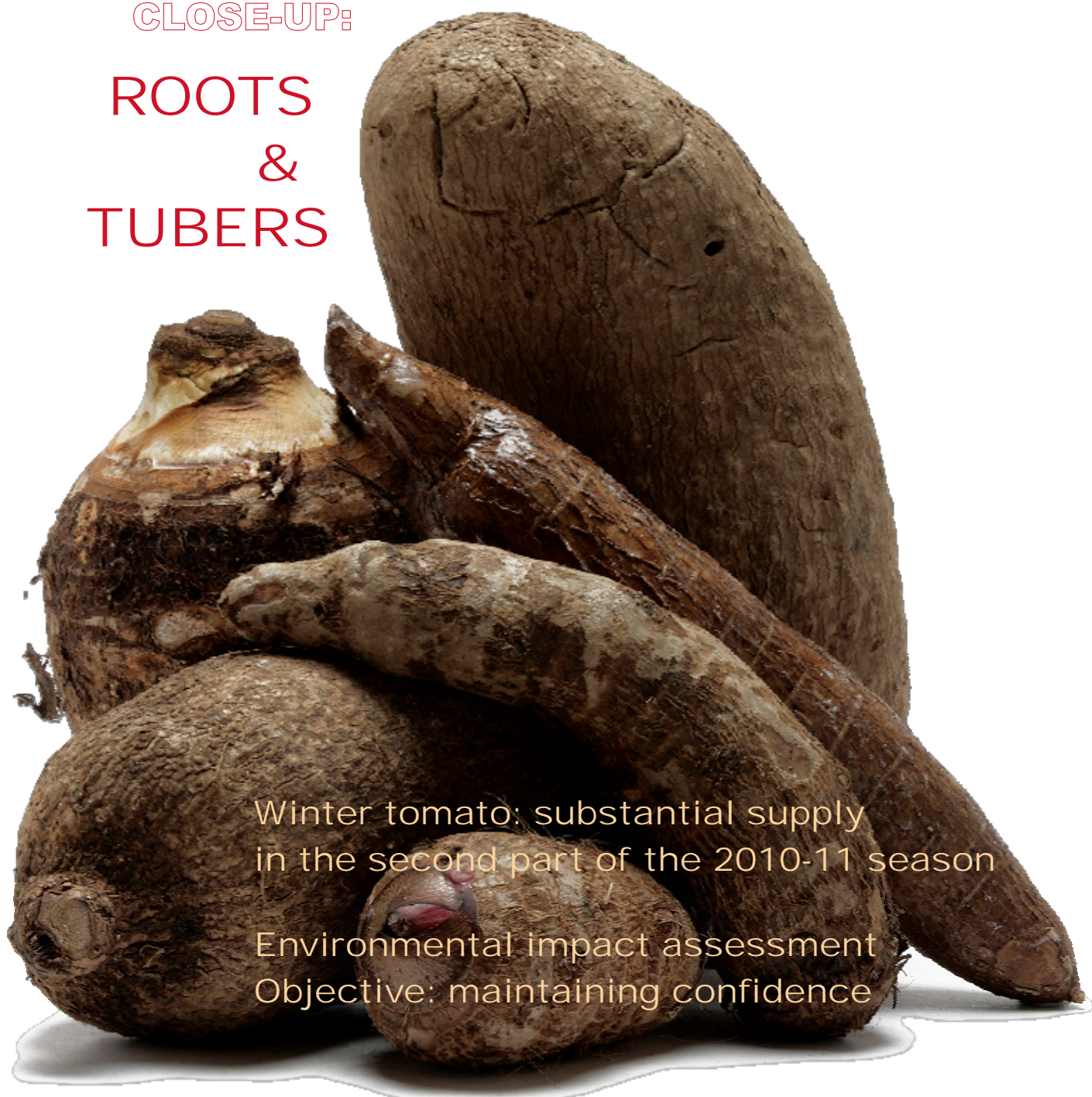


CLOSE-UP:  
ROOTS  
&  
TUBERS



Winter tomato: substantial supply  
in the second part of the 2010-11 season

Environmental impact assessment  
Objective: maintaining confidence

# Environmental impact assessment

## Objective: maintaining confidence

**Every two years, the international conference on Life Cycle Assessment in the Agri-food Sector is the occasion for reviewing assessment methods and actual studies in the sector. It was seen that researchers working in environmental assessment are on a pioneer front and that the industry is tending to make more rapid progress than concepts or methods. The issues in terms of market access are enormous and the pressure on research is strong.**

It is not necessary to make a reminder of how environmental questions increasingly fashion what is said and also what is done. As we have often reported and criticised here, some sectors have been strongly targeted. Thus the fruit and vegetable sectors in general and imports in particular are often pilloried. There are many reasons for this. Fruit and vegetables are a basic fresh component of our diet, one fruit in two eaten in Europe is imported, produce is often transported for long distances, production is large in most European member states and is well organised as regards lobbying, a fringe of consumers mixes local and sustainable, pressure groups have a certain audience, etc. In short, the sector is attacked for reasons ranging from legitimate environmental questioning to the defence of particular economic interests.

