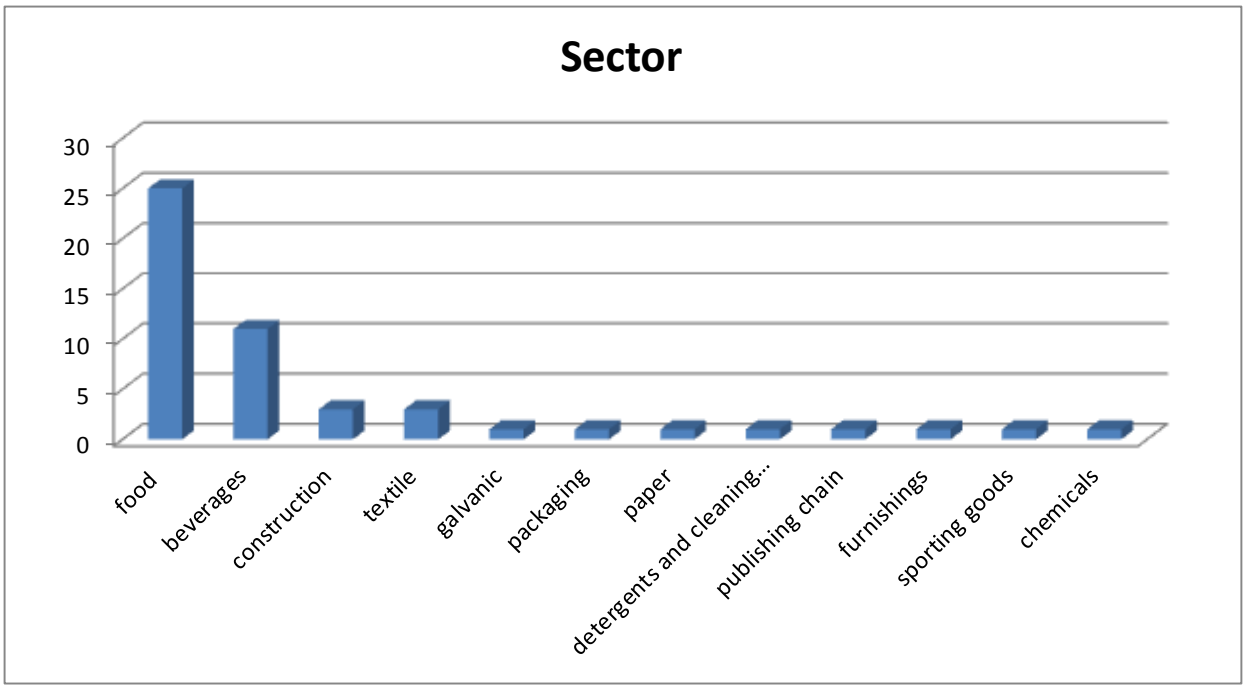
Sectors and products investigated

The analyzed experiences concern different types of products that belong to different economic sectors. The following table and related graph show the involved economic sectors.

sector	EPD	Italian Environment Ministry footprint	PEF	BPX30-323	Water footprint	Carbon footprint	Other initiatives of LCA	TOTAL
food	4	2		6*	9	2	2	**25**
beverages	1	3		3	2		2	**11**
construction	3							**3**
textile				2		1		**3**
galvanic	1							**1**

packaging		1						**1**
paper			1					**1**
detergents and cleaning products				1				**1**
publishing chain				1				**1**
furnishings						1		**1**
sporting goods				1				**1**
chemicals						1		**1**

*One of these experiences involves other economic sectors: furnishings, typography



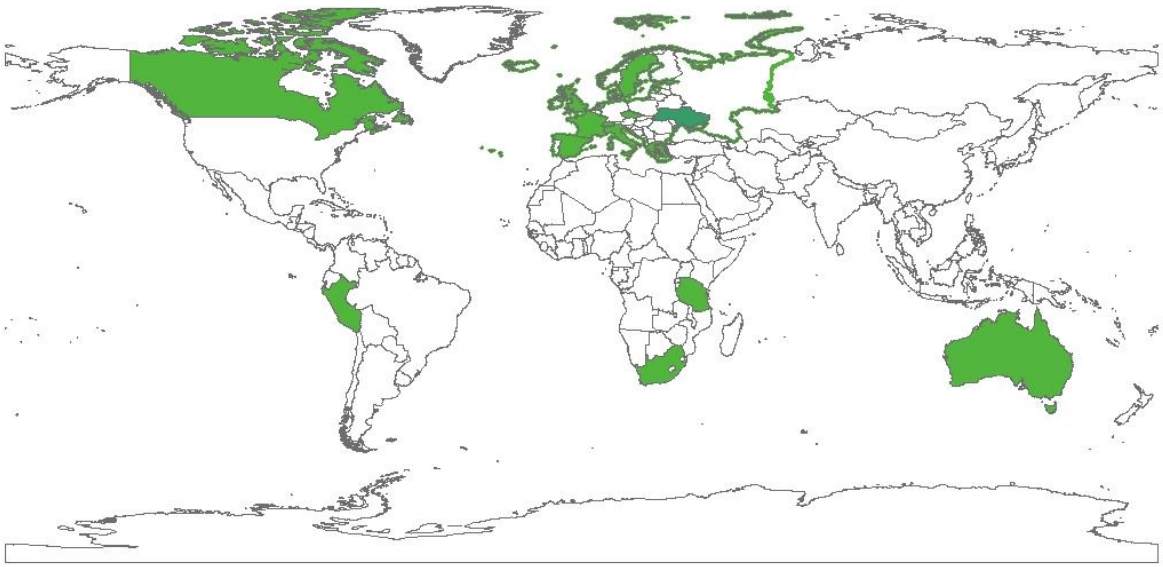
It's evident that the majority of products fall into the food (50%) and beverage (22 %) categories.

Location

The analyzed products are manufactured in several places around the world but mostly in Europe and especially in Italy. The following table and map show the location of the 50 initiatives. In some cases the place is not specified because the sites of production involved more than one country of Europe.

Location	EPD	Italian Environment Ministry footprint	PEF	BPX30-323	Water footprint	Carbon footprint	Other initiatives of LCA	TOTAL
Australia					2			**2**
Canada							1	**1**
Czech Republic					1*			**1**
France				14				**14**
Greece	2							**2**
Italy	5		6		4	3	1	**19**
Oland					3			**3**
Spain							1	**1**
Sweden						1		**1**
Switzerland							1	**1**
United Kingdom					1			**1**
Europe	2	1				1		**4**

*This product is produced in other countries around the world: Peru, South Africa, Tanzania and Ukraine



Type of application

The analyzed initiatives are mostly characterized by a cluster approach that can be understood in different ways: territorial cluster, group of companies, average product, sector cluster, chain cluster. In some cases it's no possible to define a cluster approach because the experience concerns only a big company. In the following table is shown the distribution of the experiences. It should be stated that in some cases the experiences fall into more types of application; to outline, in the table every experience is associated to the prevailing one.

Type of application	EPD	Italian Environment Ministry footprint	PEF	BPX30-323	Water footprint	Carbon footprint	Other initiatives of LCA	TOTAL
territorial cluster	3			3	1	3*	1	**11**
group of companies	2	5*					1	**8**
average product	2				2		2	**6**
sector cluster	2		1	7		1		**11**

chain cluster				4				**4**
no cluster		1			8	1		**10**

*some experiences fall into more types of application

The territorial and the sector cluster are the most frequent application (22%) among the analyzed experiences.

Boundaries of system

Usually an LCA study is related to the entire life cycle of the product from the cradle to the grave i.e. from raw material extraction to product disposal of the product. But the system boundaries of the LCA may include the entire cycle or part of it. The following table presents the process phases considered for each of the 50 analyzed experiences, divided for the associated scheme.

Phase	EPD	Italian Environment Ministry footprint	PEF	BPX30-323	Water footprint	Carbon footprint	Other initiatives of LCA	TOTAL
Total experience	**9**	**6**	**1**	**14**	**11**	**5**	**4**	**50**
Cradle to gate (excluding packaging)	0		0	0		0	2*	**2**
Cradle to gate (including packaging)	2		1	0	5	1	0	**9**
Cradle to distribution	3	1	0	0	1	0	2	**7**
Cradle to use	1	2	0	0	5*	1	0	**9**
Cradle to grave	3*	3*	0	14	0	3*	0	**23**

(*some phases of the path are not included)

In many cases (46%) all phases of the life cycle of products were considered.

Environmental impact categories

For each analyzed scheme, specific indicators are defined to assess the environmental impact. In some analyzed experiences more impact categories than the ones foreseen by the scheme are considered. The following table is a summary of the impacts and the indicators used for each scheme.

LCA scheme	Specific and added impacts
EPD	Global warming potential Emission of ozone depleting gases Acidification gases Creation of ground level ozone Eutrophication Use of resources Waste production
Italian Environment Ministry footprint	Global warming potential Water consumption Land use Socio economic impact
PEF	Climate Change Ozone depletion Ecotoxicity Human toxicity (cancer and non-cancer effects) Particulate matter Ionising radiation Photochemical ozone formation Acidification Eutrophication (terrestrial and acquatic) Resource depletion (water and mineral, fossil and renewable) Land use
BPX30-323	GHG emissions Water Consumption Water Ecotoxicity Eutrophication Raw material Consumption Water Footrpint Biodiversity Footprint Soil acidification Water Pollution Ecotoxicity Acidification Potential
Water footprint	Water footprint "blue" is the volume of freshwater withdrawn from the natural cycle for domestic, industrial or agricultural Water footprint "green" is the volume of rain water transpired by plants during cultivation

	Water footprint "grey" is the volume of polluted water, quantified as the volume of water required to dilute pollutants to point that the quality of water lathes above quality standards
Carbon footprint	Global Warming Potential Water footprint Resource efficiency
Other initiatives of LCA	Consumption of water resources Energy consumption Global warming potential Acidification Eutrophication Abiotic resource depletion potential (ARDP) Stratospheric ozone depletion potential (ODP) Aquatic eco toxicity potential (AETP) Terrestrial eco-toxicity potential (TETP) Photo-oxidant formation potential (POP) Cumulative energy demand (CED) Ozone depletion Human toxicity

The impacts most frequently considered within the schemes are: resources consumption (i.e. water, energy, etc.), eco toxicity and global warming potential.

3. Study cases

Among the 50 initiatives analyzed in the preliminary phase of the overview, 9 experiences have been selected for further in-depth analysis.
These study cases have been selected on the bases of the presence of one or more of the following elements:

1) LCA applied to group of enterprises
2) LCA applied to average products
3) LCA applied to territorial cluster
4) LCA applied to a sector
5) LCA applied to typical products

Every selected case represents a settled initiative, so it has been possible to define benefits and results of the LCA application.
Selected case studies are showed in the following chart.

study case	scheme	sector	product	type of approach	n° firms or plants
Italian apples	epd	agrifood	apple	typical product, territorial cluster	45
European bitumen industry	epd	bitumen	waterproofing bitumen	sectorial	42
European galvanic industry	epd	galvanic	steel manufacturing	sectorial	46
VIVA	Italian environmental footprint protocol	agrifood	wine	typical product, group of enterprises	9
Buzzi Unicem	epd	building	cement	average product	13
Cantina sociale Morellino of Scansano	Italian environmental footprint protocol	beverage	wine	group of enterprises	140
Coop mineral water	epd	beverage	water	average product	5
Green label Acimit	carbon footprint	textile	textile machinery	sectorial	300
Greek oil	epd	agrifood	olive oil	group of enterprises, typical product	68

For every initiative indicated above a detailed form has been detailed. The form contains the following information:

- Territorial/sectorial policy
- Technical aspects in data elaboration and in average product LCA study
- Follow up of the initiative

The forms are reported in the following pages.

