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Display of the environmental footprint of products : French developments in the food sector

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Publication director:	Dominique Dron
Author:	Antonin Vergez
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Summary

Sustainable household consumption can be an important engine for a greener economic growth. In France, the "Grenelle" environmental laws include the right for consumers to have information on the environmental performance of (mass market) products at the point of sale. Food products are concerned. It is expected that providing consumers with this environmental information could lead the whole chain, agricultural producers to retailers, to market more sustainable goods. In this paper, we will first present some other European and international, public and private initiatives, then the methodological challenges and finally the latest developments of the French system, which is unique in the world because of three main characteristics: i) it relies on a legislative pillar, ii) it aims at providing a life-cycle based and multi criteria environmental information (including but going beyond the product carbon footprint, with, for example, a water footprint representing water pollution and consumption) and iii) because it could be generalized in France in the future. We conclude on the double need to harmonize the different European initiatives and to think about the coexistence of different consumer information systems in France.

***Key words**: Grenelle, sustainable consumption, B2C, environmental footprint, multi-criteria, life cycle analysis, agriculture, food products*

Introduction

To begin the transition towards a more sustainable economy fuelled by a greener economic growth, we can distinguish between two major types of economic instruments, which can be used by the public authorities, based on whether they are directed towards supply (taxation at the source, emissions trading markets, regulations and standards to follow for example for ICPEs[1]) or demand (ecological and economic bonus/malus on new vehicles, information, awareness, educational campaigns, environmental criteria for public purchasing and procurement, supplying information to consumers on the environmental performance of products they find in stores - labels, carbon indexes, *etc.*).

After having been (?) targeted for a long time at the production system, that is, supply, the public policies promoting sustainable development are only beginning to take into consideration post-production operations and the "world of consumption". This was recently brought to light by the Conseil d'Analyse Stratégique (Strategic Analysis Council), CAS (2011) in a report underlining that "*sustainable consumption is a relatively recent subject of public policies*". We must not compare the two types of instruments to each other but rather consider their complementarity. The NSDS (2010) (in the bibliography?), National Sustainable Development Strategy, stresses that changing our production and consumption paths implies "*simultaneously influencing supply and demand so that the market of the most responsible products can grow harmoniously,* [...]". Likewise, for the MEDDTL (2010), "[...] *consumer choices are* [...] *essential to support the development of products that are more environmentally friendly and lead our society towards more sustainable methods of production and consumption*". The implicit hypothesis associated with the instruments targeted at demand is that they stimulate eco-design[2], that is, they have an indirect effect on supply, progressively encouraging manufacturers to adapt to consumer demands.

At the same time, the demand for information on the environmental characteristics of products is growing. In France, according to a consumer poll carried out in 2010, 31% of the 1,003 people polled said they were "very favourable" and 55% "somewhat favourable" to environmental labelling on mass market products[3]. That proportion can be found in other polls: according to the MEDDTL (2010) citing the Ethicity poll (2009) carried out in partnership with ADEME ("The French and sustainable consumption"), 85% of the 4,500 French polled said they would like environmental impact information on product labels, that is + 24 points in comparison to 2008. At the European level, a July 2009 European-wide poll showed that 72% of Europeans would approved a mandatory measure on carbon labelling of products (78% in France and 80% in the United Kingdom), while only 15% considered that it should be done on a voluntary basis.

According to the canons of public economy, the legitimacy for State intervention in this domain is the result of the acknowledgement of market failures: information asymmetry and unfulfilled consumer demand for environmental information[4].

In France, the Grenelle Environmental Round Table includes measures which could correct some of these shortcomings. They are aimed at making the most environmentally friendly products more visible[5], more accessible[6] and more credible[7]. One of these measures, "environmental labelling"[8] could gradually be applied to all products sold in France, including agrifood products. The subject of this article is precisely the "environmental labelling" measure of the Grenelle Environmental Round Table.

We will begin by describing the proliferation of European and international systems, as well as their key differences. An example of a private and sectorial (food) labelling system and the parallel development of the ISO standards will be presented.

We will then demonstrate that the environmental evaluation of agricultural and food products, of which we will underline the specificities, can only be representative of the overall sustainability on the double condition of being based both on a "life cyle" and multi-criteria approach. The example of the "food kilometres" or "food miles" indicator, a transport phase-specific and mono-criterion "carbon" indicator, is examined to illustrate this pressing twofold condition.

Lastly, we will present the French environmental labelling scheme introduced by the Grenelle Environmental Round Table, an ambitious and unique system aiming at providing life-cycle based and multi-criteria environmental information to the consumer. The pillars of public intervention since 2008, the main advances in efforts for food products and the national trial of environmental labelling (July 2011 – July 2012) will be explained in detail.

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[1] Installations Classées pour la Protection de l'Environnement / Classified Installations for the Protection of the Environment

[2] According to the NSDS (2010), eco-design attempts to minimise the impacts of a product on the environment throughout its entire life cycle: from the extraction of raw materials up until it is recycled or eliminated at end of life, without forgetting its packaging, distribution and use. Ecobilan provides a definition of eco-design: https://www.ecobilan.com/fr_ecodesign.php

[3] IPSOS poll carried out in 2010 on 1,003 people who are representative of the French population within the context of the FCD-ANIA pilot project

[4] see Salanié (1998) or Varian (1995)

[5] Promoting existing labels and new methods and channels to provide environmental information.

[6] Economic incentives (tax credits, bonus/malus, *etc.*).

[7] Reform of the BVP (Advertising Verification Bureau), which became the ARPP (Advertising Regulation Authority), promotion of ISO Standard 14021 on self-declared environmental claims and proposals to change the French consumer code so as to ensure the pertinence and honesty of environmental claims.

[8] See article 54 of Grenelle 1 and article L. 112-10 of the French Consumer Code, modified by article 228 of the law referred to as "Grenelle 2".

We will conclude on the double need to harmonise the different systems on a European level (to start with) and to consider the coexistence in France of systems providing consumers with environmental information on food products.

1. Providing consumers with information on the environmental characteristics of products: a global process, diverse systems

1.1 Factors differentiating environmental labelling systems

In Europe and around the world, there has been an increase over the last several years in the number of environmental labelling systems for products, all sectors and all products taken together. While they all aim at providing consumers with information on the environmental impacts attributed to the manufacturing processes of the products they purchase, they are at present very diverse.

The major factors that differentiate and characterise the environmental labelling systems for products are the following:

- we clearly distinguish the systems aimed at providing mono-criterion information (focused on GHG emissions: the "carbon footprints" of products) from the multi-criteria systems (including the French system, see its description and justification below) which can include, but are not limited to, the carbon footprint of products
- we must also distinguish between the approaches which allow an exchange of information between businesses ("B2B", *business to business*) and those intended to inform end consumers ("B2C", *business to consumers*)
- we also make a distinction between public or (public-private) systems with a legislative basis and private systems developed voluntarily.
- in terms of legal framework, we can compare the voluntary approaches to the mandatory approaches (currently nonexistent, but they may come into being, in France)
- regarding the methods of communicating the information: the *medium* (material, like a message next to the price, on the package, on a label, a sign in the store, on the receipt, on leaflets or catalogues or dematerialised, like on websites), differs from the labelling *format* (numbers with or without units, a standardised or non-standardised scale, graph, colours, *etc.*). The systems use a wide variety of these methods[9]
- the evaluation methods of the environmental impacts attributed to products may be inspired by Life Cycle Assessments (LCAs) in a more or less strict manner: following such international standards as the ISO[10] standards can be total and costly or much more partial in which case we will speak of "simplified LCAs". However, they can just as well not be LCA-inspired and be based on labels certifying that a single phase, for example, of the manufacturing process meets certain environmental criteria.

1.2 A proliferation of European and international systems

Numerous environmental labelling systems for products are being created across the world, the crushing majority focused on the carbon footprint of products. Each system is a combination of various factors of differentiation. The European Commission (DG Environment) contracted Ernst & Young (2010)[11] to carry out a study. That study is composed of an overall and comparative description of the European systems, such as PAS 2050[12] in the United Kingdom or BP X30-323[13] in France, or those of non-European Union countries or international organisations (Japan, South Korea, GHG Protocol, ISO 14067), whether they have already been adopted[14] or are still in the development stage[15]. The initial *benchmark* focused on 44 methodologies on the basis of 30 criteria grouped into 5 key subjects: maturity, ease and cost of use, reliability and soundness, coherence, pertinence for implementation at the European Union level.