All interest groups now base their approaches on environmental impact assessments. Among the methods that can provide information, life cycle assessment (LCA) seems essential. It is standardised by ISO 14040 and 14044 (see box). For example, ADEME (Agence de l'Environnement et de la

Maîtrise de l'Energie), the French environmental and energy agency, chose the method for a French project for the environmental labelling of products for the general public, one of the numerous projects set up by the 'Grenelle de l'environnement' meetings. We shall return to this subject in future issues as the question is highly strategic for all the stakeholders in our fruit and vegetable sectors and promises to be particularly complex.

Most uncertainties are related to emission factors that are old, unsuitable, extrapolated, estimated, etc.

Meanwhile, on the subject of LCA and the data that it can produce, the major event for the champions of LCA worldwide was held in Bari (Italy) from 22 to 24 September. This was the occasion for a few days spent exploring this universe that combines research and industry in marriages that are often strange and sometimes unnatural. It is obviously risky and complex to summarise more than a hundred presentations and as many posters in just a few

lines. I shall refer to the metaphor of the glass that is half empty and the one that is half full to give my impressions. Although the global approach favoured by LCA is interesting and even essential, the people who use the method and the basic data used to calculate impact are far from perfect.

### The half empty glass

Doubtless overwhelmed by the success of these subjects and the enthusiasm shown for them, the organisers did not manage to choose between scientific congress and trade fair. The tribune was sometimes given to greenwashing professionals. Explaining that it was too complicated and expensive to run an LCA for every product for subsequent certification and then wait for publication in scientific journals, a Swiss transnational agri-food corporation said that it prefers to certify a model that would then be used for all their ranges. The product would thus be certified by proxy one by one. It does not matter if the data used to parameterise the model are erroneous or even non-existent. That's just a detail!

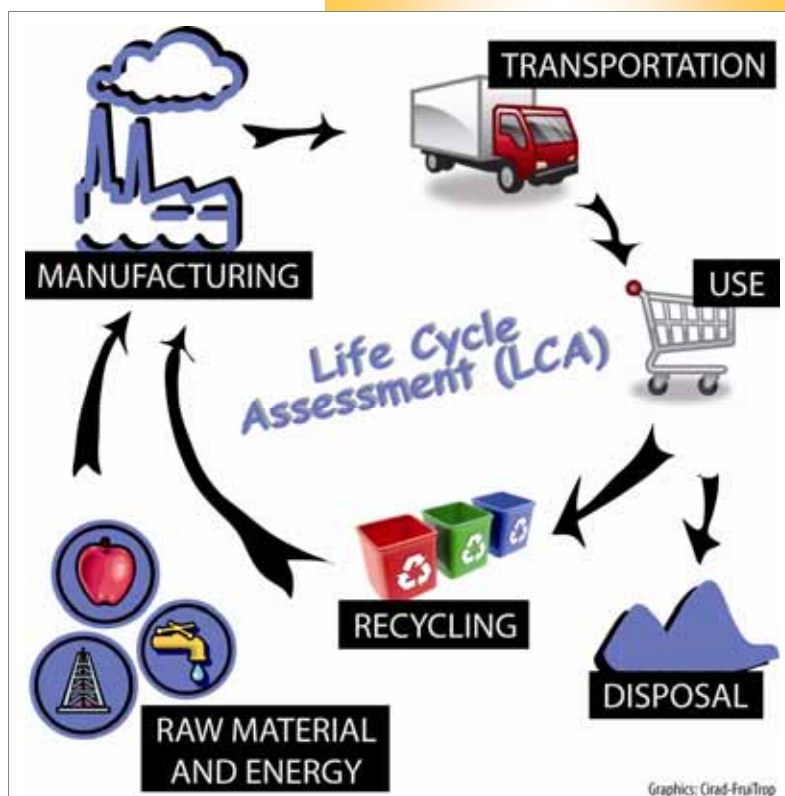
But the most demoralising feature is not caused by the scheming by those few people who twist the concept to make it compatible with their marketing policy. This has always existed. The most annoying and possibly the most serious feature is the



## A definition of Life Cycle Assessment

LCA is an environmental assessment method for the quantification of the impact of a product (whether this is a good, a service or even a process) for the whole of its life cycle from the extraction of the raw materials that it contains to its disposal at the end of its life, via phases of distribution and use. A standardised, recognised tool, LCA is the most advanced tool in terms of global, multicriterion assessment. It results from the interpretation of the matter and energy flows related to each stage of the life cycle of products and is expressed as potential impacts on the environment.