Environmental Product Declaration of Italian apples

Territorial/Sectorial Policy
The initiative is coordinated by Assomela, the Association of Italian apple producers. The association represents 80% of Italian apple production. The association is composed by 10 Producer Organizations (POs), that represent thousands of farmers. The first EPD was strongly characterized by a cluster approach. That EPD was referred to Trentino Alto Adige Region apple production. The 2013 version is extended to other regions and represents 80% of Italian apple production. This version is more characterized by an average product LCA approach. The origin of the initiative is related to external input (costumers). Members of the association were interested in a tool able to give good imagine and marketing value through the environmental qualification. Assomela proposed the Product Environmental Declaration and members approved the solution. The data collection involved the Producer Organizations. Every PO selected a reference person to follow the data collection, coordinated by Assomela. Every PO selected a Quality Responsible as right function to follow the data collection phase. The use of EPD has been mainly by the Producer Organizations, that are the owners of the EPD. It's a support tool for POs in territorial marketing and cluster policy. A potential use of the EPD identified by Assomela is also towards the Public Authorities. The EPD could be used for territorial valorization. The unmodified LCA results of average product are used by the POs because the differences of production among POS are little. Moreover, the appeal of an average product study, participated by a so high rate (80%) of producers, is considered bigger than a single producer study. Other possible use of the EPD by the association is related to public conferences, but every use of EPD has to be decided by Assomela members.
Technical aspects in data elaboration and in average product LCA study
The duration of the study (from data collection to EPD publication) is about 6-7 months. Involved subjects are: Assomela, 8 producer organizations, farmers, consultant. The Environmental Product Declaration was performed by 8 of the 10 POs associated in Assomela which represent almost 99% of total production of the association. The analyzed apples belong to different varieties but differences in the environmental impacts are not significative. For this reason, the resulting impact can be considered to be referring to an "average apple". The presented informations refer to eight of the ten Producer Organizations associated to Assomela, operating in the regions of Trentino Alto Adige, Piedmont and Veneto. Since the goal of the declaration is to provide information typical of the whole association, the data have been processed in a way that allows to create different averages between the organizations that participate to the project, using weight factors calculated on the basis of production volumes. General system boundaries are the following: Upstream: land use change, input production

Core: field phase, packaging, storage
Downstream: transportation, use, end of life
The apples subject of the declaration are intended for direct consumption.
Three kinds of packaging have been taken into account: unpacked, apples in plastic material sack containing 2 kg of product, a polystyrene tray with 6 apples.
For the end of life scenario, three kind of packaging management have been considered: landfill, energy recovery, recycle.
The nursery phase has not been considered since the average orchard duration may exceed 25 years and thus the impacts of this phase can be considered negligible. This aspect is coherent according to the PCRs (PCR UN CPC 013 FRUITS AND NUTS, date 23-08-2012).
The impacts referred to the transportation phase have been calculated by supposing a transport of 850 km by truck and 250 km by ship, because in addition to the Italian and European markets, the distribution also concerned overseas, Asian and North African markets.

Follow up of the initiative

The apple producers association selected the EPD system as way to endorse the average product LCA study. The acknowledgment is referred to a group of enterprises.
Assomela believes that, in future, an analysis of conformity among the apple EPD and the PEF requirements will be useful.
The Italian apple producers are interested to keep a dialogue with European Commission and are sensitive to European policies. It's important to carry out activities coordinated with European Commission policies.
Assomela is interested in a future aknowledgement of PEF by the European Commission, but not in a simplified PEF pattern for the enterprises involved in an average product PEF study. This position is referred specifically to the apple production. In fact, as said in previous sections, the average product LCA study is considered more appealing than the single one, that is considered unnecessary.

Environmental Product Declaration of European waterproofing bitumen

Territorial/Sectorial Policy
The initiative is coordinated by Bitumen Waterproofing Association (BWA), the European Association of Bitumen Producers. For the study, 42 companies of ten European Countries have been involved (companies forma Italy, France, Germany, Spain, Netherlands, Belgium, Finland, Norway, Denmark and Sweden). A first EPD has been developed in 2000. The study has been updated in 2013. Involved companies are the most representatives of importance within the involved countries. The initiative has been promoted by the BWA. A cluster approach has been used in order to valorize a similar products and processes among the European producers, moreover the common approach help the companies to communicate the same information about the environmental performance of the product and to train the personnel about environmental tasks. The companies have been involved through territorial cluster (one for each Country) and the activities have been developed by a working groups (with regularly meetings). The data collection has been made through a webpage. Each company filled in a questionnaire in the webpage. The average data could be used by companies as benchmarking. Advantages of the case study have been the economy of scale, that's it, a reduction of costs about the data collection and data elaboration, moreover, a higher appeal to present a state of the art of the whole sector instead of the state of the art of a single company. Difficulties are related to the long time to obtain and elaborate the data.
Technical aspects in data elaboration and in average product LCA study
Involved subjects are: BWA, 42 producers from 10 territorial clusters (Countries), consultants. There are not important differences among the companies because the processes and used technologies are very similar. 6 different application of bitumen systems have been identified in order to develop the EPD study. The systems consider layers and thickness of the application. Used database was Ecoinvent and the software was SimaPro. The considered shelf life is: 90 years after application. And the end of life scenario considers a European scenario: landfill 68%, incineration 24%, recycling 85%. Distribution phase considers 50 km. The PCR is under consultation and approbation (to update it with new rules of General program Instructions of EPD). Non CPC is used. Name of PCR: BITUMEN, PLASTIC AND RUBBER FLEXIBLE SHEETS FOR ROOF WATERPROOFING. For the installation, use and end of life stages are considered indications of the rule EN 15804
Follow up of the initiative
BWA is not interested to adapt the initiative to the PEF methodology.

Environmental Product Declaration of Galvanic European industry

Territorial/Sectorial Policy
The European galvanic industry LCA (Life Cycle Assessment) was part of a wider project started in 2005. The project aims at defining an eco-marketing strategy for the galvanic industry. IZA (International Zinc Association) and EGGA (European General Galvanizers Association) promoted and supported this project. Following the main project objectives: • Realize a market research to identify the niches for the promotion of the environmental benefits coming from the galvanic processes • Identify the characteristics and environmental benefits associated with the galvanic industry to be included in the eco-marketing strategy • identify hotspots in the production processes and gain improvement in a life cycle perspective Italian consultants (LCE) collected data at European level. For the collection of data the national associations played a fundamental role. The project involved eight national associations and 46 European firms. For the collection of specific data, a specific questionnaire was prepared and sent to the firms through the national association. EGGA and LCE processed the collected data. Then the average result was sent to firms. The average results were used for communication purposes. The results for the single firms were not communicated in order not to stimulate competitiveness and direct benchmarking among firms. The future objectives of the project are to gain the environmental improvement of each enterprise. EGGA, supported by LCE, identifies the environmental hotspots of each company providing its data and technical information. EGGA communicated the certain percentage on companies environmental impact comes from energy use or waste water treatment, and other. From the LCA studies emerge suggestions for the companies to improve their production process and reduce the environmental impact. Some companies have also their own LCA (e.g. in Italy) but they were realized independently from the sectorial LCA. There is an intersection between the action carried on by EGGA and the single enterprises for the realization of the PCR in the Environdec system. The galvanic industry decided to start this project at a sectorial level because it wanted to promote the sector, not stimulate competitiveness or benchmarking among firms in the same sector. In addition, in the sectorial EPD, in order to explain the relevance of a sectorial study, is reported that the hot-dip galvanizing is a service for the protection of metals from corrosion processes and it could be granted by a variety of firms that are not identifiable when the project is prepared (for example in the building sector). The sectorial EPD could help in the identification of the product or the process without referring directly to a particular supplier. A singular EPD could be less useful for this kind of use if compared to a sectorial EPD, since the first is specific for a certain supplier. The first draft of the PCR “corrosion protection of fabricated steel products” was developed in 2006 and was only for single EPDs. It was reviewed in 2011 and, thanks to the experience made with the sectorial LCA, a paragraph for sectorial EPD was added.
Technical aspects in data elaboration and in average product LCA study
According to EGGA, the sample used in the sectorial LCA must reflect the real average processes and

products of the sector, niche productions or particular processes shall be excluded from the study. The sample representativeness should be evaluated according to:

- Number of companies involved and estimation of the total number in the sector
- Total production of companies involved and estimation of the total production in the sector
- Consideration concerning the set of technologies/process included and the type of production to which the sector EPD would be relevant.
- Geographical coverage of the sample

In the study done in 2005, the system boundaries chosen were cradle to gate. The use phase and the end of life were out of the system boundaries.

Some specific information on technical aspects are given below:

- Recycling credits associated with the downstream module shall be provided separately and not integrated into the overall environmental performance or into standard results
- Infrastructures, capital goods and building are out of the system boundaries
- Activities and travels of the personnel are not included in the system boundaries
- Waste treatment is excluded when the waste undergoes a treatment that it will transform the waste in a resource for another use

Some output from the system cannot be considered waste but by products because they have an economic value In these cases, a mass allocation shall be used. Economic allocation is not allowed.

Follow up of the initiative

EGGA is considering the PEF methodology and is following the PEF pilots carried by the European Commission. According to EGGA, there is a problem for the adoption of the PEF methodology for products that are used in the building sector: the PEF methodology needs to be compliant with EN 15804 (environmental product declaration for the building sector). The PEF is not compliant and the building sector is an important market for the galvanic industry.
EGGA is still working with the enterprises for the realization of an updated sectorial LCA at European level with the aim of realizing a sectorial EPD that can be certified by the EPD system, Environdec. The first sectorial LCA realized by EGGA at European level in 2006 was not certified by the Environdec system since the old PCR has not any requirements for sectorial LCA. After this first experience, EGGA collaborated in order to modify the PCR and introduced a specific paragraph for the realization of sectorial LCA.

VIVA's Sustainable wine

Territorial/Sectorial Policy
The Ministry for the Environment, Land and Sea launched on July 2011 a National pilot project for the evaluation of the sustainability of vine-wine supply chain, throughout the calculation of water footprint, carbon footprint and two new indexes. Nine large Italian viticulture companies (F.lli Gancia & Co, Masi Agricola, Marchesi Antinori, Mastroberardino, Michele Chiarlo, Castello Montevibiano Vecchio, Planeta, Tasca d'Almerita e Venica&Venica) and three research institutions (Agroinnova, Competence Centre of Università di Torino, Research Centre Commitment for sustainable agriculture Università Cattolica del Sacro Cuore, Biomasses Research Centre of Università degli Studi di Perugia) are partners of the ministry on VIVA project. The three-year project will enable to add value to the Italian wine, making it a "flagship product" of sustainable development in Italy and worldwide. VIVA Sustainable Wine is a national pilot project to measure the sustainability performance of the supply chain vine-wine, from the calculation of the water footprint and carbon footprint of products and companies. The cooperative approach adopted allowed to the partner companies to give their contribution in defining the indicators and in the critical issues identification concerning the application of the analysis tools. The Ministry selected the wine productive chain for its relevance in the Italian Economy. The project idea started by a company. Starting from the company suggestion the Ministry structured and coordinated the VIVA project involving other wine producers and "Federvini", the sector trade organization. The project interested the main Italian territories for the wine production. The Ministry tried to build a nationally representative companies sample, diversified in size and territory relevance, production techniques and involvement in the vineyard management. There is a Management committee to take the main decisions for the project development. The technical partner and the Ministry are part of committed. VIVA's sustainable wine started in 2011. The choice of products was also left to the companies according to their marketing needs. The Ministry only suggested some products to focus the project action and the LCA (Life cycle assessment): red and wine wine and sparkling wine. The goals of this project are: • to establish a database allowing to track the current situation of the Italian viticulture with regard to eco-sustainability (starting from the analysis of sample companies representing the national situation); • to define guidelines for a sustainable production taking into account the indications of the European Union and other institutions such as O.I.V; • to develop a sustainability code allowing the certification for those companies that follow the guidelines proposed by the Italian Ministry for the Environment; • to provide an easy-to-use software, able to assess the vineyard management environmental performance, based on indicators that include social, economic and environmental aspects;

- to train technicians able to implement the proposed sustainability protocols in the wineries;
- to bring the project results to the consumer's attention, both at national and international level.