Eleven systems were selected for the core of the study: national systems developed by governments (PAS 2050 by the United Kingdom, BP X30-323 by France, "Food labelling" by Sweden, "Climatop" by Switzerland, "Korea PCF", "Japan PCF"), international initiatives (ISO standard 14067, the "Sustainability Consortium" of private American companies that organised themselves, the "GHG Protocol") and private initiatives (carbon indexes created by French supermarkets Casino and Leclerc). The study consisted of analysing and comparing the 11 systems regarding the standard LCA criteria[16]. Lastly, the study devises 5

[9] One should not confuse the scientific methods to calculate environmental impacts on the one hand, which can be complex, and the media and formats used for labelling on the other hand, which must be simple and easy to understand for consumers.

[10] *International Standard Organisation*, see paragraph below on the standards in LCAs.

[11] *The study is available on this website: http://circa.europa.eu/Public/irc/env/carbon_footprint/library*

[12] PAS stands for Publicly Available Specification.

[13] BP X 30-323 is the Best Practices Guide on environmental labelling in France. It will be widely discussed in the rest of this article.

[14] As is the case for the PAS 2050, BP X30-323, Japan, and Korea systems.

[15] As is the case for the GHG Protocol and ISO 14067 initiatives.

[16] System boundaries, functional unit, cut-off rules, source, nature and quality of data, allocation of environmental impacts between products and co-products throughout the industries, handling displaced emissions and biogenic carbon, *etc.*

potential scenarios of European Union environmental labelling policy and evaluates, for each one, the advantages and disadvantages of the 11 systems. The 5 scenarios are:

1. constant public policies (that is, no new action from the European union)
2. voluntary evaluation of the carbon footprint of products by the companies (for their own use)
3. informing consumers of the carbon footprint of products (with 3 sub-scenarios: differentiating only the best products, providing information for all products on a voluntary basis or obligation to provide information for all products)
4. economic incentives for consumers (a sort of bonus/malus scheme that would be calibrated on the carbon footprint of products)
5. minimum requirements for products (on the basis of the carbon footprint of products and the model of the ecodesign directive[17])

Developed in 2008, PAS 2050 methodology was a pioneer[18]. While BP X 30-323 was inspired by PAS 2050, today it goes beyond its model (legislative basis and multi-criteria approach, sectorial guidance and rules documents, product category rules, implementation tools, *etc.*). Furthermore, BP X 30-323 has no major differences with the GHG Protocol, which is used by leading multinational companies, and whose "product" version is being finalised by the *World Research Institute* (WRI) and the *World Business Council for Sustainable Development* (WBCSD). The harmonisation of parallel methodologies (methodology and general standards) should be progressive, without posing any major problems in the long run. For example, for the sake of international harmonisation in terms of trade, the "carbon footprint calculation" portion of the BP X 30-323 is set to be adapted to the international standard on carbon footprints (ISO 14067, currently being developed).

On the European Commission level, in July 2011 DG Environment launched a six-month trial[19], not on the methods of displaying the environmental characteristics of products, but rather on the possible application of a methodology to calculate the multi-criteria environmental footprint of products and services elaborated in 10 different companies. While the European trial of the methodologies does not suggest how these efforts will be followed-up, it is a strong European signal as regards providing environmental information to consumers.

To finish illustrating the increasing number of international initiatives, we can lastly mention that pilot projects are under way in South Korea (54 products covered at this stage), in Taiwan and in Thailand. In Japan as well, where a 3-year (2009-2011) pilot project was launched on carbon labelling of consumer products (as part of an "Action Plan for achieving a low-carbon society") which has entrusted the project to the Japan Environmental Management Association For Industry (JEMAI) of the Ministry of Industry and Innovation, in partnership with a distributor, Eon. The labelling is mono-criterion, focused on the carbon footprint, and remains voluntary. The official label, accompanying an impact expressed in absolute values (grams of GHGs per gram of product), is mandatory. However, more detailed information on the distribution of the impacts per lifecycle phase is available on the Internet. It is the manufacturers themselves who develop their own rules and methodologies for each product category, and the JEMAI then verifies the data and results of the calculations. As in France, the project involves the development of a public database.

1.3 An example of a private European sector-based and multi-criteria initiative: the Food SCP Round-Table, in the pipeline

The European federations of the agrifood industry launched a round-table on sustainable development (steered by the CIAA[20]) on 6 May 2009 in Brussels: the "Food sustainable consumption and production round-table", abbreviated to Food SCP RT[21]. It is the result of a voluntary approach on the part of the private stakeholders of the food industry, in cooperation with the european Joint Research Center (JRC), UNEP, UNDP and the EEA[22].

Its priority is to establish scientifically reliable and uniform environmental assessment methodologies for food products, covering not only the emissions of greenhouse gases (GHG) but also any other category of significant environmental impacts throughout the entire product life cycle, in order to communicate that information voluntarily between manufacturers (B2B) as well as to end consumers (B2C). Two other objectives are also expressed: identify suitable tools to communicate with

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[17] Directive 2005/32/EC.

[18] According to the OECD (2009), PAS 2050 "*specifies the requirements for the measurement of GHG emissions associated with the life cycle of goods and services ("products"), on the basis of the principles and techniques of life cycle assessment. The requirements specified are to identify the system boundary, the sources of GHS emissions that fall within the system boundary, the data requirements for carrying out the assessment and the calculation of the results. The standard includes the six GHSs identified under the Kyoto protocol and covers the entire lifecycle of products, including the use phase and the emissions linked to direct land use changes that occurred since 1990. The GHG emissions excluded from the assessment are particularly those associated with the production of capital goods such as, machinery, equipment and buildings, used in the lifecycle of products; transport of employees to their place of work; manual labour; and animals providing transport services*".

[19] See http://ec.europa.eu/environment/eussd/product_footprint.htm

[20] Confederation of the Food and Drink Industries of the EU: www.ciaa.be

[21] http://www.food-scp.eu/

[22] United Nations Environment Programme / United Nations Development Programme / European Environment Agency

consumers and other stakeholders, and promote continuous environmental improvement measures along the entire agrifood supply chain.

Ten guiding principles must be followed in order to limit the risk of manufacturer and consumer confusion, as they are confronted with a proliferation of reference documents and labels[23].

1.4 International standards for LCAs

Environmental labelling systems are often based on LCA-type environmental evaluation tools. These methods are foundation stones on the international level. The LCA is indeed a standardized and structured method: the ISO 14040 (on how LCAs are carried out) and 14044 (on how their results are communicated) standards were published in 2006.

These documents recall the contexts in which an LCA may be used (identifying improvement possibilities, informing private and public decision-makers, choosing environmental indicators, marketing) and specify the four phases of an LCA:

1. definition of the goals and scope of the study
2. inventory of flows over the entire life cycle of a product (LCI)
3. evaluation of environmental impacts
4. interpretation

An additional phase may be included: the comparative claim phase (claim regarding the environmental superiority or equivalence of a product in relation to a competitive product which performs the same function). These documents define the usual terminology of LCAs (inventories of input and output flows, elementary flows and processes, system boundaries, functional unit, *etc.*).