Source: ADEME



lack of confidence finally inspired by present LCAs. If it is considered, as a preliminary approach and with a great dash of optimism, that the method is common to all and applied in a professional manner, doubt can be cast on the data and models used to calculate environmental impacts. Indeed, the results proposed display uncertainties bordering on the ridiculous. The very serious paper by L. Milà-i-Canals for Unilever is an edifying example here. The study concerned the impact in terms of greenhouse gases in CO<sub>2</sub> equivalent of the manufacture and consumption of dehydrated soups in various parts of the world. The results displayed variability figures that sometimes doubled. There are many such examples. The method is not in question. The researcher who conducted the study is an 'LCA-er' respected by his peers. He is employed by the company, had access to the process and could have drawn up an accurate inventory. This is the heart of the problem. Most uncertainties are related to emission factors that are old, unsuitable, extrapolated, estimated, etc.

We gain better understanding of the current importance of databases. All countries and all sectors would like to own and feed databases. The idea is that it is better to do things yourself and that it is more profitable for an operator or a sector to bring his or its own expertise rather than see that of a competitor. France, for example, via ADEME, has federated agricultural technical institutes and research centres (CIRAD, INRA) in the 'Agribalyse' project to the design of a public database.

Although the intensity of environmental impacts will be the next criterion of choice for referencing in supermarkets or for purchase by consumers, the production of studies and reference material is becoming an important economic issue for economic stakeholders. The temptation to perform greenwashing or to denigrate a competitor's environmental performance is never far off. Especially when you can demonstrate that white is black or that black is white. I have mentioned uncertainty in emission factors. I can also point at the extreme diversity of the systems seem for the same product. Presentations of LCA concerning pineapple—one in Costa Rica and the other in Ghana—are interesting in this respect, and only in this respect in fact. The variability of the results presented according to farming system types is phenomenal. In Ghana, acidification and eutrophication vary from 1 to 8 between plantations A and B and erosion varies from 1 to 2. In Costa Rica, the carbon footprint varies from 90 g to 580 g equivalent CO<sub>2</sub> per kilogram of pineapple delivered to the United States.

## What is an emission factor?

An emission factor is a multiplying factor for calculating—or at least estimating with a certain margin of error—the quantity of pollutant emitted as a result of a human activity. For example, travelling by car for one kilometre requires on average—with a margin of uncertainty related to the weight of the vehicle, the power of the engine, its age, etc.—the combustion of a quantity of fuel containing 50 grams of carbon (from 40 grams outside a town to 70 grams in a city centre, calculating the average emissions of a petrol engine and a diesel engine). The emission factor resulting from the combustion of fuel alone is therefore 50 grams carbon equivalent (CE). To this must be added the emission involved in the manufacture of the vehicle related to the kilometre (environ 11 grams CE) and finally the emissions 'upstream' of the fuel, that is to say extraction, refining and transport (approximately 8 grams CE). So this gives a total emission factor for a 1-kilometre car journey of some 70 grams CE. Emission factors are available for the other impact categories studied: eutrophication in NO<sub>3</sub> equivalent, potential acidification in SO<sub>2</sub> equivalent, etc.

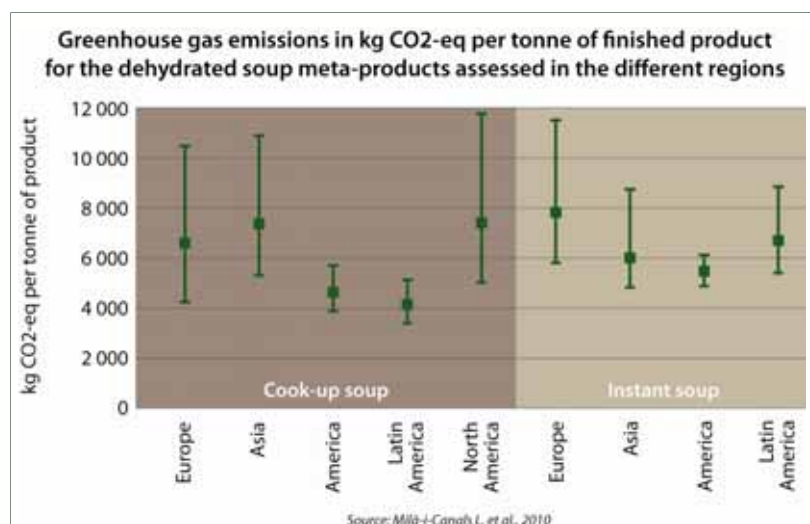
Source: [calculeurcarbhone.org](http://calculeurcarbhone.org)