The companies involving in the project can use the VIVA's label that presents the values associated to each indicator.

Technical aspects in data elaboration and in average product LCA study

The following indicators are gathered in a complex toolbox, characterized by a guided data input procedure and an instantaneous result visualization. This support tool allows the winemakers to quantify the impact on the environment in order to monitoring the different production phases and to support effective strategies to reduce emissions.

The "Air" indicator evaluates the total greenhouse gas emissions, directly and indirectly related to the life cycle of a wine bottle (0.75 l). In accordance with the Kyoto Protocol, the greenhouse gases that should be included are: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), sulphur hexafluoride (SF6) and perfluorocarbons (PFCs).
The life cycle of the wine bottle includes four major phases: vineyard management; transformation of grapes into wine and bottling; distribution of bottles; refrigeration and disposal of glass (called respectively the vineyard, wine cellar, distribution and consumption).

The water footprint is an explicit indicator of the fresh water consumption in the vineyard and in the cellar related to the wine production . This indicator reveals the total volume of fresh water, consumed (evaporated or incorporated into a product) and polluted for the production of one wine bottle (0, 75 l).

Other two indicators are: the "vineyard" on the activities management and the "territory" concerning the landscape, biodiversity, local communities, and the economic impact on the territory and on the local communities.
The four indicators are assessed for each company involving in the project.
The data collection is the project phase more complex and time consuming. The Ministry and the technical partners carried out a sensitivity survey of the carbon footprint indicators. For other indicators the collected data were only primary. An independent external partner verified the accuracy of the data with random method.
The uncertainty analysis was performed for all data processed to calculate the carbon footprint. The data quality is based on the following parameters: reliability, completeness, representativeness temporal geographic representation, technological representativeness.
The "Use" and "End of life" phases were included in the various scenarios and considered for the carbon and water footprint.
The LCA study not included the machinery impact but considered the periodic maintenance activities. The final distribution impact was quantified taking into account the distance from all the regions and countries with the final destinations, the type of vehicle used, the weight carried, for every destination and for every type of vehicle.

Follow up of the initiative

A disciplinary will emerge from the project (in progress); it introduces the tested methodology and the details on the indicators. The disciplinary allows to other wine producers to implement the methodology tested by ViVA project and to create other environmental footprint. The companies interested in the VIVA's methodology should sign an agreement with the Ministry. So they can realize their product environmental footprint and, after the validation, adopt the VIVA label.

The Ministry is following the PEF development to assess the difference with the VIVA's methodology. The Ministry will share the VIVA's methodology with European Commission.

The Ministry recognizes the cluster approach relevance to disseminate the environmental footprint approach and especially to sensitize the consumers.

Other projects are starting focused on different productive field and involving more than 200 companies.

Environmental Product Declaration of COOP mineral water

Territorial/Sectorial Policy
The initiative is coordinated by Coop Italia, the largest retail chain of supermarket in Italy, and it is part of a broader articulation of a consumerist campaign launched by Coop in 2010 for responsible consumption of water, with particular attention to environmental aspects with a slogan "Drink water from the tap or from sources close to your territory." The decision to approach the water, first branded product, to the EPD comes from the desire for transparency towards consumers, consistent with the principles of the campaign and the definition of actions designed based on the study itself to reducing the impact environmental. With regard to the product, there are two main areas of improvement: bottle weight reduction since 2007 and reduction of transport impacts by identifying and characterizing multiple sources in order to reduce the mileage: from 2010 to 2012 increased from 2 to 5. ThE EPD is referred to the mineral water sold by Coop Italia in Italy, it is distributed in different PET bottle sizes: 0,5 litres (sparkling and natural), 1,5 litres (sparkling, natural and lightly sparkling) and 2 litres (natural) The water comes from 5 sources in Italy to minimize the need to transport in the distribution. The sources of water have been involved in the process of illustration of the project for an initial sharing of objectives. A questionnaire was then subjected to the water establishments. The questionnaire was functional in gathering the primary data of the water establishments. There was no problem for the involvement of the sources and data retrieval. The EPD results have been communicated to COOP shareholders and consumers through various communication channels: house organs, meetings and conferences. The EPD mineral water was a first experience for Coop, who recently extended to beef and veal meat. There were no particular problems, if not the initial difficulty to make it clear to suppliers the type of data necessary for the purposes of the LCA study. This difficulty has required preliminary checks on the quality of the data with the end of their homogenization. The main advantage for Coop Italia is to have precise, transparent data, that are comparable with the data of competitors that have joined the EPD system.
Technical aspects in data elaboration and in average product LCA study
The following subject were involved in the EPD study: - The Office environment belonging to the Directorate Quality - The Marketing Department, which provided the sales data of water from different sources - Quality Department, which provided the process report of the establishment - Independent external consultancy for the elaboration of primary and secondary data aimed at the LCA

study and design of the EPD report published

The calculation of the "average bottle" for each format (0.5 l for still and sparkling water, 1.5 liters of water for natural, slightly fizzy and sparkling mineral water and 2 l) was carried out using weights calculated on the basis of the volumes provided by each of the sources.

The EPD was performed using life cycle assessment methodology considering the whole process from cradle to grave according to the PCR “CPC code 24410- Bottled waters, not sweetenedor flavored.

General system boundaries are the following:
Upstream: It includes the production and the transportation of the bottle and the caps
Core: It includes the water pumping from the sources to the plant as well as the bottling phases. CO_2 production for sparkling water is also included.
Downstream: Transportation from the plants to the distribution platforms and recovery or dumping of the packaging materials.

All the information is referred to 1 litre of mineral water packed and transported to the distribution platform (declared unit).

The definition of EPD was initially based on the existing PCR. The definition of COOP mineral water EPD, however, has stimulated a change in the PCR on the aspect relating to the delivery of the filled bottles to the Distribution Center: the existing PCR predicted a fixed average distance, while COOP found that this data was not sufficiently representative (for "COOP mineral water" the data is much lower compared to a water produced from a single source and distributed throughout the territory). It was then turned on the sharing procedure that led to the modification of PCR.

To calculate the environmental impacts of transport was used operation Ecoinvent Operation, 16-32t lorry, EURO3/RER U. The average capacity of the truck is used 25 tons. A coefficient of 1.7, to multiply by the distance between the production plant and the distribution center, was used to estimate the return of the truck without load.

Follow up of the initiative

Coop has decided, following the mineral water EPD, to prepare EPD for the meat of beef and veal and to participate to the LIFE + Project Climate ChangE-R Reduction of greenhouse gases from agricultural systems of Emilia Romagna (LIFE12 ENV / IT / 000404)

Vignaioli del Morellino di Scansano wines' Carbon Footprint

Territorial/Sectorial Policy
The initiative is coordinated by "Cantina Cooperativa Vignaioli del Morellino di Scansano". Cantina, founded in 1972, is today formed by 152 members whose vineyards spread over the hills surrounding the village of Scansano, in the province of Grosseto, covering a total of about 400 hectares. The study of CARBON FOOTPRINT (CFP) was initially launched using a public grant from the Province of Grosseto. The grant has allowed to calculate the CFP and to promote it. "Cantina Cooperativa Vignaioli del Morellino di Scansano" then requested a contribution to the Italian Ministry of the Environment in order to certify the CFP. The decision to initiate a study of CFP was taken independently, no request was in fact received by customers or retailers. The products selected for the study of CFP are two labels that represent 5% of the value of production; the labels are meaningful for the large organized distribution and catering. The results obtained from the study of CFP have been used to inform and educate winemakers and to raise awareness among suppliers of other raw materials (cork, glass bottles, packaging). Cantina wants to exploit the results to have more visibility in the market and to characterize their own labels. The study will be disseminated in the summer of 2014. The main difficulty was to collect data from winegrowers by filling in a questionnaire. A useful tool to solve this difficulty has been consulting the agricultural register. Another difficulty was the identification of the average emission factors related to various substances (pesticides, fertilizers) used by different winegrowers. Substances that are homogeneous in terms of function but have different chemical components.
Technical aspects in data elaboration and in average product LCA study
The choice of farms that give the grapes to the winery was done by identifying a representative sample in terms of size variability. Were involved 12 farms that supply 20% of the total grapes to the winery. 12 farms were surveyed to collect data and information necessary for the calculation of the CFP. The system boundaries are those identified by PCR "wine of fresh grapes, except sparkling wine: grape must" and comprise the step of growing grapes, wine making, packaging, bottles distribution to logistics platforms and the end of life of the packaging material. The functional unit was 0.75 l bottle.
Follow up of the initiative
The study CFP was useful for improving the production process and to reduce inefficiencies and has had its importance regardless of the CFP certification. Increased efforts will only make sense if the market will prove to be highly interested in these aspects of environmental qualification of the product. Today, this interest is poorly perceived.

ACIMIT green label

Territorial/Sectorial Policy
The ACIMIT green label is a document that aims to identify the energy and environmental performances of textile machinery and make them easily recognizable and comprehensible, using a process designated by the manufacturer as an evaluation parameter. In the absence of an internationally recognized standard for the classification of energy and/or environmental performance levels for textile machinery, Italian machinery manufacturers are promoting an instrument whose goal is to demonstrate some key performance data for their machinery. This information can also be compared with competitors. Enhanced awareness of excellence in technology and sustainability is, in fact, an element that boosts the strength of Italian textile machinery industry, which is in the front line in order to promote sustainable solutions.
Technical aspects in data elaboration and in average product LCA study
Specifically, the quantity of equivalent emissions of carbon dioxide (Carbon Footprint - CFP) produced during the machine's operation, is the parameter that has been chosen to provide an environmental efficiency value to the machinery being labelled. Italian textile machinery manufacturers who wish to use the ACIMIT green label must comply with the "Sustainable Technologies" project by adhering to and respecting a memorandum of understanding, as well as a rigorous compliance standard defined by ACIMIT. By underwriting and complying to this standard, Italian machinery manufacturers who use the ACIMIT green label formalize in writing their commitment to respect the procedures and tests defined by the implementation regulation deliberated by ACIMIT.
Follow up of the initiative
At ITMA ASIA + CITME 2012 ACIMIT has introduced the certified version of this instrument. In fact, an international certification organism, RINA (www.rina.org), has validated the green label issuing process and the evaluations it contains. Based on a standardized and certified procedure, RINA verifies (for some manufacturers, drawn from those participating in the project every year and representing about 20% of the joined companies) both the evaluation criteria and operating conditions of the machinery being assessed for the labeling process. Other trademark labels exist in the industrial machinery sector that assign sustainability compliances to manufacturers; in actual fact, these are simply self-referenced labels of an exclusively promotional nature. They fail to provide technical criteria (i.e. measurable values) that justify the attribution of the sustainability trademark. Above all, their claims are never verified by third parties. With this further evolutionary process Italian manufacturers are able instead to provide potential customers machinery performance information that has been verified by an internationally recognized certification organism. And the road to perfecting the green label does not end here. Measuring a production process does not in itself guarantee the quality of textile products downstream from the process. This is why ACIMIT is already working to make the green label a guarantee of the final product. The road to the qualification of textile machinery is a long and arduous one, but Italian textile machinery

industry has taken its position in the front lines.
The ACIMIT Supplier of Sustainable Technologies registered trademark is the symbol that identifies Italian textile machinery manufacturers who comply with the "Sustainable Technologies" project, and thus use of the ACIMIT green label.
The "Supplier of sustainable technologies directory" section of this website lists the ACIMIT associated members adhering to the Sustainable Technologies project, also recognizable by the use of the "Supplier of Sustainable Technologies" logo attributed to them.