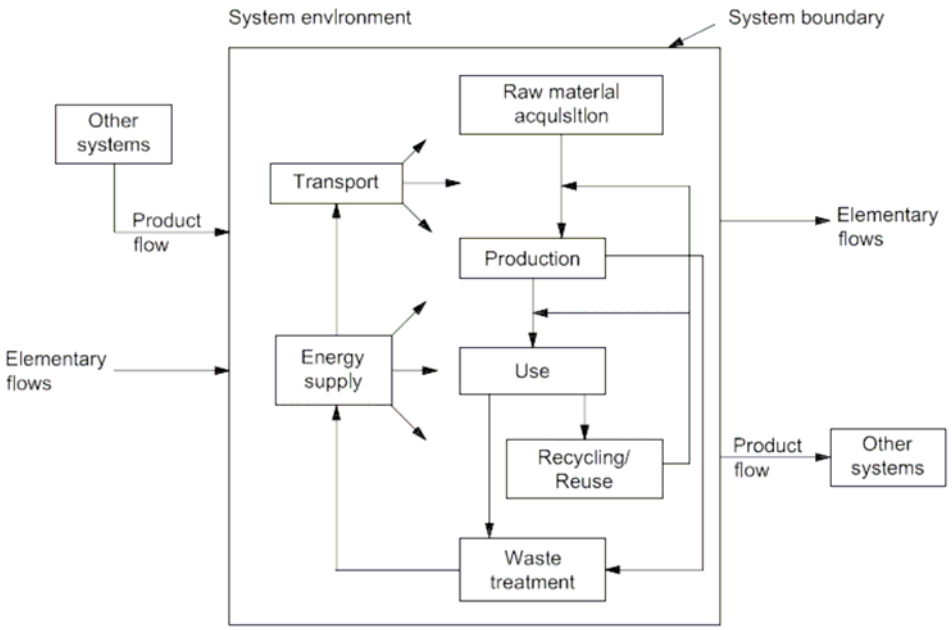

Figure 1: example of system delimitation (boundary) in LCA (Source: ISO 14040).

One of the main characteristics of LCAs is that they only deal with potential environmental impacts[24]. The life cycle is either assessed from "*cradle to grave*", or with more limited boundaries (this is the case for agricultural products for which LCAs can focus on a "*cradle to farm gate*" system). An LCA's boundary depends on its objective. A comprehensive LCA which includes all the life cycle stages of a product can be used to identify "*hot spots*", that is, the phases which contribute the most to the total impacts. Subsequently, when it comes to differentiating products, simplified and less costly LCAs are sufficient.

Concerning the calculation of the carbon footprint of "products", it should be noted that ISO standard 14067 (part 1 on quantification and part 2 on communication) is currently in development and should serve as a methodological foundation for environmental labelling systems to come or those being developed.

[23] see Jungbluth *et al.* (2000) on the risk of consumer confusion in the face of the increased number of labels and information on products.

[24] According to ISO standard 14040, "*the expression* "potential environmental impacts" *is relative in that the impacts are linked to the functional unit of a product system*".

2. Environmental labelling and agricultural and food products

2.1 Specificities of agricultural and food products

Agricultural production is the first link in the agrifood industry chain. It has strong specificities, particularly the following three:

First of all, this link is the cause of both negative and positive environmental impacts. The negative impacts are varied: GHG emissions contributing to climate change, pollutant emissions leading to water eutrophication and ecotoxicity[25], erosion of biodiversity. Conversely, certain agricultural practices contribute positively to the environment: providing and maintaining habitats that are favourable to biodiversity, capturing and storing of carbon in soils, hedges, *etc.* Consequently, it is the net effect (the difference between the positive contributions and the negative impacts) of these agricultural practices on the environment that should be evaluated and credited to an agricultural good produced in such systems. In fact, it is easier to assess improvements or deteriorations, rather than positive or negative effects: strictly speaking, it is the development over time, the dynamic of the net effect that matters.

A *second* specificity is that, in comparison with the other sectors, the same agricultural product can come from different farming systems (breeding in plains or mountains, meat from dairy herd vs. meat from suckler herd, systems that are more or less extensive / intensive, *etc.*).

Lastly, a *third* specificity is that it is based on geographically scattered natural biological processes, which vary over time and space and depend on climate conditions. The environmental evaluation of agricultural products is therefore complex.

2.2 "Food miles" and short supply chains: an example to better appreciate the importance of LCAs

2.2.1 The distance travelled by food, "food miles": a most imperfect indicator

In the United Kingdom, the concept of *food miles* (or food kilometres), representing the distance travelled by food from the field to the consumer, has been the subject of many assessments. The concept was conceived by Tim Lang, a professor at the University of London in the 1990s. "*Food* miles"*, that is, the distance travelled by food from the field to the plate, are a way of estimating the environmental impact of our food. Half of the vegetables and 95% of the fruit eaten in the United Kingdom are imported*" (Stacey, 2009).

Gradually, *food miles* became an indicator of environmental impact and a communication tool intended for consumers (see Kirby (2005), Durgahee (2005) or Smith and MacKinnon (2005)). It generated a certain enthusiasm for short food supply chains. Sirieix and Grolleau (2007) noted: "*Local food supply chains, with fewer intermediaries between the producer and the end consumer* [...]*, are largely described as a way to promote a more sustainable consumption system. More precisely, local food supply chains can reduce the environmental impacts of food kilometers ("food miles"), the distance that food travels between the production location and the consumption marketplace.*"

Is the idea that, for any given agricultural good, the lower its food miles indicator the better it is for the environment, well-founded? In other words, how much does the transport phase contribute to the total "carbon footprint" of a food product? Are "*food miles"* a good indicator of the overall sustainability of products?

The results of the assessments are rather counter-intuitive. *First of all*, it is indeed difficult to compare two food supply systems, without making reference to the quantities transported. The environmental impacts of a transport phase must therefore be expressed by relating them to one kilogram of transported product. *Secondly*, transporting one kilogram of merchandise over one kilometer has very different impacts depending on the means of transport (which also determines the quantities that can be transported). According to CRIOC[26], the CO_2 emissions by boat amount to 15 to 30 (grams of CO_2 per ton-km), by train approximately 30, by car from 168 to 186, by lorry from 210 to 1,430, and by plane from 570 to 1,580. For example, Rigby and Bown (2003) demonstrated that the CO_2 emissions for one kilogram of pineapples imported to the United Kingdom from Ghana is 5 kg by plane compared to 50g by boat. *Lastly*, for a given mean of transport, the issue is that of logistic efficiency to reduce GHG emissions: transport by boat can be more or less efficient, as can transport by lorry ("no empty returns" for example). *Consequently*, "*food miles*", being only a distance, are not a very pertinent indicator of the GHG emissions of the transport phase since they depend both on the means of transport and its efficiency.

Other phases of production of a food product must be taken into consideration: transport is not the only phase that generates environmental impacts at the product level. Schlich and Fleissner (2005) also show that choosing a local product is not systematically more economical in terms of energy consumption. For two products they studied, fruit juices and lamb meat, it is not the place of production (Germany) but rather the organization and size of the production – processing – distribution chain that determines energy efficiency[27]. Stacey (2009) draws a similar conclusion.

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[25] resulting from pesticides and artificial or organic fertilizers.

[26] Research and Information Centre of Consumer Organizations.

[27] And we know that as long as there is little use of decarbonated energy (the case in Germany), energy consumption leads to proportional GHG emissions.

A study led by Reinhardt (2005) also shows that, in terms of energy, the means of transportation chosen by the consumer to purchase a kilogram of bread can even out the advantage of the most energy efficient bread manufacturing process. Processing and packaging are also important but to a lesser extent.

Lastly, in Redlingshöfer (2006), a study also shows that in the German food system in 1991, 52% of GHG emissions were the result of agricultural production, 29% from the household preparation / consumption phase, and only 13% from the distribution (transport) phase.

To sum up, the "*food miles*" indicator, being a distance, neither takes into account the type of transport (so it can not be a good indicator of the GHG emissions produced by the transport phase), nor the ultimately slight proportion of GHG emissions of the transport phase in the total emissions caused by food systems. Lastly, the overall sustainability of a system or product encompasses environmental dimensions other than GHG emissions[28]. It is consequently, not a very pertinent indicator of the environmental impacts of the food chains.

Short food supply chains

Short food supply chains for agricultural products have existed for a long time[29].

These marketing methods which are very common in France, particularly in the southwest and north of the country[30], are currently making their way back to the forefront. The action plan to develop them, developed in France by the Ministry of Agriculture in 2009, defines them as a "method of marketing agricultural products that involves direct sales from the producer to the consumer or indirect sales provided there is only one intermediary"[31]. Short supply chains are generally associated with positive effects on the environment including in particular lower emissions of GHGs *since the food does not travel long distances*. Is this a sound argument?

First of all, given that short supply chains are defined by a maximum number of intermediaries between producers and consumers, and not by a maximum distance between the place where the product is produced and where it is consumed, the food could in fact travel long distances in "short supply chains". If a consumer travels 100km alone in their car to purchase their products "directly from the farm" (in this case the number of intermediaries is nil), the GHG emissions of such a process when included in the carbon footprint of the product purchased (if the calculation boundary includes that trip), will be very high. *Secondly*, the concept does not make reference to conventional, organic or rational production methods (which influences GHG emissions[32]).

