

Creation of a public LCA database of French agricultural raw products: agriBALYSE

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ABSTRACT

ADEME, the French Environment and Energy Management Agency, sees Life Cycle Assessment (LCA) as an essential tool to guide the evolution of agricultural production chains towards environmental sustainability. ADEME implements a recent French law aiming to introduce environmental labelling of consumer products, including food, by end of 2012. Labelling should indicate the product's carbon-footprint, but also other impacts. In this context it was decided to create a public life cycle inventory (LCI) database of French agricultural raw products. The database, named agriBALYSE, will be developed by a consortium consisting of ten institutes for applied agricultural research and three agricultural research institutes specialised in the environmental analysis of farming systems. The database will apply a consistent methodology for the establishment of LCIs of plant and animal products at the farm gate. The methods used and the data format will be in accordance with ISO norms, the ILCD handbook and the general methodology adopted for the environmental labelling of consumer products in France. The methods will be developed in the project, and will be based, as much as possible, on the involvement and the consensus of the concerned stakeholders. The LCI data should allow the calculation of the indicators identified for environmental labelling, but also of other frequently used LCA indicators. By the end of June 2011 the 3-year project should deliver LCIs for the most representative production systems of the main French crop and animal products, using existing methods and data. By the end of 2012, more LCIs, based on methods developed in the project, will be available for a wider range of production systems and production modes per product, and the range of products covered will be larger.

Keywords: agricultural products, life cycle inventory database, environmental labelling

1. Introduction

ADEME, the French Environment and Energy Management Agency, sees Life Cycle Assessment (LCA) as an essential tool to guide the evolution of agricultural production chains towards environmental sustainability. In 2007-2008 a review of the international literature of LCA studies of agricultural products was carried out on behalf of ADEME (results available at <http://www.ademe.fr/htdocs/publications/dossier/av22/p1.htm>). In

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October 2008 ADEME organised a one-day conference to present and discuss the results of this study with concerned stakeholders. The literature review and the conference confirmed the value of the LCA approach for the assessment of agricultural production systems, and documented large differences for the environmental impacts of agricultural products. For several products up to ten studies were available, revealing major variability of LCA results for a same product, due, in part, to methodological differences. The study finally revealed that some impacts (e.g. biodiversity) were not or poorly taken into account, and that LCA studies on French products were rare.

In 2007 the French government organised the "Grenelle de l'Environnement", a series of multi-stakeholder conferences on the implementation of sustainable development in France (<http://www.legrenelle-environnement.fr/>). This resulted in the Grenelle 1 law, which, in its article 54, states that a consumer should "dispose of environmental information that should be sincere, objective and complete regarding the global characteristics of a product and its packaging". The Grenelle 2 application law requires a one-year-experimental phase of environmental labelling of consumer products, including food, in 2011 in order to introduce the environmental labelling by end of 2012. Labelling should indicate the product's carbon-footprint, but also other impacts, to be determined by a group consisting of stakeholders such as ministries of Agriculture and Environment, businesses involved in the food chain, environmental consultants, researchers, environmental and consumer organisations.

LCA was identified as the most appropriate method to quantify the environmental impacts of products. For food products, agricultural production chains will be involved to supply information on agricultural production processes. Agricultural products are very diverse, and very often different production modes exist for the same product. Furthermore, the implementation of a wide ranging LCI database covering plant as well as animal production will involve many methodological choices. Therefore such a study should be carefully coordinated across production chains. In this context it was decided to create a life cycle inventory database of French agricultural products.

2. Objectives

The goal of the program initiated by ADEME is to set up an LCI database agricultural raw products (plant and animal), named agriBALYSE. For this reason, an LCI method adapted to agriculture will be developed, which should be based, as much as possible, on a consensus among stakeholders (authorities, academic research and institutes for applied agricultural research) and which should be homogenous across production chains. The LCI agricultural database will be implemented in a public database to be developed by ADEME for the environmental labelling in all economic sectors; agriBALYSE will provide data allowing stakeholders to compare and improve agricultural production modes..

The program has two objectives:

- Contribute to the environmental labelling of food products, by supplying LCIs and Life Cycle Impact Assessment (LCIA) scores for the main agricultural raw materials.
- Help the people working in agriculture and in the food industry to analyse production chains in order to reduce their environmental impacts. The data provide by the program should serve as a benchmark for future LCA studies.

Furthermore the database will enhance the international visibility of French LCA studies.