Environmental Product Declaration of Greek extra vergin olive oil (EVOO)

Territorial/Sectorial Policy
The initiative was coordinated by RodaxAgro Ltd (consultancy company) and involved 68 Greek olive farmers' group and union of cooperatives from Peloponnese and Crete organized in the Group of Farmers NILEAS, the Union of Cooperatives of Peza and the Union of Cooperatives of Mirabello. RodaxAgro Ltd informed the clusters about the opportunity of registering with EPD which could allow them to put a specific logo of their choice on the products, visible by the consumers. Therefore the farmers foresaw an opportunity to differentiate their own product from the competitors and to enhance their prestige ("*doing something first in the world, counts for Greek mentality*"). In all the clusters a sound environmental management system is operating since 2003. One of the EVOO cluster was a finalist for European EMAS Award some years ago. The three clusters participated in two LIFE+ projects, SAGE10 (2010-2014) and oLIVE CLIMA (2012-2017); the latter could support the carbon balance claims in the respective EPD. The LCA was developed through a cluster approach because of the large number of farmers and the coordination in product certification has been used to bind them together. The EVOO has been publicized by the International EPD system and the products marketed locally in Crete, by one of the clusters. Data were used to better understand and control the production cost and the improvements necessary in the agricultural practices in olive culture. The main difficulty highlighted is the software price; also data quality (collection & control) because time consuming.
Technical aspects in data elaboration and in average product LCA study
The data collection has been made through the environmental management system implemented by the same consultant. Three clusters were involved. In each of them 1-2 agronomists trained by RodaxAgro since the last 10 years were used for data collection. Primary data recordings was mostly produced by the farmers. In a few instances the agronomists get the data by interviewing each farmer. All data refer to each parcel of olive groves. From the production of 2011-2012 they have selected a small part of Extra Virgin Olive Oil and bottled it in 21 390 numbered packages of 0.75 litre. This EPD is valid solely for those 21 390 packages Functional Unit: 0.75 litre of extra virgin oil including packaging in colored glass bottles otherwise 1 litre functional unit is possible by multiplying performance values by 1.33. System boundaries: cradle to transport (from field to oil transportation). Use phase was not included, meanwhile end of life was included. Environmental performance is expressed according to the Product Category Rules for Virgin Olive Oil and its Fractions (PCR 21537 of the International EPD system). Calculations have been based on a Life Cycle Assessment with the help of SIMAPRO v 7.2.4 software. Three impact assessment methods have been used, i.e. primarily 'EPD (2008)' v 1.03, but also 'CML 2 Baseline 2000' v 2.05 for abiotic depletion & ecotoxicity and lastly 'Ecological footprint' v 1.01.

Time requirement for LCA studies was about a year for EVOO (first attempt, ever).
Data collection is subject to a strict quality system with three levels of control for mistakes, omissions and outliers. In this respect there has been no sampling (all data were used), hence no need for statistical analysis. Data represent 100% of the populations of respective units (olive groves).
There are few differences due to the process or the technology (2 o 3 phase olive oil mills). So the main differences are in the field-part of olive oil production. Main factors are geography (soil, precipitation), cultivar and year of production but above all external factors which can influence yield (e.g. drought in autumn).

Follow up of the initiative

All packages of olive oil will bear the mark shown below, either as a sticker on the bottle or as a hanging leaflet. Alternatively, will be used the option to have a more expanded text in a 2-3 page leaflet stuck on the bottle.

The three groups have been certified in accordance with the ISO 14001, one of them registered with the EMAS.

They plan to adapt their initiative to the new European methodology (PEF) even thanks to the new Common Agricultural Policy regarding this tools.

According to the consultant, the calculation of carbon balance was a challenge. Instead, they totally disagree agree with the possibility of a simplified PEF pattern for the enterprises involved in a cluster product PEF study because an accurate knowledge of current situation is an absolute pre-requisite for LCA. They justify simplification only for the less significant aspects of the study.

Environmental Product Declaration of Buzzi Unicem cement

Territorial/Sectorial Policy
In 2003 Buzzi Unicem (an Italian Company producing cement and aggregates) was involved in the Life "INTEND" Project , which had the aim to implement an international EPD system. The reason why Buzzi Unicem decided to test the EPD was the growing attention toward the product impact, as a result of the EU Communication on the Integrated Product Policy (IPP). INTEND Definition of an EPD system that can be applied at international level and its implementation in two pilot countries (Sweden and Italy) LIFE03 ENV/IT/000324 The project objectives consist of: – defining and testing an Environmental Product Declaration (EPD) system, according to ISO14025, that can be applied at an international level; – defining the EPD international framework by the identification of coordination and harmonization rules among national schemes; – providing the Member States and adhesion countries with the opportunity and tools to cooperate in the implementation of an international system composed of national sub-systems; – disseminating the knowledge of TYPE III Environmental Claims and educating technicians. A wider objective of the project is to increase knowledge and awareness about the environmental aspects of products (goods and services).
Technical aspects in data elaboration and in average product LCA study
In 2012, the life cycle study was extended to all the cement produced in Italy. The results of this study were eventually reported in the EPD for Buzzi Unicem cement and certified by ICMQ (certificate 12009EPD) in June, 2012. This study on cement will allows the company to conduct the life cycle study of any concrete - specific for any work site - produced using verified and certified cement. In accordance with UNI EN 197/1, the document reports 16 environmental performance indicators for each cement, including: • Greenhouse gas emissions; • Water consumptions; • Recycled content. Experts are paying more and more attention to these specific indicators, to the extent that they are often represented separately by symbols, such as Carbon Footprint, Water Footprint and Recycled.
Follow up of the initiative
The first EPD developed by Buzzi Unicem SpA was related to the average cement produced inside the

Vernasca Plant (PC) and to the average beton coming from the concrete Santena (TO) Plant, in order to cover the entire production cycle, from the extraction of raw materials in its own quarries, to the cement production and the manufacture and marketing of the ready-mixed beton.

The choice of the Vernasca site is mainly due to the presence of an ISO 14001 environmental management system certified and more mature than those of the other sites.

In order to achieve the LCA and to publish the EPDs, Buzzi Unicem decided to promote the creation, the sharing and the distribution of the Product Category Rules through meetings both at national and international level with the professional associations.

After the first experience, it was decided to widen the spectrum of products subject to investigation by the central EAS service, also thanks to the use of central management software.

The data collection work has been arranged and managed by the central EAS service (Ecology, Environment, Safety) which submitted the request data to the Production Units on the national territory. Even the phase of the results analysis was carried out at central level.

Having one multisite Organization for a single product, even if with changes in the recipe, has facilitated this choice.

Since 2011 Buzzi Unicem decided to expand the EPD implementation to all cements (51) produced in all cement Plants (13) of the Italian Group. Besides, Buzzi Unicem worked closely with the Italian Trade Association (AITEC) for the implementation of the sector EPD, certified in late 2013, able to provide for all its members as well as for the potential customers, the environmental impacts of each type of cement.

The evolution of the Buzzi Unicem commitment towards the EPD is mainly due to the development of protocols for the buildings construction such as LEED and ITHACA, that have increased the interest in the environmental product certifications.

Considerations about the selected study cases

The second part of the overview was aimed to an in-depth analysis of 9 cases of excellence for the application of a cluster approach in the Life Cycle Assessment.
All the cases are characterized by an official acknowledgment:

- 6 Environmental Product Declarations
- 3 acknowledgment by Italian European Ministry
- 1 sectorial certification

Totally, enterprises involved by the LCA studies have been more than 650.
Main objectives that pushed the enterprises and their associations to carry out LCA at cluster level are different considering the diversity of productive sectors.
Frequently the underlined aim emerged from the interviews is connected with a marketing qualification or a sector promotion, but in some cases, a cluster approach has been a mean to foster enterprises of the same sector to improve their environmental performances. In these cases, the LCA study has been very useful for benchmarking use.
The main tackled difficulties are related to the data collection. The data collection is time expensive and the coordination of a high number of people and productive sites make the process more complex. Operative solutions adopted have been: centralized management of data collection, web platform launch, training among companies representatives.
A main question for an LCA applied with a cluster approach is the representativeness of the sample. In the analyzed study cases, the used criteria for the selection of enterprises have been:

- number of involved companies in relation to the total number of companies in the cluster
- dimension of involved companies in terms of production, workers and sales volume
- used technologies
- geographical coverage.

In some cases, the LCA study involved more than the 80% of cluster companies.
A section of the questionnaire was dedicated to the opinions of case study reference persons on PEF.
Two of them are not interested in PEF.
Five study cases judged positively a future acknowledgement of PEF by the European Commission and three of them considered useful a simplified path for SMEs based on a cluster approach.

Annexes

1. chart of EPD analyzed initiatives
2. chart of BPX30-323 analyzed initiatives
3. chart of Water footprint analyzed initiatives
4. chart of Carbon footprint analyzed initiatives
5. chart of Italian Ministry of Environment protocol analyzed initiatives
6. chart of PEF analyzed initiatives
7. chart of other initiatives of LCA analyzed initiatives
8. questionnaire format for study cases interview