There again, if we define them by the number of intermediaries, there is no reason, *theoretically*, for short food supply chains to have lower GHG emissions. Maréchal and Spanu (2010), however, observed developments towards more sustainable practices for farmers selling their products in short supply chains.

For Edwards-Jonesa, *et al.* (2008) and Tukker and Jansen (2006), only life cycle, and in our opinion, multi-criteria approaches, would be able to show whether short supply chains are worthwhile or not.

In the meantime, other arguments, more social ones, can be used to promote short supply chains: "restoring social cohesion", a "producer – consumer relationship", "preservation of a certain form of small-scale farming", "forming an agricultural belt to fight against urban heat islands and improve the self-sufficiency of cities in terms of food", "answer to consumers' growing demands for local, traditional, quality and seasonal products" or even "job creation".

2.2.2 The "life cycle" approach, more pertinent for the evaluation of environmental impacts

In the agrifood industries, as in other industries (it is not a specificity), the same kinds of pollution can occur at different stages of the manufacturing process. For example, GHGs are emitted during the agricultural phase, but also during the transport, processing, storage and maybe even the use phase (cooking) of the food product. Likewise, pollutants contributing to water eutrophication or ecotoxicity are emitted during the upstream phase of farming but other pollutants (or those very same ones) can be emitted further downstream from the manufacturing process of food products.

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[28] And even non-environmental dimensions (social and economic)

[29] According to Bernard Mondy (2007), "*short food supply chains have existed for some time now,* [...] *farm-direct sales have a relatively ancient history,* [...] *are in essence deeply rooted in the history of agriculture, it was once even the principal marketing method.*"

[30] According to MAAP (2009), 88,600 farms sold their products directly in 2005, that is 16.3 % of farms.

[31] Direct sales covers farm sales (basket, picking, market on the farm, *etc.*), collective sales (collective point of sale or collective basket), local market sales, local deliveries, mail order (or online, *etc.*) or pre-established sale (CSA-Community supported agriculture). Indirect sales with only one intermediary are frequent with restaurants and retailers (butcher, local grocer, supermarkets, *etc.*).

[32] On the issue of the link between short food supply chains and the adoption of sustainable agricultural practices, see Maréchal and Spanu (2010) who show that consumers are less the cause of the changes in practices of farmers in short food supply chains, when they really manifest themselves, than the very interaction between the farmers belonging to these distribution networks.

Also, to be able to take into account and add up the respective pollutions of each stage, a product "life cycle approach" is necessary. This approach not only helps identify the phases that contribute most but also to add up the emissions of various phases to calculate a combined impact attributable to the end product.

The "life cycle" approach is a matter of common sense but is not a dogma: in the case where all or the overwhelming part of the environmental damage would be primarily generated during one of the stages of the agrifood industry (identification of a critical point or "*hot spot*"), a non "life cycle" indicator but specific to the phase in question, may be cleverly used to characterize the corresponding issue. For food products, that could be the case for the issue of "biodiversity" for which nearly all the impacts are generated during the agricultural production phase.

2.3 Multi-criteria labelling is necessary to reflect the overall sustainability of products

2.3.1 Distinguishing *environments* and *scales*

The way of life of the inhabitants of a country or region of the world and the consumption of convenience goods (or mass marketed products) by households affect the annual emissions of GHGs. According to Naizot and Gregoire (2006), "*an adaptation or change in the behaviour of each individual can contribute to reducing emissions, on the track to dividing by 4 the level of greenhouse gases emitted in France by 2050*". Nevertheless, several types of *environment* should be distinguished and taken into consideration. Household consumption affects those *environments* (water, climate, biodiversity), on different scales (global and local). GHG emissions alter the global environment by contributing to climate change. The emissions of other pollutants that alter the local environment, such as the quality of air, water and soils, must also be considered. The damage to natural environments resulting in a loss of biodiversity attributable to certain manufacturing processes of consumer goods should also be classified among the threats to local environment.

There are *many* environments, which are more or less affected by the various consumption patterns, by the emissions of various types of pollutants. The consequence of this simple fact is that the carbon footprint of products is not sufficient to represent the overall environmental profile of a product. Products sustainability can not be limited to their carbon footprint. To ensure a certain faithfulness to the idea of a product's overall sustainability, several environmental criteria and indicators must be used. This method of supplying multiple environmental information, intended to reflect several (more than just one) impacts attributable to a product, is the multi criteria approach. We can then speak of an "environmental footprint", which is much more encompassing than the mere "carbon footprint".

2.3.2 Environmental footprint, functional units and low input extensive agricultural practices

To compare the environmental performance of two farming systems producing the same good (wheat, for example), the environmental impacts should be related to the yardstick of the function of those systems, which is the "functional unit" (FU). ISO standard 14044 defines the functional unit as the "*quantified performance of a system of products intended to be used as a unit of reference in a life cycle assessment*". In the agricultural and food systems, the FU may be the kilogram, litre, calorie, *etc.*

Numerous studies compare, based on life cycle assessments, the carbon footprints of a given product produced in intensive *versus* extensive farming systems. Contrary to what might be expected, although it is not systematic, literature shows that products from organic farming systems, those which are among the most extensive, have a carbon footprint, expressed in CO_2eq / kilogramme or per litre (in the case of milk for example), that is frequently higher than that of the same product grown in an intensive system[33]. The report from the *Réseau Mixte Technologique* (Technological Mixed Network) for the development of organic farming states: "*With regard to organic farming, the choice of FU is important. Indeed, according to the studies consulted, the FU used is either related to the hectare, or to the mass of the product (kilogramme or tonne). When the tonne produced is used as the* [functional] *unit, the results are often less favourable to organic farming because it has a lower yield per hectare*" (*RMT Dev AB, 2010*).

How can this phenomenon be explained?

The *first* explanation, which is systematically given, is this one: in extensive systems, the yield per hectare is lower than in intensive systems and the emissions of pollutants (in particular GHG emissions) are certainly lower per hectare, but remain at such a level that the "pollutants / kilogramme or litre produced" ratio can be higher than that same ratio calculated for those same products grown in more intensive systems. In intensive systems, the yield effect "dilutes" the potential increase in GHG emissions, and by using the kilogramme or litre as a functional unit the carbon footprint seems lower.

We have a *second* explanation: the economy of scale leads to "ecologies of scale". This time it is not the yield effect that is behind the lower carbon footprint for products grown in somewhat more intensive systems, but rather the size effect. Given that organic farms are generally smaller than conventional farms[34], the economies of scale are not entirely applicable, which, as demonstrated by Schlich and Fleissner (2004), generates "diseconomies of scale" and therefore "dis*ecologies* of scale".

Nevertheless, we would like to qualify these results which are far from being reliable and stabilized. First of all, the carbon footprint results with a kilogramme or litre FU, as frequent as they seem to be, should be considered with much precaution, for at least two reasons:

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[33] See Reinhardt and Müller-Lindenlauf (2010), Schader *et al.* (2010), Tuomisto *et al.* (2010), Lindenthal *et al.* (2010), Mogensen *et al.* (2010), Heller et al. (2010), Kool *et al.* (2009) and van der Werf, Kanyarushoki and Corson (2009).

[34] This is not the case in Eastern Europe where organic farms are somewhat bigger, but the studies cited do not study those geographical areas.

1. Comparing the carbon footprints of a given product grown in different agricultural farming systems is not always reliable because the calculation assumptions are not always the same (boundary of the LCA, types of GHGs, characterization factors, inclusion or not of the storage of carbon in soils, *etc.*)
2. The study by van der Werf *et al.* (2009) also shows that the variability of the carbon footprints of products *within* the organic or conventional systems (*intra-system variability*) is greater than the variability between systems (*inter*-system variability) and comes to a rather encouraging conclusion: significant margins of progression, within a single system, are possible.

We should also emphasize that, in multi-criteria reasoning, using the "kilogramme" or "litre" of product FU is not necessarily unfavourable to products from somewhat more extensive agricultural systems: van der Werf *et al.* (2009) clearly demonstrates that for other environmental issues (eutrophication, acidification, soil toxicity, use of non-renewable energy), organic milk has a better environmental performance than conventional milk (except for the "land footprint"), with the quantitative "litre of milk" FU. On the whole, the "environmental footprint" of organic milk is better than that of conventional milk, in a LCA method and with the "litre" as a FU.