3. Organisation

The program is based on the following principles:

- The program is participative, based on the partnership of all parties involved.
- The data resulting from the project will be made available publicly.
- Results will be transparent, for each product inventory data will be made available, and methods used for calculations will be transparent.

The project will be carried out in close collaboration by fifteen partners:

- ADEME funds the project and assures its leadership and co-ordination with the database set up for all economic sectors.
- INRA, the French Institute for Agronomic Research, will contribute to the management of the project and define the methods and life cycle inventories for animal products from metropolitan France.
- ART (Agroscope Reckenholz-Tänikon Research Station, Switzerland) will contribute to the management of the project, define the methods and life cycle inventories for plant products from metropolitan France and will contribute to the construction of the database structure with ADEME.
- ACTA (Network of Institutes of Plant and Animal production chains) will contribute to the management of the project.
- CIRAD (Centre for International Cooperation and Agronomic Research for Development) will contribute to the management of the project and take care of methods and life cycle inventories for products from outside metropolitan France.
- Ten institutes for applied research in crop and animal production: ARVALIS (cereals), CETIOM (oil crops), UNIP (protein crops), IFV (vineyard and wine), ITB (sugar beet), CTIFL (fruit and vegetables), Terre d'Innovation (special crops), IFIP (pigs), ITAVI (poultry) and IE (livestock) will contribute to the development of methods for the establishment of environmental inventories, collect representative data on crop and animal production systems, and critically review draft LCI and LCIA results.

Three committees have been defined for the governance of the project. The strategic committee ensures the overall governance of the program. The steering committee ensures the technical and scientific governance of the program. The consultative committee has for role to advise, inform and orient the program.

4. Methodology

The database will implement a consistent methodology for the establishment of LCIs of plant and animal products at the farm gate. The functional unit will be 1 kg of product for solids and 1 l of product for liquids. The methods used and the data format will be in accordance with ISO norms 14040 and 14044, the ILCD handbook and the general methodology adopted for the mandatory environmental labelling of consumer products in

France. The inventory data should allow the calculation of the indicators identified for the environmental labelling of food products, but also of other frequently used LCA midpoint indicators.

By the end of June 2011, the 3-year project will deliver LCIs for the main French crop and animal products based on the most representative production systems or these products (e.g. conventional production of wheat), using existing methods and data. By the end of 2012, LCIs will be produced for a wider range of products, resulting from a variety of production systems and production modes. Thus, the range of products will be extended (e.g. regional production of wheat, wheat produced using low-input and organic production modes, rice, roses). Methodological choices regarding system limits, allocation procedures, functional units, unit processes, methods for the estimation of direct and indirect emissions and characterisation methods will be made in the course of the project, and implemented in the calculation of the LCIs that will be delivered at the end of the project.

5. Results

The project will deliver its first results at the end of June 2011 (Phase 1), as the experimental phase of the environmental labelling of consumer products starts in July 2011. The final results of the project will be delivered for the end of 2012 (Phase 2). Table 1 lists the products that are considered for Phase 1 and the objectives for Phase 2. These objectives give the general framework for the program; they will be further detailed in the course of the project and will depend on the rate of implementation of methodological choices and on the availability of data.

Table 1: Plant and animal products considered for phases 1 and 2 of the project.

	Plant products		Animal products	
Phase 1	IFV	Grapes		
	ARVALIS	Bread wheat Durum wheat Barley Potato Starch potato Sweet corn	ITAVI	Broiler Turkey Foie gras Roasting duck Egg Fish from aquaculture Rabbit
	UNIP	Pea Horse bean	IE	Cow milk Bovine meat
	CETIOM	Rapeseed Sunflower	IFIP	Pig meat
	ITB	Sugar beet		
	CTIFL	Apple Tomato		
	TOTAL	14 products	TOTAL	10 products
Phase 2	ARVALIS	Rice	IE	Goat milk Sheep milk Lamb meat
			Other products to be defined.	
	CTIFL	Carrot, Peach		
	IFV	Grapes for white/red/rosé/ effervescent wine (4 products)		
	Terre d'innovation	Cider, Rose		
		Other products to be defined.		
TOTAL	30 to 40 products	TOTAL	30 to 40 products	

6. Conclusion

The program aims to produce a publicly available life cycle inventory database of agricultural products, using methods that will be based, as much as possible, on a consensus of the partners involved and of concerned experts. The involvement of interested stakeholders should favour its broad adoption across the food chain.