1. chart of EPD analyzed initiatives

Information	trentino alto adige apples	greek oil	Puglia Region oil	greek kiwi	coop mineral water
scheme/methodology	EPD (ISO14025)	EPD (ISO14025)	EPD (ISO14025)	EPD (ISO14025)	EPD (ISO14025)
sector	Agri-food	agricultural and food (agroindustrial)	agricultural and food (agroindustrial)	agricultural and food (agroindustrial)	Beverages
type of application	typical product, territorial cluster	typical product, group of farmers (small group of olive growers)	typical product, territorial cluster	group of companies, territorial cluster	average product
scheme manager (if exists)	Swedish Environmental Management Council	Swedish Environmental Management Council	Swedish Environmental Management Council	Swedish Environmental Management Council	Swedish Environmental Management Council
location	Italy	Greece	Italy	Greece	Italy
year and project duration	2011 - 2012 production of apples	2011 -2012 production olives	2010-2011	2010-2011	2012
type of enterprises	apples growers	olive growers and oil producers	olive farms	kiwi growers	Supermarket
number of enterprises	4 organisations with 13.250 producers	68 Greek olive growers from Peloponnese and Crete	63 farms located in Puglia (Bari and Andria) that supply two cooperatives equipped with mill for pressing the olives.	99 growers from Pieria Prefecture located at Municapal department of Karitsa in the Municipality of Dion	1 company of supermarkets (5 water springs)
involved actors	Assomela, Organisations of producers, cooperatives	farmers' group and union of cooperatives	farms and two coopertives: 63 olive farms of the OASI / ASSOPROLI BARI supply the "Riforma Fondiaria" Cooperative of Andria and the "Elaiopolio della Riforma Fondiaria" Cooperative of Ruvo. All these farms are located in both of these municipalities and other neighbouring areas.	producers' organitation composed of 99 growers. The organitation is vertical which grows, collect, maintains, packs and exports fresh products	COOP Italia and 5 producers of spring water
functional unit	1 kg of apples (not packaged)	0.75 litre of extra virgin oil including packaging in colored glass bottles otherwise 1 litre functional unit is possible by multiplying performance values by 1.33	a litre of extra virgin olive oil packaged in glass bottles of 0.5 liters appropriately labelled	1 kg of kiwifruit (inclusive of peel)	1 litre of bottled water (delivered to distribution plattform)
system boundaries	Cradle to transport (scut-off consumption and end of life)	cradle to transport (from field to oil transportation)	cradle to grave (from cultivation to consumption)	cradle to grave (cut off waste treatment in the core process)	cradle to grave (Cut off distribution and use phase).
phases of product's life	field work, storage, packaging and distribution	*upstream process* : field *core process:* processing and packging *downstream process* : transportation	*upstream process* : cultivation *core process* : milling, packging, storage *downstream process* : distribution, consumption	*upstream process* : production agrochemicals, production elecrticity and fuel used at the farm, packhouse and storage, including coolstore *core process* : field operations, kiwi fruit packing and storage, fruit transportation from field *downstream process* : transportation delivery, use phase, waste mamagement	Packaging production, water production, bottling, CO2 production for sparkling water, trasnport to distribution plattform, end of life of packaging.
indicators	GWP, ODP, AP, EP, POCP, ADP, use of renewable primary energy [MJ], use of non renewable primary energy [MJ], use of secondary material [kg], use of secondary fuels [kg], water consumption [m3], hazardous waste disposed [kg], non hazardous waste disposed [kg]	use of renewable and non renewable material[kg], use of renewable and non renewable energy [MJ eq] , use of elecrticity [MJ] , use of water [m3] GWP100 [kg CO2eq] ODP [kg CFC 11-eq] AP, [kg SO2 eq. POCP [kg C2H4eq] EP [kg PO4eq] human toxicity [kg 1,4-DB eq.] Ecotoxicity (Fresh water aquatic ecotox, Marine aquatic ecotoxicity, Terrestrial ecotoxicity) [kg 1,4-DB eq.] land use [m2a] ecological footprint, [Global m2a] emission to air [kg] others indicators (Material to recycle / other use2, Hazardous / active material Other waste, Waste for renewable energy, Toxic emissions) [kg]	use of renewable and non renewable resources for energy use [MJ] and the use of materials [kg], use of elecrticity [MJ] and water [m3], GWP100 [kg CO2eq] ODP [kg CFC 11-eq] AP, [kg SO2 eq. POCP [kg C2H4eq] EP [kg PO4 3-eq] human toxicity [kg 1,4-DB eq.] Ecotoxicity (Fresh water aquatic ecotox, Marine aquatic ecotoxicity, Terrestrial ecotoxicity) [kg 1,4-DB eq.] land use [m2a/ha] waste production (No Hazardous and Hazardous / active material, Material to recycle / other use2, Waste for renewable energy) [kg]	use of renewable and non renewable resources for energy use [MJ]and the use of materials [kg], use of elecrticity [MJ] and water [m3], GWP100 [kg CO2eq] ODP [kg CFC 11-eq] AP, [kg SO2 eq.] POCP [kg C2H4eq] EP [kg PO4 3-eq] human toxicity [kg 1,4-DB eq.] land area occupied [m2a/ha] land use change since 1990 [ha] material subject for recycling [kg]/ha waste production [kg]/ha ecological footprint [Pt]	GWP, ODP, AP, EP, POCP, ADP, use of renewable primary energy [MJ], use of non renewable primary energy [MJ], use of secondary material [kg], use of secondary fuels [kg], water consumption [m3], hazardous waste disposed [kg], non hazardous waste disposed [kg]

1. chart of EPD analyzed initiatives

Information	european galvanic industry	waterproofing bitumen european industry	cemento Buzzi Unicem	calcestruzzo Buzzi Unical
scheme/methodology	EPD (ISO14025)	EPD (ISO14025)	EPD (ISO14025)	EPD (ISO14025)
sector	Galvanic	bitumen	cement	concrete
type of application	sectoral EPD	sectoral EPD	average product	average product
scheme manager (if exists)	Swedish Environmental Management Council	Swedish Environmental Management Council	Swedish Environmental Management Council	Swedish Environmental Management Council
location	Europe	Europe	Italy	Italy
year and project duration	2005	2012	2010	2006
type of enterprises	galvanic companies	bitumen producers	cement producers	concrete producers
number of enterprises	46 located in European countries	42 located in European countries	13 plants of Buzzi group, located in different italian regions	1 plant that produces 5 kinds of concretes
involved actors	European Association of Galvanic Companies and 46 companies	Bitumen Waterproofing Association and the 42 associated enterprises	plants of Buzzi Group	plants of Buzzi Group
functional unit	Galvanic work (38 micron) of a peace of iron of 39 kg, with a measure of 1m*1m*5mm, and lifetime of 59 years	1 m2 installed roof waterproofing with flexible sheets for roofing, with a reference service life of 90 years	1.000 kg of cement	1 mc of concrete
system boundaries	Cradle to gate (cut off distribution and end of life phase)	from raw materials estraction to end of life (cradle to grave)	From extraction of the raw materials to production of cement «from the cradle to the gate»	From extraction of the raw materials to distribution of ready-mix concrete «from the cradle to the gate»
phases of product's life	Iron production, zinc production and other materials, galvanic process	*Upstream proces* s: raw material extraction and processing, recycling processes for recycled material input, transport to the manufacturer *Core Process* : Manufacturing *Downstream Process* : transport to the building site, installation into the building, refurbishment (as maintenance), transport to the product's waste processing, waste processing for reuse, recovery, or recycling, recovery and/or disposal, Disposal of waste, reuse, recovery or recycling and/or recovery potentials	Estrazione materie prime e produzione correttivi Estrazione – produzione combustibili Trasporto materie prime, correttivi e combustibili Preomogeneizzazione materie prime Macinazione materie prime e produzione "farina" Omogeneizzazione e stoccaggio "farina" Cottura – produzione clinker Stoccaggio clinker Macinazione miscela clinker-correttivi – produzione cemento Stoccaggio ed insaccatura cemento	Cement production Extraction and production of inerts and production of additives Transport of ready-mix concrete constituents Constituents storage Dosage into ready-mix concrete mixer Distribution of ready-mix concrete
indicators	GWP, ODP, AP, EP, POCP, ADP, use of renewable primary energy [MJ], use of non renewable primary energy [MJ], use of secondary material [kg], use of secondary fuels [kg], water consumption [m3], hazardous waste disposed [kg], non hazardous waste disposed [kg]	GWP, ODP, AP, EP, POCP, ADP, use of renewable primary energy [MJ], use of non renewable primary energy [MJ], use of secondary material [kg], use of secondary fuels [kg], water consumption [m3], hazardous waste disposed [kg], non hazardous waste disposed [kg]	electricity consumption [kWh] non renewable resources consumption [kg] use or recovererd materials [kg] water consumption [l] hazardous waste production [kg] non hazardous waste production [kg] GWP [kg CO2eq] ODP [kg CFC 11-eq E-08] AP [kg SO2eq] POCP [kg C2H4eq] NP [kg PO4-3eq] particulate emissions [kg]	non renewable resources [kg] renewable resources [kg] water consumption [l] resources with energy content [MJ] Global warming - GWP Ozone Depletion - ODP Acidification - AP Eutrophication - NP fotochemical oxidant formation - POCP hazardous waste production [kg] non hazardous waste rpduction [kg] air emissions (particulate, NOx, SOx, CO2, CO, NH4, HCl, HF, TOC, NH3, N2O, methals)

2. chart of BPX30 analyzed initiatives

Information	AFISE (association française des industries de la détergence)	Alter-Text	Association Brasseurs de France	CCI des Landes- EuroSIMA
scheme/methodology	BP X 30-323	BP X 30-323	BP X 30-323	BP X 30-323
sector	Production of detergents and cleaning products	Textile chain	Alcoholic beverages	sports goods
type of application	sector cluster	sector cluster	sector cluster	territorial cluster
scheme manager (if exists)	AFNOR ADEME	AFNOR ADEME	AFNOR ADEME	AFNOR ADEME
location	France, Paris	France, Lyon	France, Paris	France, Mont de Marsan
year and project duration	6/6/2011 - 5/6/2012	1/7/2011- 30/6/2012	26/5/2011-25/5/2012	7/2011-7/2012
type of enterprises	Large enterprises	small and medium enterprises	Large enterprises	small and medium enterprises
number of enterprises	7	9	2	3
involved actors	AFISE trade association, Colgate-Palmolive SAS, Henkel France, Mc Bride SAS, Novamex, Procter & Gamble, Reckitt Benckiser France, Unilever production enterprises; DRC Environment for the technical consulting, Ethicity for the consumers communication.	Alter-Text trade association for the ecological and ethical management of textile chain. Bel Maille, Création Mervil SAS, Devernois, Les tissages de Charlieu, MDG SA, Promod SA, TAT, Teintures et apprêts d'Anjoux, Trouillet the involved enterprises; Cycleco for the technical consulting on LCA; (Università di Losanna. UIT Roanne, UNITEX, CCI de Roanne, Espace Textile, ITECH, IFTH, TECHTERA, depending on product analyzed)	Association Brasseurs de France trade association, Brasseries Kronenbourg e Heineken France the involved enterprises ; Bio Intelligence Service for the technical consulting.	CCI des Landes (Chamber of Commerce and Industry of Landes) the project promoter, EuroSima (European Surf Industry Manifacture Association) trade association; Cinex SAS, Green Wave SAS – NOTOX, Rip Curl Europe involved enterprises. QUANTIS for the technical consulting, HOP3 for the consumers communication.
functional unit	are defined 4 product categoryies: Powder product, Liquid diluted, Liquid concentrate, Ultra concentrated liquid; is defined, for each category, the average amount of product for	not specified	25cl of beer in a glass bottle and metal stopper	not specified
system boundaries	Cradle to Grave	Cradle to Grave	Cradle to Grave	Cradle to Grave
phases of product's life	Production of raw materials (product and packaging), transport to the production site, Production of detergent and packaging, Distribution, Use, Waste water treatment, Waste treatment of packaging .	not specified	Agricultural stage (coltivation and trasfomation of barley); Product manufacture (Brewing, Filtering, Cooking, Clarification, Fermentation); Packaging (Extraction of raw materials; primary, secondary and tertiary packaging); Transport (employed transport to site production and wast tratement phase transport are not included); Distribution (large retail chain, Pub, Bar and restourants are not included); Use (storage and use); End of Life (Final disposal and waste traetment of packaging and water).	Green Wave (Raw Materials, Production Phase, waste production treatment, Final disposal (use is not considered because too much subjective)
indicators	GHG emissions (g eq CO_2/wash a 43° e 30°); Energy Consumption (MJ/wash 43° e 30°); Water Consumption(l/lavggio); Water Ecotoxicity(Qualitative evaluation, the quntitative evaluation it's under studyng).	GHG emissions (g CO_2 /product), Water Consumption, eutrophication	GHG emissions (g CO_2/F.U.), Raw material Consumption (%)	GHG emissions (g CO_2/F.U.),Water Consumption, Raw material Consumption (litres of Oil eq), Eutrophication.