2.3.3 Conclusion

The multiplicity of environmental issues makes multi-criteria evaluations essential. For a given FU, the same product can be both "good" for the climate and "bad" for local natural environments (see Redlingshöfer and Vergez, 2011).

The use of a FU reflecting "production" rather than "space" can lead to very different interpretations as regards the respective sustainability of the farming systems. Out of context, it seems impossible to declare a FU more "accurate" or more "pertinent" than another. The pertinence of a FU depends on the objective of the environmental evaluation, the type of environmental impact studied (local pollution / global issue) and the objectives of public policies. The use of several FUs, without excluding any *out of hand*, is necessary to clarify the public decision (Basset-Mens *et al.*, 2008).

2.4 Strengths and weaknesses of LCAs applied to agricultural products

Life cycle assessments, inasmuch as they are used to examine the impacts of the manufacturing processes of food products throughout their life cycle, and to establish an overall, multi-criteria environmental profile, therefore seem the most adequate.

A study carried out by ADEME (2008) has helped identify the strengths and weaknesses of LCAs applied to agricultural products. The main positive aspects underlined in the study are the following:

- when carrying out an overall assessment of environmental impacts on the entire production process of a value chain, this type of approach is relevant to identify the critical points ("hot spots") and classify the issues according to priorities, for example, comparing the respective impacts of transport and other production stages
- more precisely, the ADEME underlines the great relevance of these methods to evaluate energy consumption and GHG emissions for various stages of production. On these indicators LCA provides essential information to inform and suggest improvement approaches on all stages of agricultural production. Additionally, it is used to compare, within the context of applied research, the environmental performance of different production methods. In this sense, the LCA is a planning and decision-making tool. Methodological efforts are nevertheless necessary to improve the modelling of the mechanisms and causalities between environmental flows and impacts and to reduce the uncertainties on the characterisation factors.

The main limits of LCAs applied to agricultural productions, highlighted in the ADEME study (2008), focus on:

- for Basset-Mens *et al.* (2008) the LCAs applied to agricultural and food products do not sufficiently take into account the impacts linked to land use (soil quality, biodiversity) which remain little and often poorly integrated (strong uncertainties on the reliability and precision of the results), as well as the social impacts[35].
- the management of the agricultural area (spatial dimension) is difficult to take into account in a product LCA. As an example, the problems of production competition, spatial organisation of productions or the indirect effects of the expansion of a production on deforestation are difficult to integrate. This dimension requires the development of more integrated methods that can be used at the farm or even territorial level.
- the partial, irregular and uncertain consideration of the storage of carbon in agricultural cultivated soils and meadows
- the lack of available data at the farm level sometimes seems to be a limit to the use of certain indicators. The studies available (in 2008) make, for example, little reference to the consumption of water attributable to agricultural products
- the evaluation of certain indicators that are pertinent on the local scale is delicate (eutrophication, for example), it requires a contextualised evaluation and the specificity and vulnerability of the environment must be taken into account. The LCA generally measures potential impacts independently of the environment.

[35] The UNEP (2009), however recently published an initial guide on the integration of social aspects into LCAs of products and services with the objective of improving the social and socio-economic conditions of production and consumption.

The ADEME study (2008) on the LCAs applied to agricultural products has shown that the state of the art in terms of LCAs of agricultural products helps first and foremost to draw tendencies, rough estimates and identify essential boundaries. It also demonstrated the complexity of agricultural systems and the difficulty in assessing them in a harmonised framework. The study has helped to establish important aspects which will be useful in the development of future LCA studies, such as the need to harmonise methodological choices. This is one of the objectives of the AgriBALYSE project (2010 – 2012)[36].

3. The French environmental labelling scheme introduced by the Grenelle Environmental Round Table is ambitious and unique

3.1 Objectives: provide "life cycle" and multi-criteria environmental information to the end consumer

The NSDS 2010 – 2013 (2010) specifies that sustainable development "*is not limited to the sole development of green technologies or green growth of certain sectors in particular those linked to energy, the environment or information technologies. It affects all activities – especially those linked to mass market products such as the agrifood sector – and is available at each stage of the life cycle of products, from their conception until they are recycled, including the stages of their production, distribution and use*".

The general objective of the French system is to provide the consumer ("B2C") with sincere, objective and complete information on the environmental impacts attributable to mass marketed products throughout their entire life cycle. "The life cycle approach" is therefore recommended.

The pursuit of this general objective leads to building a scheme aimed at 1) orienting consumer demand towards products that generate the least negative environmental impacts, in order to 2) incite producers to make environmental progress (ecodesign their products). Even targeting the consumers with this measure, positive feedbacks on the entire value chain, through indirect incentives, are expected: for example, with retailers facing greener demand by end consumers, they could influence producers'methods of production.

In the European and worldwide emulation, described in the first part of this document, the singularity of the French system, at a technical level, can be summarized in the following points:

- all the international approaches are currently private, voluntary and have no legislative foundation. France is presently the only country to have a legislative pillar for environmental labelling.
- there is a risk of exclusivity given to the carbon footprint in mono-criterion labelling: France has also distinguished itself by choosing multi criteria environmental labelling (including a carbon footprint).
- the "life cycle" approach recommended in the French environmental labelling project does not mean that ISO standards 14040-44 must be followed step by step but that we must adopt an overall view of all impacts (of the same type).

3.2 The pillars of the French public authorities' action since 2007

In December 2008, Grenelle Environmental Round Table Operational Committee (COMOP) No.23 on consumption submitted its report to the Secretary of State[37]. Two key commitments were put forward in section No.2 "ecological labelling and eco-awareness raising": 1) "Make environmental information on products and services more widespread", and 2) "Develop environmental and social labelling of products, one sector at a time, based on rigorous and transparent reference documents, established by associating a pluralist and accredited expertise (including the expertise of environmental and social partners, and consumer associations), that is consistent with the Community framework".

Between late 2008 and July 2012, the strategy of the public authorities is based on several pillars:

1) a legislative framework encouraging environmental information to be made available to consumers thus establishing and stabilizing the project over time

2) technical support as regards methodologies, technical reference document and databases through the ADEME AFNOR platform

3) support from the public authorities of the ANIA FCD ADEME pilot project

[36] The Agri BALYSE project is aimed at putting together a harmonised and transparent public Life Cycle Assessment database of agricultural products. It is currently being put together by the ADEME, Research centres (INRA and Cirad in France, ART in Switzerland) and the French technical agricultural institutes (Arvalis Plant Institute, Pork Institute, French Vineyard and Wine Institute, Livestock Institute, Aviculture Institute, Cetiom, Unip (national pulse growers union), Terres d'innovation).

[37] One of the major advances of the Grenelle Environmental Round Table is that it underlined the need to extend environmental concern to the area of consumption, an area which until now had been poorly dealt with, as opposed to other subjects (renewable energies, transport, waste, etc.) which have received long-standing environmental attention. Operational Committee No.23, presided by Yves Bur and Christian Babusiaux, was put in charge of measures concerning consumption.

4) nationwide environmental labelling trial between july 2011 and july 2012

5) at the same time, supporting the voluntary initiatives of private stakeholders like those of major French distribution companies (Casino and Leclerc developed a carbon index for a portion of the products they sell) but which we will not explain in detail

6) supporting and encouraging methodological developments and harmonisation on the European Union level

3.2.1 A legislative pillar composed of two articles from the Grenelle laws

The legislative pillar is composed of two laws:

- law No.2009-967 of 3 August 2009, programming act concerning the implementation of the Grenelle Environmental Round Table, referred to as the "Grenelle 1" stipulates in article 54 that "*Consumers must have access to sincere, objective and comprehensive environmental information on the overall characteristics of the product / packaging pair* [...] *France will support the recognition of these same requirements on the European Union level.* [...] *The methodology associated with the evaluation of these impacts will be discussed in consultation with the relevant stakeholders.*"
- law No.2010-788 of 12 July 2010 concerning national undertakings for the environment, referred to as "Grenelle 2 ", specifies in article 228 that: "*From 1 July 2011, and after consultation with all stakeholders of the relevant sectors, a trial will be conducted for a minimum period of one year. The objective of this trial is to inform the consumer, gradually and by any suitable method, of the carbon footprint of products and their packaging, and the consumption of natural resources or impact on natural environments that are attributable to these products throughout their life cycle.*"

3.2.2 The technical pillar: the ADEME AFNOR platform

Concerning the technical pillar, the task of the ADEME AFNOR platform is to prepare a good practices reference and general document and to elaborate Product or Sector Category Rules documents for environmental labelling. The underlying objective is to harmonise the environmental evaluation methods, and share costs and best practices[38]. The platform has been meeting since September 2008 and has several hundred regular participants representing all kind of stakeholders (370 organisations, 1,000 experts): companies, federations of businesses, unions, researchers, environmental associations, consumer associations, research departments, ministries, ADEME, AFNOR, *etc.* Involvement is entirely open to stakeholders and it functions on the basis of finding a consensus (rather than by unanimity).

It has the following structure:

- the general platform escalates the advances of the sector working groups and meets regularly to inform the stakeholders
- approximately 16 sector working groups (the "WGs"), one for each major product category: food products, mobile telephones, electric tools, detergents, rinsed-off products, textiles, shoes, products for building, seat cushions, furniture, mattresses, tables, stationery products, crockery, backpacks, sport equipment, *etc.* to produce its final document (the "sector reference document"), each WG must answer the following questions: what are the main environmental issues? What is the relevant assessment boundary (the stages of product life cycle)? Which indicators should be chosen to provide the best information on the environmental issue? How are they calculated, both in terms of method as well as data (specific data or from generic databases)? What rules should be considered for the allocation of environmental impacts between product and co-products? Which functional unit should be used to express the results? Which databases are necessary? What is the optimum period of validity of a reference document once it has been put forward? How often should it be possible to update it?

[38] See the dedicated website http://affichage-environnemental.afnor.org/

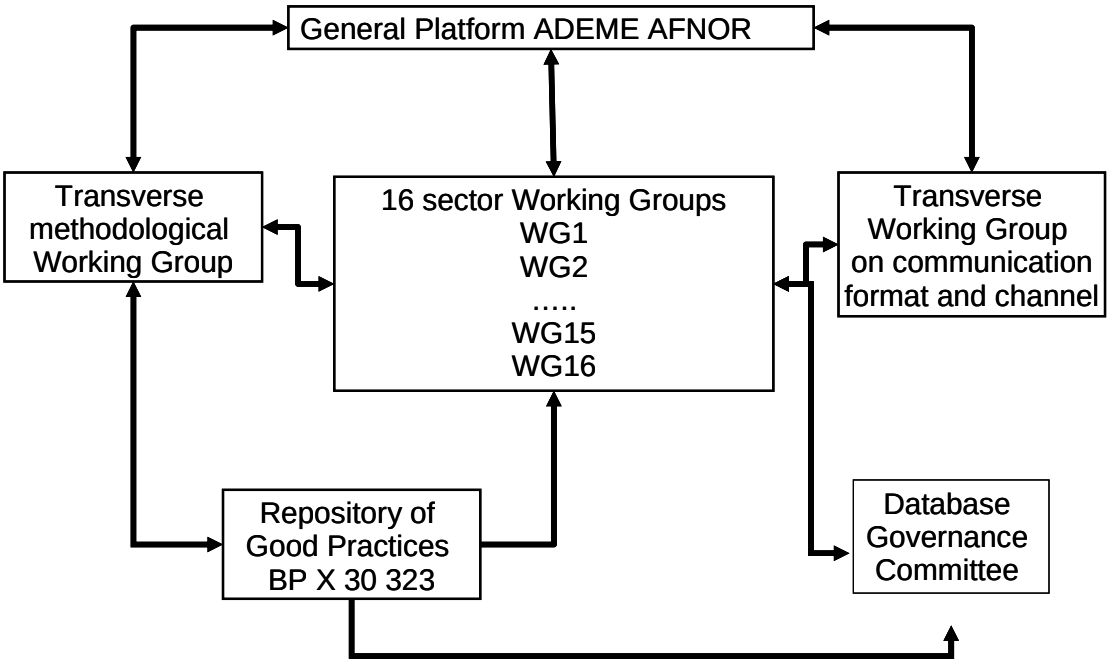

Figure 2: The ADEME AFNOR platform responsible for developing technical-environmental reference documents for sector and product categories

Two transverse working groups also appear in figure 1:

- one on the labelling media and formats, which presented its conclusions in March 2010, by proposing an evaluation *in principle*, of the advantages and drawbacks of each labelling media and format method[39]
- the other on the methodologies to be used to calculate the environmental impacts with LCAs

Efforts have been made within this platform since mid 2008 and have already been used to publish:

- in September 2009, a document on general methodology, the BP X30-323 ("General Principles for Environmental Labelling of mass market products"[40]) containing a detailed methodological appendix. In the Ernst & Young (2010) study, the BP X 30-323 is one of the top graded methodologies for all scenarios, owing in particular to the fact that it is accompanied by solid implementation tools (sector guidelines, databases, *etc.*) and that it is aimed at multi-criteria labelling, a sign of greater consideration of the overall sustainability of products[41].
- the reading guide on the methodological appendix
- sector reference documents were adopted and reference documents according to more specific product categories (equivalent to PCRs (Product Category Rules), were finalised, such as shoes, bedding, seat cushions, TVs, toilet paper, certain sports items (rackets and backpacks), or are in the process of being validated such as food, detergents, shampoos, stationery, ironmongery, wooden furniture, nappies, *etc.*

[39] The participants in this working group attempted to answer the following questions: how many indicators? The same number of indicators for all categories? Should the designation of environmental issues be the same for the categories of impacts? Should it be scientific or not? Should the results be given in absolute or relative values? Should they be standardized? Which standardization factors should be used? Should there be a consistent display format according to product categories? Should a results reliability indicator be considered (uncertainty)? Should mentioning certification of the results by a neutral and independent organization be considered? Should an additional labelling medium be considered, in order to obtain detailed information, purchasing advice, etc.? Should the impacts arising during the product use phase be distinguished? Should labelling be differentiated according to the purchasing frequency of products?

[40] The X 30-323 Good Practices Reference Document establishes the good practices to collect and give consumers information on the environmental impacts of staple goods and services. It can be considered a framework document which will be completed by documents based on product categories. In other words, certain labelling rules are the same for certain products, while others have various versions depending on product category. The BP X 30-323 specifies that the information must concern the product – packaging pairing, reflect the impacts occurring throughout the life cycle and that the life cycle assessment methods must comply with international ISO standards (14040, 14044, 14067, *etc.*). This reference document may be accessed on the AFNOR website:
http://www.boutique.afnor.org/NEL5DetailNormeEnLigne.aspx?CLE_ART=FA165312&nivCtx=NELZNELZ1A10A101A107&aff=1736&ts=3797713&ectrans=1

[41] PAS 2050, developed in the United Kingdom is nevertheless better graded for one option among the 5 conceivable options on the European level, and that is the voluntary communication of environmental information.

Lastly, ADEME is also in charge of building a database which will be free and public, and will contain information that is generic (for example: GHG emissions produced by a company's consumption of a kilowatt-hour of electricity) or specific by default (for example, GHG emissions linked to the transport of merchandise by a 12-tonne lorry). This database may be regularly refined and amended based on a method of consultation and governance that is in the process of being defined.

3.2.3 The ANIA FCD[42] pilot private project to fuel the discussions of the ADEME AFNOR platform

The FCD / ANIA/ ADEME pilot project was partly financed by the public authorities and carried out in parallel of the ADEME AFNOR platform. Successfully completed in 2010, its general purpose was to identify the key methodological and operational issues of "life cycle" and "multi-criteria" environmental labelling in France. The pilot project was supposed to test the feasibility of environmental evaluation, suggest methodological orientations to simplify it and evaluate the ability of companies to gather the necessary information and fuel the discussions of the members of the ADEME AFNOR platform and designers of the general database. To do so, the current availability of reliable data was reviewed (inventory and assessment of existing databases around the world).

In total, 130 food product references[43] and 100 non-food product references were evaluated.

Environmental evaluation, *via* simplified LCAs, is based on the combined use of primary data (specific to the manufacturing site) collected from the manufacturers themselves[44] and secondary data (generic data[45]) such as the impact factors of ingredients[46], the scenarios of distribution, freezing, use, *etc.*

A colloquium on the results the pilot project was organised in October 2010. Several lessons were drawn from it:

- the stages of manufacturing and distribution are the two stages during which the collection of information encountered the most difficulties
- the lack of certain data concerning the impact and characterisation factors is curbing, at present, the actual implementation of multi-criteria labelling. This type of labelling is nevertheless the goal as it is more accurate and in keeping with the idea of the overall sustainability of products (see above)
- putting together a complete and coherent public database, launched by the public authorities, is essential to the widespread implementation of environmental labelling

For companies, simplifications must be introduced wisely to reduce, as much as possible, the onus placed on them and the risk of error. For example, stable methodological rules must be defined in connection with the other international initiatives. We can see the idea of a necessary harmonisation, at least on the European scale, of the methodologies employed.

3.2.4 National environmental labelling trial in 2011 - 2012

The national trial outlined in article 228 of Grenelle 2, which began on 1 July 2011, must last at least one year. It is of voluntary nature and has got a "variable geometry"[47]. On 8 March 2011, French Minister of Ecology and Sustainable Development, Nathalie Kosciusko-Morizet, announced the list of the 168 companies selected (out of 230 applications received), and just as many "campaigns". The selection covers all economic sectors[48] and company sizes[49].

The object of the trial is to carry out a full-scale test, on a variety of market segments, on how information is passed on throughout the entire production and distribution chain, all the way to the end consumer. It includes various parties (including NGOs) that will help to optimise but above all to explore different calculation methodologies, communication channels, indicators, etc.

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[42] FCD = French Retail Consortium ; ANIA = French Food Industry Association

[43] Vegetable fats, coffees, cereal products, bulk fruits and vegetables, prepared vegetables, caterer starters and precooked dishes, desserts with fruit, meats, dairy products, cooked pork meats, fish, animal feed, drinks (fruit juice, waters, fizzy drinks, spirits)

[44] Nature and quantity of ingredients used, origin and / or method of production, nature and quantity of packaging, energy consumption of the site, nature and quantification of discharges into the environment, quantities produced on the site, distance and means of transport of input products and finished product

[45] Collected in various existing databases such as ELCD, EcoInvent, LCAFOOD, PlasticEurope, CML

[46] An impact factor expresses the environmental impact associated with a unit of product (in this case, an ingredient). Not to be confused with a "characterization factor", a term that is much more defined by ISO standards 14040-44, and expresses environmental impact per unit of flow of materials (for example the Global Warming Potentials (GWP) of the various greenhouse gases, 1 for carbon dioxide, 25 for methane, 298 for nitrous oxide, are characterization factors).

[47] The call for candidates (late 2010) was open to companies of all sizes and from all sectors, to unions, federations or other groups (producers and/or distributors) so long as the product or products involved in the campaign are marketed in France. The specifications were flexible but called for campaigns to inform consumers, that were operational as of 1 July 2011, and make use of multi-criteria environmental labelling. Lastly, the campaigns had to be open to external evaluation/assessment by certain stakeholders such as universities, consumer or environmental protection associations.

[48] Note that approximately 40% of the companies taking part in the national trial on environmental labelling belong to the agrifood sector

[49] 30% of them have less than 50 employees and 25% have more than 500.

Its objective is to emphasize the feasibility and optimisation conditions of making the environmental characteristics of products available to consumers. It is not, at this stage, a massive spread or a guarantee of direct comparability of environmental impact figures. Save a few rare exceptions, each voluntarily involved company only tests a few products, the indicators and databases are not all stabilised and their values are not all directly comparable.

Preliminary feedbacks from consumers (good understanding) are also expected at the end of this experimental phase.

In this way, seven consumer associations have grouped together and will draw up a questionnaire that will be used to gather the consumers' opinions on the format of the labelling and the information they were provided. Based on the data collected, they will make recommendations and submit them to the Ministry at the end of the one year long trial. The MEDDTL also uploaded a public consultation on the various labelling formats and 'knowledge of environment labelling'[50] quizz to its website. It is first and foremost a way to raise awareness and help people adapt to environmental labelling: to make consumers want to know more.

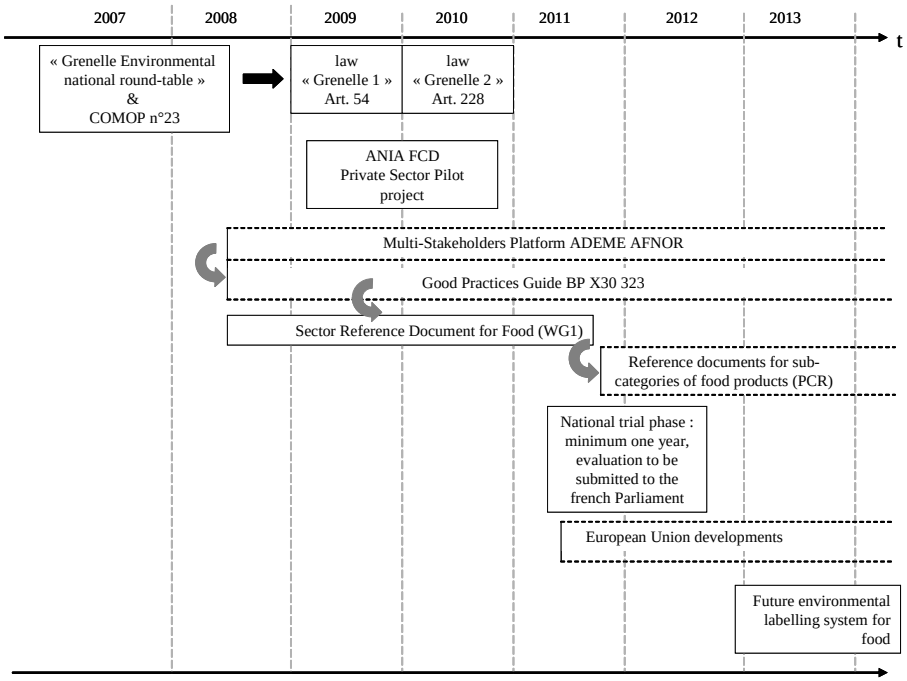

Figure 3: Pillars of the public authorities' actions since 2007: a chronological diagram

3.3 Agricultural and food products in the French environmental labelling scheme

In the ADEME AFNOR platform, the object of Working Group No.1 (WG1) is to elaborate a reference document that provides a methodological framework to evaluate the environmental impacts of food and animal feed products.

This reference document will be a sector adapted version of the BP X 30-323 whose guiding principle is that the evaluation of the environmental impacts of products must be carried out in accordance with the "life cycle" approach and multi-criteria approach. Like any sector reference document, this one lists the items mentioned in article 6, paragraph 1 of the BP X 30-323 good practices reference document, for food and animal feed products.

The product considered in this reference document is the product-packaging pair, i.e. the food product and its system of packaging: primary[51], secondary[52] and tertiary[53] packaging. As regards the FU, the group currently favours the following: 100 g / 100 ml, which is the unit of reference for the calculation of the impact, or the portion, when that information is available and defined by professionals of the sector or by a European Regulation.

The environmental issues considered to be pertinent are the following: impact on climate change, impact on water, in its qualitative (aquatic eutrophication and ecotoxicity) and quantitative aspects (water consumption and in the medium to long run, water stress), and the impact on biodiversity. The projected methods and indicators are the following:

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[50] http://www.consultations-publiques.developpement-durable.gouv.fr/experimentation-sur-l-affichage-environnemental-1/survey/10364

[51] Sales packaging or primary packaging is packaging intended for the end-user or consumer. Primary packaging waste ends up with the consumer.

[52] Grouped packaging or secondary packaging is packaging designed to gather together a group of items. For example: cardboard boxes used to group together items.

[53] Transport packaging or tertiary packaging, is packaging used to facilitate handling and transport of items and secondary packages, to avoid physically handling them and the damages linked to transport. For example: pallets and stretch wrap.

Environmental issue	Indicator	Unit	Calculation method
Climate changes	Emissions of greenhouse gases	grams of CO_2 equivalents	IPCC (2007)
Water consumption	Water consumption	litres	Net consumption Release in another environment not included Takes in sea water or stable ground water (over a period of 3 years) not included
Water quality (1)	Marine eutrophication	Kg of N equivalents	Recipe 2008
Water quality (2)	Aquatic Ecotoxicity	PAF.m^3.kg.kg^{-1} emitted	UseTox
Biodiversity	To be defined	To be defined	To be defined

(*) PAF: Potentially Affected Fraction (of Species)

Table: Projected methods and indicators for food and animal feed products.

Source: ANIA & ADEME (2011).

This table is intended to evolve according the known data. In terms of the environmental issues relating to "water", today there is currently no single indicator to measure the multiple dimensions of the impacts on water. Those impacts could eventually be evaluated by the Water footprint indicator, currently being developed by the ISO (cf. ISO 14046). The water consumption indicator reflects the use of water, in its quantitative dimension, but does not, at this stage, take into account, the local conditions and the notion of water stress, as it would be desirable. The calculation method for the consumption of water was developed by the transverse methodology WG and validated by the platform in the BP X30-323 reference document. The latter document nevertheless specifies that the pertinence of this method will be re-evaluated in the light of the ISO standard being developed on the "water footprint". The aquatic eutrophication and ecotoxicity indicators could, in the long run, be grouped together within a single indicator but that requires further methodological research and progress.

Likewise, at present, a single and consensual indicator does not exist to calculate the impact of a product on biodiversity. The reference document for WG1 also includes recommendations on the rules of allocation of environmental impacts between products and co-products, the methods of taking end-of-life into account (food and packaging waste), the boundary (stages of life cycle taken into account or not) and the calculation methods of indicators, the primary, secondary and semi-specific data to be used, the temporal validity of the data and frequency of necessary updates while taking into account the technical constraints related to the various labelling media, and lastly, the validation method of the data and results.

It is a reference document that covers all food and animal feed products. Given the diversity of these products, it should be noted that, once it is finalised and validated by the general platform, may be adapted by the sectors wishing to specify certain aspects for their product categories.

Conclusion and prospects

How can we direct our economies towards a greener, more sustainable growth? The CAS report (2011) recalls how much a policy promoting sustainable consumption in France should "*be ambitious in its objectives, and complementary to the measures intended to redirect the production system*". Providing environmental information on mass-consumption products, information that is increasingly demanded by consumers, is one of the levers that can be potentially activated, on the demand side.

As such, it is not surprising to see that environmental labelling on mass-consumption products, including food products, is on the rise and that many systems are growing in number around the world. These systems differ nonetheless according to whether they are mono or multi-criteria, voluntary or mandatory, their "B2B" or "B2C" approach, based on whether they are phase-specific or if they fall within "life cycle" type overall approaches, whether or not they have a legal basis, a pilot and experimental phase, and lastly, according to the recommendations they formulate in terms of labelling media and formats.

To characterise the environmental footprints of food products, a single-criteria, phase-specific (transport) indicator, such as "*food miles*", has numerous shortcomings. In order to reflect overall sustainability, environmental labelling on agricultural and food products must favour the "life cycle" approach as well as multi-criteria environmental evaluations, while remaining aware of the limits of these methods. We agree with the conclusions of the ADEME (2008) on this point.

We then presented the French environmental labelling scheme, a product of the Grenelle Environmental national round table, which is still under construction but is unique in its form, and is aimed at providing "life cycle" and multi-criteria information to the end consumer. The scheme could be brought into widespread use, if necessary, at the end of the one year long trial that began on 1 July 2011.

On an international scale, these innovative systems (including the French scheme) are sometimes based on different methods. The emulation that lead to their proliferation is part of a kinf of competition (yet cooperative: "co-opetition"), a "race for influence", between national, foreign and private reference documents. Harmonisation will be necessary in the near future. That is the role and aim of the European Union, which, on the one hand, emphasised sustainable consumption (cf. its action plan on "Sustainable consumption and production" in 2008[54], and its current revision process), and on the other hand, is looking at ways in which it could contribute: the European Commission is set to put forward a harmonisation framework in 2012, following a methodological trial (carried out during the second half of 2011) covering various economic sectors and products.

Concerns are becoming clear within the international community with regard to world trade: won't product carbon footprints hinder the development of poor countries? Brenton, Edwards-Jones and Jensen (2009) analysed the potential effects of carbon footprints on international trade and in particular on poor countries. They contest the idea according to which trade would be penalized by the use of carbon footprints. In fact, greater carbon efficiency, at other stages than transport, can help compensate the emissions produced during the transport phase. Furthermore, developing countries must take advantage of the opportunities provided by favourable climate conditions and the use of production techniques that consume relatively little amounts of fossil energies. The main problem with including them in the carbon labelling schemes of the products they export perhaps lies in the costly access to certified data. This could be a rationale for specific financial support targeted at helping developing countries'exports.

On the French level, another project remains to be initiated, that is the coexistence of this environmental labelling scheme on food products with other distinctions such as "product grown on a farm with high environmental value", logos and labels (organic agriculture, sustainable agriculture, labels certifying quality or geographic origin) and the European Ecolabel whose extension to food products is occasionally mentioned.

[54] http://ec.europa.eu/environment/eussd/escp_en.htm

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Abbreviations

LCA: Life Cycle Assessment

ADEME: Agence de Défense de l'Environnement et de Maîtrise de l'Energie / French Environement and Energy Management Agency

EEA: European Environment Agency

AFNOR: Association Française de Normalisation / French National Organisation for Standardisation

ANIA: Association Nationale des Industries Alimentaires / French Food Industry Association

B2B: Business to Business

B2C: Business to Consumers

BP X 30-323: Good Practices Reference Document

CGDD: Commissariat Général au Développement Durable / General Commission for Sustainable Development

COMOP: COMité Opérationnel / Operational Committee

CRIOC: Centre de Recherche et d'Information des Organisations de Consommateurs / Research and Information Centre of Consumer Organisations

DGCCRF: Direction Générale de la Concurrence, de la Consommation et de la Répression des Fraudes / The French Directorate General for Competition, Consumer Affairs, and Fraud Control

FCD: Fédération Commerce et Distribution / French Retail Consortium

F SCP R-T: Food Sustainable Consumption and Production Round-Table

GHG: Greenhouse Gas

WG: Working Group

LCI: Life Cycle Inventory

ISO: International Standardization Organisation

MAAPRAT: Ministère de l'Agriculture, de l'Alimentation, de la Pêche, de la Ruralité et de l'Aménagement du Territoire / French Ministry of Agriculture, Food, Fisheries, Rural Affairs and Spatial Planning

MEDDTL: Ministère de l'Ecologie, du Développement Durable, des Transports et du Logement / French Ministry of Ecology, Sustainable Development, Transport and Housing

UNDP: United Nations Development Programme

UNEP: United Nations Environment Programme

WRI: World Research Institute

WBCSD: World Business Council for Sustainable Development

Department of the Commissioner-general for Sustainable Development
(Commissariat général au développement durable)
Economy, evaluation and integration of sustainable development service
(Service de l'économie, de l'évaluation et de l'intégration du développement durable)
Tour Voltaire
92055 La Défense cedex, FRANCE
Tel: +33 (0)1.40.81.21.22

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Summary

Sustainable household consumption can be an important engine for a greener economic growth. In France, the "Grenelle" environmental laws include the right for consumers to have information on the environmental performance of (mass market) products at the point of sale. Food products are concerned. It is expected that providing consumers with this environmental information could lead the whole chain, agricultural producers to retailers, to market more sustainable goods. In this paper, we will first present some other European and international, public and private initiatives, then the methodological challenges and finally the latest developments of the French system, which is unique in the world because of three main characteristics: i) it relies on a legislative pillar, ii) it aims at providing a life-cycle based and multi criteria environmental information (including but going beyond the product carbon footprint, with, for example, a water footprint representing water pollution and consumption) and iii) because it could be generalized in France in the future. We conclude on the double need to harmonize the different European initiatives and to think about the coexistence of different consumer information systems in France.

Key words: *Grenelle, sustainable consumption, B2C, environmental footprint, multi-criteria, life cycle analysis, agriculture, food products*

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