The excellent study on apples and kiwifruits performed by New Zealand researchers is a kind of synthesis of the present limits of studies. It shows that the results are very different if the calculation method is changed (PAS 2050 against LCA) or if the year factor is not taken into account (via the evolution of yields or by taking climatic parameters into account). Uncertainty is also enormous in pollutant emissions caused by sea transport, demonstrating once again the strong need for accurate reference material (database, range of farming systems, etc.).

One can also regret the voluntary or involuntary confusing of environmental impacts and sustainability, with some speakers switching from one to the other without taking economic and social aspects into account. One of the major issues of the coming years is the design of methodologies for assessment of the impacts on total or global sustainability of a certain investment, technique, organisation, etc. Few teams are active here as yet. In France, the initiative of various research institutes in Montpellier grouped in Elsa (Environmental Lifecycle and Sustainability Assessment) can be mentioned (Fruitrop n°169). This is aimed at developing methods covering the various dimensions of sustainability.

## The half full glass

These criticisms result to a considerable degree from the youth of this science, which has been developing for hardly twenty years. Immense progress has been made and the field of study displays great vitality and promise. Of course, scientists have understood the limits of the exercise and are working on improving the reliability of results and incorporating more of the variability of the systems studied. For example, the pluriannual approach will be better taken into account in fruit and vegetables. In addition, the Bari conference revealed the emergence of very advanced reflection on impacts previously little assessed for lack of appropriate methodology—such as impacts on water. It can be considered that a complete methodology will soon be proposed. Discussion on biodiversity and its assessment were also very fruitful in a field that previously seemed to be unattainable. We saw growing initiatives in databases, in the taking into account of tropical produce and the emergence of a new LCA Code of Good Conduct. The conference was finally an occasion to show the importance of the combination of agrifood industries and researchers in the conducting of impact assessments and also in the development of



## Social LCA as encouragement for reflection on the motivations of LCA

LCA was initially aimed at drawing attention to unintentional negative impacts on the environment (Udo de Haes et al., 2002). It was not intended for the assessment of sustainability in the most commonly used sense, that is to say with environmental, social and economic dimensions.

However, the ambitious scope of LCA (multicriterion, holistic, global analysis, etc.) has made it a common tool used by institutional, scientific and professional communities. Given the pressures and issues related to sustainable development, user expectations have evolved with regard to this tool that seems particularly suitable for providing a response.

Thus the formal integration of social and economic aspects and the hinging of the various assessments seem a strong issue for methodological development in the coming years. This will not be possible without reflection on the conceptual, theoretical and methodological framework of LCA.

As there is such enthusiasm, it is therefore the responsibility of the LCA scientific community to consider the objectives of the tool so that it can give a pertinent, coherent response to the logical expectations generated.

Source: CIRAD-Unité de Recherche  
Systèmes Bananes et Ananas

methods. It is just necessary for everyone to keep to his role. We can also praise the small revolution that has made 'eco-socio' aspects fully-fledged themes for discussion. A complete session was devoted to the subject. The next conference will be held in Rennes, France, in 2012. Progress will certainly have been made in all fields by then.

Whether it is a tool for communication or one for defending a sector, it seems that we have lost sight of the prime objective of LCA, that is to say the comparison of two technologies, of two similar systems, in order to identify for each type of impact (acidification, eutrophication, erosion, biodiversity, etc.) hot spots that can be considered the most serious leaks into the environment, with the aim being to make choices in the design of products made, delivered and consumed. This is the principle of reverse engineering and ecodesign. The LCA tables of the law are often trodden underfoot by users who see the method as a way of greening their image or ungreening that of their competitors. The sometimes too simplistic comparison of 'produce and consume locally' and 'produce elsewhere and consume here' is a result of this. One has the impression that a tool initially reserved for researchers or informed professionals has been stolen, without the instructions for use, by industry and consultants to make what is often a large environmental washing machine. The body of studies is increasing at a rate that has nothing in common with the production of methods, measurements of emissions, etc. Let us take care that the foundations will still hold up the Tower of Babel that we are building. There is no need to remind you what happened to the first one, when its occupants no longer spoke the same language ■

Denis Loeillet, CIRAD  
denis.loeillet@cirad.fr