2. chart of BPX30 analyzed initiatives

Information	CCI des Landes- FRCA Aquitaine	CMA / CNIDEP / INBP	Consortium Group e CASINO, Bio Intelligence Service et ses partenaires
scheme/methodology	BP X 30-323	BP X 30-323	BP X 30-323
sector	food, agricultural	bakery, furnishings, typography	food (paste and Ready vegetables)
type of application	territorial cluster	territorial cluster	cluster chain
scheme manager (if exists)	AFNOR ADEME	AFNOR ADEME	AFNOR ADEME
location	France, Mont de Marsan	France, Nancy	France, Saint-Etienne
year and project duration	7/2011-7/2012	1/7/2011-1/7/2012	1/7/2011-1/7/2012
type of enterprises	small and medium enterprises	small and medium enterprises	Large Enterprises
number of enterprises	3	15	9
involved actors	CCI des Landes (Chamber of Commerce and Industry of Landes) the project promoter, FRCA Aquitanie (Regional Federation of Agricultural Cooperatives of Aquitania) trade association; Groupe Aqualande, Lartigue et Fils, Sikig Sica des Gaves involved enterprises. QUANTIS for the technical consulting.	Chambre de Métiers et de l'Artisanat (CMA) di: Meurthe-et-Moselle, Landes, Gironde; Région Aquitaine; L'Assemblée permanente des chambres de métiers et de l'artisanat (APCMA); Centre National d'Innovation pour le Développement durable et l'Environnement dans les Petites entreprises (CNIDEP); Institut National de la Boulangerie Pâtisserie (INBP); Union nationale de l'imprimerie et de la communication (UNIC); trade association and public institution involved in the project. Créations Desmarchelier, JCD agencement, EURL Legeron, Menuiserie Clerc (furnishings); Atlantique Offset, Groupes LIS 33 Imprimerie Sadima, Imprimerie Lagarde, Imprimerie papeterie Castay, Imprimerie Pixagram, Imprimerie sérigraphie Publitel (typography); La petite Arcillonne, Nouvelle imprimerie du bassin, Boulangerie Pâtisserie Eric Launay, Boulangerie au fournil de Jean-René, Le festival du goût (bakery) the involved enterprises. Università de La Rochelle e CMA17 for the technical consulting .	Consorzio Casino (large retail) Monoprix (large retail) e BIO Intelligence Service for the technical consulting, are the project promoters. Meralliance, Matines,le groupe Glon, Alter Eco, Les eaux minérales de Saint Amand, Saint Michel Biscuits e Fruité the involved production enterprises.
functional unit	not specified	100g of product (food)	100g of product
system boundaries	Cradle to Grave	Cradle to Grave	Cradle to Grave
phases of product's life	Aqualand (Farming, Production, Packaging, Distribution, Storage, Use, End of Life)	Food: Extraction of raw materials (ingredients) , Transport, Production and preparation phases, Extraction of raw materials (packaging), Distribution (Transport and storage), Use (storage and preparation), End of life (Packagin and product)	Food: Extraction of raw materials (ingredients) , Transport, Production and preparation phases, Extraction of raw materials (packaging), Distribution (Transport and storage), Use (storage and preparation), End of life (Packagin and product)
indicators	GHG emissions (g CO_2/F.U.), Water Footrpint (l eq/F.U.), Biodiversity Footprint (m^2 of tropical forest replaced in urban zone during one year)	GHG emissions (g CO_2/F.U.), Raw material Consumption, Material Consumption, Soil acidification, Eutrophication (g eq N/F.U)	GHG emissions (g CO_2/F.U.), Water Footprint (l eq/F.U.),Water Pollution (g eq di PO_4^{3-}).

2. chart of BPX30 analyzed initiatives

Information	Corea, Neodis Gamm vert / Invivo	Chambre Syndicale des Eaux Minérales	CCI des Landes / FRCAA	FNCG Fédération National des Corps Gras
scheme/methodology	BP X 30-323	BP X 30-323	BP X 30-323	BP X 30-323
sector	pet food	beverage-natural water	Wine	Oil seed
type of application	cluster chain	sector cluster	sector cluster with territorial value	sector cluster
scheme manager (if exists)	AFNOR ADEME	AFNOR ADEME	AFNOR ADEME	AFNOR ADEME
location	France, Paris	France, Paris	France, Mont de Marsan	France, Paris
year and project duration	1/7/2011-30/6/2012	2011-2012	1/7/2011-1/7/2012	3/2011-30/6/2012
type of enterprises	Llarge Enterprises	Llarge Enterprises	small and medium enterprises	Llarge Enterprises
number of enterprises	3	3	1	1
involved actors	Partnershipship Enterprises, SCA Corea Poitou-Charentes(raw materials suppliers), Neodis (producer), Gamm Vert (retailer) (all of them are involved with INVIVO), Union InVivo technical consulting, Bossa Verde and Incorporesano for the consumers communication.	Chambre Syndicale des Eaux Minérales project promoter, Danone Eaux France (Societé Anonymes des Eaux Minérales d'Evian), Société des Eaux Minérales de Saint Amand, Nesté Waters France involved enterprises. Ethicity and Quantis for the technical consulting.	CCI des Landes and FRCA Aquitanie (Regional Federation of Agricultural Cooperatives of Aquitania) trade associations, Château LAROSE TRINTAUDON involved enterprise. Quantis and HOP3 for the technical consulting.	FNCG, ONIDOL (l'interprofession des oléagineux), CETIOM (l'institut technique des oléagineux) trade associations and project promoters, LESIEUR (Vegetable oil) production enterprise, (Centre technique industriel des professions de corps gras) ITERG, ACèVOL (Analyse de Cycle de Vie pour les OLéagineux) for the technical consulting and ILEC consumers communication .
functional unit	Daily ration of product (350g Recommended)	1,5 l of water in a plastic bottle	Cru bourgeois Haut-Médoc (75 cl) in a glass bottle	producing and consume 100g of product by retail channels
system boundaries	Cradle to Grave	Cradle to Grave	Cradle to Grave	Cradle to Grave
phases of product's life	Food: Extraction of raw materials (ingredients) , Transport, Production and preparation phases, Extraction of raw materials (packaging), Distribution (Transport and storage), Use (storage and preparation), End of life (Packagin and product)	Extraction of raw materials (product, packaging), Bottling, Transport, Distribution, Use, End of life.	not specified	Raw materials coltivation (rapeseed, sunflower), Transport to the processing plant ; Raw materials production packaging ; Production stage (Crushing, refining and bottling); Customers use phase; End of life. Transport is included
indicators	GHG emissions (g CO_2/F.U.), Water Footprint (l eq/F.U.), Eutrophication(g eq N/F.U), Ecotoxicity (PAF/m^3 Day), Biodiversity (experimental: Potentially extinct Species/year).	GHG emissions (g CO_2/F.U.), Water Footprint (l eq/F.U.), (accaunting the local water stress), Biodiversity (under study)	GHG emissions (g CO_2/F.U.), Water Footprint (l eq/F.U.), Biodiversity	GHG emissions (g CO_2/F.U.), Water Footprint (l eq/F.U.), Biodiversity

2. chart of BPX30 analyzed initiatives

Information	Pôle Textile Alsace	SCOREDIT	Biocoop
scheme/methodology	BP X 30-323	BP X 30-323	BP X 30-323
sector	textile	publishing chain	food
type of application	sector cluster with territorial value	cluster chain	cluster chain
scheme manager (if exists)	AFNOR ADEME	AFNOR ADEME	AFNOR ADEME
location	France, Mulhouse	France, Paris	France, Paris
year and project duration	10/2010- 1/6/2012	01/07/2011 - 30/06/2012	24/6/2011-25/6/2012
type of enterprises	small and medium enterprises	small, medium and large enterprises	small and medium enterprises
number of enterprises	19	16	4
involved actors	Pole Textile Alsace, IFTH (Institut Français du textile et de l'habillement), Regional direction ADEME Alsace, Lorraine e Bourgogne, the actors involved in the project promotion ALSATEXTILE; Corderie Meyer-Sansboeuf; DHJ International; DMC SA; Freundenberg Evolon; Green Attitude Compagnie; Tissu Gisèle; Virtuose; Lingerie Wolf; Scapalsace (Leclerc); SDEDE SA; Sogecoq; Contino Technologies; Ethic and Life; Rhovyl SAS; Tissage Gérardmer Garnier-Thiébaut; Tricotage des Vosges; Dim SA; Textilot, involved enterprises.	Union Nationale de l'Imprimerie et de la Communication (UNIC), Syndicat National de l'Edition SNE, Syndicat de la Presse Magazine SPM project promoter; ALTAVIA (editor); Circle Printers (editor); Dynamique Entrepreneuriale (editor); Editis (editor); Fnac (editor); Gutenberg networks (editor); Jouve (editor); Mayence (editor advice); Prisma presse (editor); Terra Economica sas (editor), the involved enterprises who partecipated to the sperimentation; Terre vivante (editor); Joly Editions (editor); Bolloré Thin Papers (Paper mill); Magnard (editor); UPM (Paper mill); Vertaris (Paper mill) Partner enterpeises; Ecofolio (recycling organization); Terra 21 (consulence); SGS (consulence); Prisma Corporate Media (communication agency); Kaori (consulence); Bossa verde (consulence); Bio Intelligence Service (consulence) for the technical and communication consulting	Biocoop (retailer of Bio products) project promoter, Cereco; Nutitrion&Nature; Triballat Noyal the involved enterprises; Greenext for the technical consulting.
functional unit	Example: 1 pair of shoes size 42 worn 1 year; 1 sweater composed of 6 50g balls of yarn worn 80 times and washed 40 times; Production of 1 cotton/poliestere cloth 320x180 cm resistant to a hundred washes and usable for most consecutive nights;	not specified	not specified
system boundaries	Cradle to Grave	Cradle to Grave	Cradle to Grave
phases of product's life	not specified	not specified	Extraction of raw material and energy, Transport Production and Packaging, Distribution, Purchasing and transport, Use, End of life and final disposal.
indicators	GHG emissions (g CO_2/F.U.), Water Footprint (m^3 eq/F.U.) , Raw material Consumption (kg Eq Sb), Aquatic Eutrophication (kg Eq.N)	Ozone layer depletion (g eq of C2H4 RECIPE 2008);GHG emissions (g CO_2/F.U. IPCC GWP 100);Raw material Consumption (g eq di Sb CML 2011).	GHG emissions (g CO_2/F.U.); Aquatic Eutrophication(g eq PO4 3), Acidification Potential (g eq SO2).

3. chart of Water footprint analyzed initiatives

Information	Tomato Sauce	Pasta, Biscuits	Strawberry jam	Tomato Sauce Mutti	Soy beverage	Soy hamburger
scheme/methodology	Water Footprint Network	Water Footprint Network	Water Footprint Network	Water Footprint Network	Water Footprint Network	Water Footprint Network
sector	agro industry	agro industry	agri-food	agro industry	agro industry	agro industry
type of application	consumer product	consumer product	prodotto tipico, cluster territoriale	consumer product	average product	average product
scheme manager (if exists)	CSQA	Barilla CSR Impegni ambientali	CESQA Università di Padova	Mutti, with collaboration of WWF Italia e Department for Innovation in Biological Systems, agri-food and forestry of Tuscia (Viterbo) Italia	Alpro Comapny with collaboration of WWFand Water Centre of Twente	Alpro Comapny with collaboration of WWF and Water Centre of Twente
location	Italia - Emilia Romagna	Italy	Italy-Veneto	Italy	Oland	Oland
year and project duration	2012-2013	2013 -2014	2011	2011	2011	2010
type of enterprises	producers of processed tomato	food industry	agricultural companies	food industry	food industry	food industry
number of enterprises	four oproductive organizations associated with 13250 members	single company	single company	single company	single company	single company
involved actors	Consorzio Padano Ortofrutticolo (Co.Pad.Or.)	Gruppo Barilla	Rigoni di Asiago	Mutti	Alpro	Alpro
functional unit	glass bottle of 700 mll		Jar of jam of 330 gr	Glass bottle of 720 gr	1 liter soy beverage	1 soy burger of 170 gr
system boundaries	Packaging for the transport, storage, waste disposal, retail, stage use.	Packaging for the transport, storage, waste disposal, retail, stage use.	Study from cradle to gate: Crop, Dry sorting and freezing, fruit processing and preparation of jam, Crop, transport.	Packaging for the transport, storage, waste disposal, retail, stage use.	Packaging for the transport, storage, waste disposal, retail, stage use.	Packaging for the transport, storage, waste disposal, retail, stage use.
phases of product's life	cultivation, production, bottling	Phase farming, processing ingredients, food preparation, during use and storage, transportation, energy generation processes, primary and secondary packaging equipment, paper and machinery, infrastructure	Cultivation, processing, packaging and shipping.	cultivation of tomatoes, harvesting, processing establishment; packaging	Approvvigionamento; produzione;packaging	Procurement, production, packaging
indicators	water footprint "blue, green footprint; improntagrigia.	water footprint "blue, green footprint; improntagrigia.	water footprint "blue, green footprint; improntagrigia.	The water footprint "blue" is the volume of freshwater withdrawn from the natural cycle (taken from surface water and groundwater, ie rivers, lakes and groundwater aquifers) for domestic, industrial or agricultural (in the latter case, for irrigation) The water footprint "green" is the volume of rain water transpired by plants during cultivation The water footprint "gray" is the volume of polluted water, quantified as the volume of water required to dilute pollutants to point that the quality of water lathes above quality standards.	water footprint "blue, green footprint; improntagrigia.	water footprint "blue, green footprint; improntagrigia.

3. chart of Water footprint analyzed initiatives

Information	Beer	Coca Cola	Swelled cereals	Peanuts M&M's	Tomato for pasta Dolmio
scheme/methodology	Water Footprint Network	Water Footprint Network	Water Footprint Network	Pfister on WSI	Pfister on WSI
sector	beverages	beverages	agro industry	agro industry	agro industry
type of application	consumer product	consumer product	consumer product	consumer product	consumer product
scheme manager (if exists)	Company Sab Miller	Comapny Coca Cola	WFN	CSIRO	CSIRO
location	Czech Republic, Peru, South Africa, Tanzania and Ukraine	Oland	United Kingdom	Australia	Australia
year and project duration	2010	2010	2010	2009	2009
type of enterprises	beverages	Beverages	food industry	food industry	food industry
number of enterprises	single company	single company	single company	single company	single company
involved actors	Sab-Miller	Coca Cola	Nestlè	Murs Industries	Dolmio
functional unit	1 pint of beer	0,5 litri	WF level of production (industrial plant)	250 grams of peanut	575 grams of sauce
system boundaries	Packaging for the transport, storage, waste disposal, retail, stage use.	Packaging for the transport, storage, waste disposal, retail, stage use.	Packaging for the transport, storage, waste disposal, retail, stage use.	Packaging, transportation, sales, processes, disposal, primary packaging, secondary packaging.	Packaging, transportation, sales, processes, disposal, primary packaging, secondary packaging.
phases of product's life	Procurement, production, packaging	agricultural phase, processing ingredients, food preparation, during use and storage, transportation, energy generation processes, primary and secondary packaging equipment, paper and machinery, infrastructure	Phase farming, processing ingredients, food preparation, storage and use phase	Phase farming, processing ingredients, food preparation, storage and use phase	Phase farming, processing ingredients, food preparation, storage and use phase
indicators	water footprint "blue, green footprint; improntagrigia.	water footprint "blue, green footprint; improntagrigia.	water footprint "blue, green footprint; impronta grigia. The grain that enters the system (ton / year); - The amount of grain produced (tons); - The waste of grain (in% or ton); - The water used in the factory (m3); - Wastewater discharged (quantity and quality);	water footprint "blue, green footprint; improntagrigia.	water footprint "blue, green footprint; improntagrigia.

4. chart of Carbon footprint analyzed initiatives

Information	Ricerca Eupolis per Regione Lombardia	Etichetta per il Clima LEGAMBIENTE	GREEN LABEL ACIMIT
Scheme/methodology	LCA / ISO 14040	Regulations "Label for the climate" which refers to the PAS 2050.	ACIMIT Green Label based on ISO 14040, PAS 2050, GHG.
Sector	Tomato sauce production.	Various (production and services).	Textile machinery.
Type of application	Territorial cluster / Avarage product.	Product/services qualification.	Sector cluster (Italian textile machinery manufacturers).
Scheme manager (if exists)	n.d.	Legambiente	SUSTAINABLE TECHNOLOGIES PROJECT. Implementing Regulation. / RINA Certification Scheme
Location	Lombardia (Italy)	Italy.	Italy.
Year and project duration	2012	2010-2013	from 2012.
Type of enterprises	Tomato supply chain.	Various.	Italian textile machinery manufacturers
Number of enterprises	A consortium of approximately 550 farming companies; 2 processing companies.	Various.	The Italian manufacturers of textile machinery and accessories are about 300 with 12,200 employees.
Involved actors	Tomato cluster, Farming associations, Processing companies.	Tomato seedling cultivation companies; farming companies (tomato plants cultivation); Consorzio Casalasco del pomodoro s.a.c. - c/o Str. Provinciale 32 - 26036 Rivarolo del Re (CR) (for transformation and packaging).	ACIMIT/ RINA/ companies.
Functional unit	1 kg of tomato sauce.	Various.	Reference process.
System boundaries	Cradle to Grave.	Declared in the Declaration for Climate Labels.	Use
Phases of product's life	All life cycle phases of tomato sauce (packaging included, consumption excluded): tomato seedling growth, tomato cultivation and harvesting, tomato transport and sauce production, packaging materials supplying and production, packaging, distribution, packaging end-of-life.	Declared in the Declaration for Climate Labels.	Declared in the Implementing Regulation.
Indicators	carbon footprint (i.e.: global warming potential, as kg CO2e at 100 years), divided into fossil and biogenic CO2; water footprint (as cubic meters of water resources, directly or indirectly consumed duirng the life cycle), divided by sources (ocean, surface, aquifer, unspecified source) and by use (cooling, hydropower production, unspecified use); resource efficency (as resource use - renewable and non-renewable - without energy content as kg and with energy content as MJ).	GWP kg di CO2e.	GWP kg di CO2e.

4. chart of Carbon footprint analyzed initiatives

Information	LCA study of a swedish chemical industry cluster	Carbon Footprint of Costa Rican Coffee
Scheme/methodology	LCA ISO 14040 (CML 2001).	PAS 2050, IPCC 2006.
Sector	Chemical industry.	Coffee supply chain.
Type of application	Territorial cluster.	Territorial cluster / Sector cluster.
Scheme manager (if exists)	n.d.	n.d.
Location	Sweden (Stenungsund).	Costa Rica / Europe.
Year and project duration	1 year (2011).	2009/2010.
Type of enterprises	Chemical companies (chemicals, plastics, gases, fuels).	Coffee supply chain.
Number of enterprises	5 companies.	Not specified.
Involved actors	Chemical companies for the production of chemicals, plastics, gases and fuels.	Coffee supply chain companies (farms, mills, transporters, packers, distributors).
Functional unit	Total production of the system within the year 2011	1 kilogram of green coffee.
System boundaries	Cradle to gate. The manufacturing of production equipment and buildings is not included. Transportation of incoming stream to the cluster is not included.	Cradle to Grave (from farming to disposal). Are not included: materials that contribute less than 1% of the footprint; land use change emissions; carbon storage from shade trees and perennial crop; human energy inputs to process and pre-process, transport of employees to and from their normal place of work.
Phases of product's life	All life cycle activities associated with the extraction, handling and processing of raw materials and energy inputs to the cluster, and production processes within the cluster.	Farming, milling, transport, roasting, packaging, distribution, grinding and purchasing, consumption and disposal.
Indicators	GWP kg CO2e.	GWP kg di CO2e.

5. chart of Italian Ministry of Environment protocol analyzed initiatives

Information	Curti srl	Cantina sociale Morellino di Scansano	VIVA	Distretto latte Lombardo	Conserve italia	Poolpack
scheme/methodology	Carbon footprint Italian Ministery of the environment	Carbon Footprint - Italian Ministery of the environment and Water footprint	Carbon Footprint - Italian Ministery of the environment	Carbon footprint Italian Ministery of the environment	Carbon footprint Italian Ministery of the environment	Carbon Footprint - Italian Italian Ministery of the environment
sector	Agri food (rice)	Agri food (wine)	Agri-food - wine	Agri food	Agri food	Packaging
type of application	1 big company producing rice	typical product, group of farmers	typical product, group of farmers	teeritorial cluster, group of farmers	1 big company and many small companies (chain)	group of companies
scheme manager (if exists)	Italian Ministery of the environment	Italian Ministery of the environment	Italian Ministery of the environment	Italian Ministery of the environment	Italian Ministery of the environment	Italian Ministery of the environment
location	Italy,Valle lomellina (Pavia)	Italy Tuscany,Scanzano	Italy, different regions	Italy, Piedmont Lombardy, Marche	Italy -Bologna	Italy, Reggio Emilia
year and project duration	2013 on going	2013 on going (other previous experiences)	project started in 2011	2011 (1year) new project 2013	2013 on going	2013 on going
type of enterprises	Curtiriso (Euricom Group) rise producer	group of wine producers	companies and group of wine producers	milk producers and other companies	vegetalbles and fruit producers and big productive enterprise	private firms
number of enterprises	1	Cellar + 140 producers (within 20 miles) Data collection from 15 producers	9 wineries	3 Milk plants and 19 producers (only for 2011) No data for new project 2013	about 80 producers	one firms + some paper suppliers (to be identified)
involved actors	0	Province of Grosseto, COPAIM, Caseificio di Manciano	Agroinnova research centre, Agricolture research centre for Cattolica University of Sacro Cuore, Biomass Research Centre of the University of Perugia	Fondazione Politecnico di Milano ; Agricola 2000	All members of companies	Politecnico di Milano
functional unit	rice pack 1 kg ; galletta riso; rice pack 5 kg	Wine bottle 750 ml	Bottle of wine - 0.75L	Milk (1 lt) Grana padano dop (1 kg)	tomato sauce (bottle 700 ml), pear juice (brik 200 ml), mais (canned sweet corn 1kg	To be defined. Probably one unit of volume of paper bags for bakery products for GDO realised with different materials and processes
system boundaries	from cultivation (sown) to consumption	1) from the vineyard cultivation to delivery to the GDO 2) from the vineyard through to delivery to caterers	From cradle to grave	From the cultivation of feed through to the consumer	from production to disposal of packaging	From cradle to grave. To be defined which part of the distribution phase is included in the boundaries.
phases of product's life	cultivation, transportation company, processing, packaging, transport department stores, transport to the consumer, use and end of life	cultivation, transportation company, processing, packaging, transport department stores, transport to the consumer, use and end of life	vineyard management, processing grapes into wine and bottling, distribution of bottles, refrigeration and disposal of glass	cultivation and preparation of feed, breeding, milking, production, packaging, transportation, distribution, consumption	cultivation, harvesting, transportation, processing in the sinkage, transportation, sale, consumption, disposal containers	raw materials production, transport, manufacturing, distribution (to be defined exactly), end of life
indicators	Climate Change	Climate Change + water consumption	Climate Change, water, land use, socio economic indicators.	Climate Change	Climate Change	Climate Change

6. chart of PEF analyzed initiatives

Information	PEFCR carta
scheme/methodology	PEF - development of Product Category Rules pilot for the paper industry
sector	Industry - Paper (intermediate paper product)
type of application	sector cluster
scheme manager (if exists)	European Commission
location	Europe
year and project duration	2011 (6 months)
type of enterprises	
number of enterprises	
involved actors	Confederation of European Paper Industries
functional unit	Market pulp: [xx%] air dried tonne of saleable [xx] pulp grade defined at the pulp mill's gate. The mill's gate is the pulp warehouse. • Intermediate paper product: tonne of saleable [xx] paper grade with a range of grammages [from xxx to xxx g/m2] with the [xx%] moisture content defined at the paper mill's gate. The mill's gate is at the end of reel winding process of the coated or uncoated paper reel.
system boundaries	From cradle to gate
phases of product's life	Production of raw materials, transport, processing and manufacturing till the pruduction of paper/paperboard
indicators	Climate Change,Ozone depletion, ecotoxicity, human toxicity (cancer and non-cancer effects), Particulate matter, Ionising radiation,photochemical ozone formation,acidification,eutrophication (terrestrial and acquatic), resource depletion (water and mineral,fossil and renewable), land use.

7. chart of other initiatives of LCA analyzed initiatives

Informazioni	**ECONOMIC AND ENVIRONMENTAL ANALYSIS OF THE WINE BOTTLE PRODUCTION IN SPAIN BY MEANS OF LIFE CYCLE ASSESSMENT**	**Life cycle environmental impacts of wine production and consumption in Nova Scotia.**
scheme/methodology	LCA (14040	LCA - ISO 14040
sector	wine production	wine production
type of application	average product	average product
scheme manager (if exists)		
location	Spain - Aragona and La Roja regions	Nova Scotia - Canada
year and project duration	2005	2006
type of enterprises	SMEs	farms and wineries
number of enterprises	not avaiable	not avaiable
involved actors	SMEs	members of the provincial grape growers association
functional unit	wine bottle 750 ml	wine bottle 750 ml
system boundaries	from the cradle to the grave	From the cradle to the grave. Boundaries of analysis included all major material and energetic flows associated with grape growing, wine making and glass bottle production, post-winery transport to retail, consumer transport, refrigeration and bottle recycling. Farm buildings and wine-making equipment were excluded from this analysis due to lack of existing data, the assumed low attribution of these elements to a single bottle of wine(Frischknecht et al., 2007; Mattsson, 1999a), and the exclusion of these capital goods. from previous wine LCAs (Notarnicola et al., 2003). Water use, on vineyards and in wineries, was also excluded from this analysis since this flow is not measured in the wineries at this time. Field-level emissions of chemical herbicides and fungicides were excluded from the analysis due to lack of available data concerning the climatic conditions at the time of application (Hauschild, 2000; Schmidt, 2007) and in the absence of site-specific dispersion models to estimate the fate of those emissions through the air, water and soil (Milà i Canals & Polo, 2003). However, emissions related to the provision of fungicides and herbicides were quantified, as was the provision of sugar, corks, paper labels and heat shrink capsules. Following the advice of Notarnicola et al. (2003), and Ardente et al. (2006), only transport-related emissions for yeasts, filtering and clarifying agents, bacteria, enzymes and antioxidants were quantified in the wine making stage. Also following Notarnicola et al. (2003), emissions of CO2 during the fermentation of wine have been excluded, since they represent carbon that was only temporarily sequestered from the natural carbon cycle. However, emissions of VOCs, principally ethyl alcohol, that occur during wine making were included in this analysis since they have been shown to contribute substantially to wine's depletion of stratospheric ozone (Notarnicola et al., 2003). Cleaning products used in the winery were not quantified (Ardente et al., 2006). Post winery, pallets on which wine is transported were excluded, as were activities relating to the sale of wine in stores.
phases of product's life	wine growing, prduction in winery, transport	grape growing, wine making and glass bottle production, post-winery transport to retail, consumer transport, refrigeration and bottle recycling
indicators	Consumption of water resources. Energy consumption. Global warming. Acidification. Eutrophication	abiotic resource depletion potential (ARDP), acidification potential (AP), eutrophication potential (EP), global warming potential (GWP), stratospheric ozone depletion potential (ODP), aquatic ecotoxicity potential (AETP), terrestrial eco-toxicity potential (TETP), photo-oxidant formation potential (POP), and cumulative energy demand (CED).

7. chart of other initiatives of LCA analyzed initiatives

Informazioni	**Management influence on environmental impacts in an apple production system on Swiss fruit farms: Combining life cycle assessment with statistical risk assessment**	**An application of LCA as a green marketing tool for agricultural products: the case of extra-virgin olive oil in Val di Cornia**
scheme/methodology	LCA - ISO 14040	LCA - ISO 14040
sector	Apple cultivation	olive oil production
type of application	Group of Enterprises	territorial cluster
scheme manager (if exists)		Italian national Protocol QUAM
location	Eastern anc central Switzerland	Val di Cornia - Toscana
year and project duration	1997-2000	2010
type of enterprises	small enterprises	SMEs
number of enterprises	12	
involved actors	small enterprises, Swiss Federal Research station for fruit -growing	SMEs, local Authorities, local bodies, industrial associations and environmental associations
functional unit	2 Functional Units: 1 ha and total receipts	1 kg of extra-virgin olive oil
system boundaries	LCA was carried out with the systemboundary at the farm gate. Consequently the system included all activities in the orchards as well as transport of the apples to the farm and transport of materials from the farm to the orchards. Not considered were the activities at the wholesaler and retailer such as sorting, storing and packaging of the fruits.	from cradle to gate. Not considered the tree breeding and the planting stage.
phases of product's life		olive tree cultivation, olives production, milling
indicators	Energy use, Global warming potential (GWP) for 100 years, Ozone formation potential , Aquatic ecotoxicity potential and terrestrial ecotoxicity potential, Aquatic eutrophication potential and terrestrial eutrophication potential, Acidification potential	. Global warming . Ozone depletion . Acidification . Eutrophication . Abiotic depletion . Photochemical oxidation . Human toxicity . Freshwater aquatic Ecotoxicity . Marine aquatic Ecotoxicity . Terrestrial Ecotoxicity

PREFER LIFE PROJECT

CASE STUDY INTERVIEW

Contact person: _____
Organization: _____
Function: _____
Role in the LCA study: _____

SECTION 1 Territorial/Sectorial Policy

1. Overall description of the initiative

In this section insert a general description, objectives, involved sectors, main opinion, obtained results.

Specify, if possible, the promoter and coordinator of the initiative (i.e. leader company, public authority, industrial category) and the management practices of the initiative (i.e. periodic meetings, consultants who went to the companies for data collection)

2. Which reasons led to the initiative?

Describe the main reasons behind the initiative (i.e. costumers request, initiative of a group of companies, local front runners in product's sustainability tools, category associations inducements, public financing, local community awareness on environmental issues, need to communicate environmental impacts of industrial activity, public bodies promotion, incentives)

3. Why developing the LCA through a cluster approach?
Detail the main reasons why the LCA has been carried out involving a group of companies and not just the single enterprises

4. How has the product been selected?
If there are different products related to the initiative, explain the pattern that carried to the product's selection

5. How have the companies been involved?

Describe the methods of enterprises involvement aimed at: data collection, activity validation, results use, etc. Have the promoters of the initiative been spokesmen for the enterprises? Have enterprises consultants been involved? Has a survey among enterprises aimed to test their interest been carried out? Have informational meetings taken place?

6. Use of results for territorial policy

To which aim have the results been used? I.e. communication, eco-design, enterprises environmental improvement, etc.

7. Use of results by companies

Did the enterprises use the unmodified results of average product LCA for environmental communication? Did some companies use data and methods to apply LCA to their products? Has training been carried out among local companies in order to promote the adoption of LCA? Has an help desk been created?

8. Other use of results

How have the results been communicated (website, conferences, etc.)? Have other subjects asked for project's information (enterprises, research projects, public authorities, etc.)?

9. Main difficulties

Which have been the main difficulties met during the initiative (time intensiveness, software's prize, data collection, etc.)? Which other suggestions do you have beyond these difficulties?

10. Main advantages

Which are the main advantages of the LCA study? i.e. growth of competitiveness of the group of companies or the territory, increased environmental awareness of involved companies, new opportunities of marketing for the enterprises, opportunity to participate at public financed projects, creation of a cluster environmental monitoring system, etc.

SECTION 2 Technical aspects in data elaboration and in average product LCA study

1. Development of the study and job partition

Who collaborated at the realization of the study and what was its task? For how long the study lasted? Among the possible collaborators consider internal personnel, consultants, university and others; among the different phases consider at least the planning phase, data collection, software management (if used, give details on the software used), model construction, analysis and interpretation of the results. In the evaluation of the time spent for the realization of the study, consider the duration of the study in terms of months and provide an estimation of the actual working hour

2. Representativeness and design of the sample

Describe the representativeness of the sample of firms used for the average LCA, specifying which criterion/a was/were used for the evaluation of the representativeness of the sample and motivate it (eg. annual production, personnel, revenues, type of product or other). If the subject of the study is a supply chain, clarify if the representativeness of the sample has been evaluated for each single phase or for the supply chain as a whole. Give details on how the sample was built (eg. questionnaire sent to all the firms and evaluation of the representativeness of the received answers; previous identification of the firms and their subsequent involvement for the construction of the sample; other methods)

3. **Management of the differences**

How was managed the presence of possible differences at process or technology level among the firms involved in the study?

4. Data evaluation

What kind of quality evaluations have been made on the collected data? In particular, clarify if a statistical analysis has been made on the data. If yes, list the calculated parameters and describe how they were used within the study. Which kind of data has been used (average value, weighted average value, other)?

5. Use stage and end-of-life

Are the use stage and the end-of-life phase inside the system boundaries? Describe the scenarios used for the two phases and explain how they were identified. If the use stage and the end-of-life phase are outside the system boundaries, indicate if these two points have been discussed at least from a qualitative point of view describing the possible scenarios and their potential influence on the final result of the study.

6. Life cycle assessment

If available, indicate the Product Category Rules developed as a results of the LCA study. Indicate if, within the study, simplified instruments/tools for the realization of an LCA study for the individual firm have been developed (eg. in the collection of data or in the evaluation of the impacts).

7. Technical difficulties

What was the more difficult technical aspect and/or step to manage? If the interlocutor is confident with the topic, deepen at least one of the following points: choice of the allocation criterion; inclusion/exclusion of infrastructure, machineries, maintenance; collection of upstream data; inclusion/exclusion of products or activities in the inventory.

8. Specific aspects

The impact of equipments and infrastructures has been included in the study? Normal maintenance activities have been included in the study? How was estimated the transportation of raw materials, packaging materials and finished products?

SECTION 3 Follow up

1. New tools *Considering the Recommendation 179/2013 EU that established the Product Environmental Footprint (PEF), do you plan to adapt your initiative to the new methodology? Or, otherwise, to carry out a PEF based initiative on another product?*

2. Enterprises involvement *Will you keep the involvement of cluster companies for the adoption of products sustainability tools going on? If yes, how?*

Product enhancement *Have the cluster initiative taken to an official acknowledgement? If yes, what kind of acknowledgement? Is this acknowledgement related to the cluster, the average product, the promoter/coordinator of the companies group or the enterprises involved?*

3. **Do you agree with a future official acknowledgement by the European Commission on PEF elaborated through a cluster/supply chain/average product approach?**

Totally agree				*Totally disagree*
1	**2**	**3**	**4**	**5**

Comments:

4. **Do you agree with the possibility of a simplified PEF pattern for the enterprises involved in a cluster/supply chain/average product PEF study?**

Totally disagree				*Totally agree*
1	**2**	**3**	**4**	**5**

Comments: