

Social-Life Cycle Assessment as an extended tool for the measurement of the social responsibility in the agro-food sector

*Graziella Benedetto * – University of Sassari*

** Corresponding author: gbenedet@uniss.it*

Abstract

The growing attention of consumers to the social and environmental aspects associated with the production of agro-industrial goods is a key driver for leading companies. The attention to social and environmental issues increases the added value of a company. A useful tool that can measure the Social Responsibility of a business is the Social-Life Cycle Assessment (S-LCA). The aim of this paper is to suggest a better diffusion of the S-LCA implementation in the agri-food sector, since the social dimensions of sustainability have still limited application worldwide. This scope is in line with the literature's recommendation to carry out more case studies to improve the methodology and highlight where the S-LCA is weak. The paper includes two stages: firstly a description of the methodology is proposed; secondly we will present the results of some studies, focused on the agro-industrial sector, to see what information can be drawn from S-LCA implementation.

Keywords

S-LCA, Social Responsibility, Agri-food sector

Introduction

The growing attention of consumers, intermediate and final, to the social and environmental aspects associated with the production of agro-industrial goods, is a key driver for leading companies towards the issue of Social Responsibility. The new type of consumers includes also the ethical quality and social responsibility of the manufacturing (Canavari et al., 2014; Marotta & Nazzaro, 2012) and distribution enterprises (Pulina, 2010) within its economic choices. As underlined (Canavari et al., 2014) new types of socially conscious behaviour from producers have been observed. The attention to social and environmental issues increases the added value of a company in terms of image and credibility towards stakeholders.

Today companies are induced to make decisions products that affect more or less directly, people and environment and increasingly are required to account for its social performance (Dreyer et al., 2006). Globalization and the consequent increase in the level of complexity of markets have led to the development of the concept of CSR (CSR) or to a wider corporate responsibility that leads to the creation of shared value (Nestlè, 2006).

It was also observed that «*the main problem for operators is the lack of a common and recognized framework that would allow them to properly evaluate the Corporate Social Responsibility actions they undertake*» (p. 298). In order to provide an instrument that can measure the Social Responsibility of a business, despite numerous critical (Korhonen, 2003), we want indicate as a useful tool for this purpose, the Social-Life Cycle Assessment (S-LCA). S-LCA allows to detect and measure organizational well-being, which is increasingly considered in integrated way, (eg relating to businesses and workers) but also as a factor of competitiveness, and welfare business declined through different dimensions (healthy working environment, comfortable, and welcoming; adoption of all actions and the best available technology to prevent injuries and occupational hazards; and recognition of the skills and contributions of employees and so on) .

The aim of this paper is to suggest a better diffusion of the S-LCA in the agri-food sector, since the social dimensions of sustainability have still limited application worldwide. This scope is in line with the literature's recommendation to carry out more case studies to improve the methodology and highlight where the S-LCA is weak.

The paper includes two stages: firstly a description of the methodology is proposed; secondly we will present the results of some studies, focused on the agro-industrial sector, to see what information can be drawn from its application.

Methods

The followed approach is either explorative and generative (Gough et al., 2012) and the synthesis has a configurative pattern, aiming at a theoretical research by means of fundamental literature contributions, yet representing main specific studies. A narrative synthesis of findings was undertaken. The case studies presentation is essentially aimed at highlighting possible future developments of the research, based on S-LCA in the agri-food sector. The research question is aimed to examine whether, and to what extent, the S-LCA has been implemented in agri-food sector and at the international level.

We carried out the selection of case studies on S-LCA and in the agri-food sector through specialized academic reviews. It is important to emphasize that this is not a literature review, the case studies listed are only useful for demonstration of the utility provided by the S-LCA in the field of Corporate Social Responsibility.

Results

The S-LCA literature

As recalled in Benedetto *et al* (2013) the approach of S-LCA has been well defined by Benoit and Mazijn (2010) in the following way «A social and socio-economic LCA is a social impact (and potential impact) assessment technique that aims to assess the social and socio-economic aspects of products and their potential positive and negative impacts along their life cycle encompassing extraction and processing of raw materials; manufacturing;

distribution, use; re-use; maintenance; recycling; and final disposal. S-LCA complements E-LCA with social and socio-economics aspects » (p. 37).

Specifically Traverso (2010) highlights that two approaches of S-LCA exists:

- Corporate Approach, which limits the impact analysis at firm level (Jorgensen et al, 2008; Dreyer et al, 2006, 2010; Hauschild et al., 2008);
- Guidelines Approach: which considers impacts associated with the whole supply chain, according to the UNEP/SETAC guidelines published in 2009.
- Ramirez & Petti (2011) emphasized that the difference between S-LCA and the majority of social responsibility tools, as Corporate Social Responsibility (CSR) and SA (Social Accountability) 8000, is at the level of the social impact addressed (p. 11). While CSR addresses the social impact at enterprise level using management information and SA 8000 focuses on the plant level, S-LCA uses information gathered at company, plant and process levels and it does so for the whole product life cycle (Benoit et al. 2010) from cradle to grave. Ramirez & Petti (2011) advise that is important emphasised that social impact is not directly linked to the production chain process of a product (Dreyer et al, 2006, 2010), it is not determined by physical flows, unlike the E-LCA, but from the way it interacts with stakeholders (Jorgensen et al, 2008; Hauschild et al. 2008). So, the identification of all stakeholders involved on the product/service life cycle is a fundamental issue when performing an S-LCA.

The UNEP/SETAC guidelines propose that S-LCA conforms to the ISO 14040 framework, and it is carried out in four phases: 1. goal and scope: includes a description of the functional unit, a more detailed description of the product utility and a first overview of the stakeholders concerned and the setting-up of boundaries; 2. inventory: here a first identification of sub-categories is carried out. This selection should be completed in consultation with the stakeholders concerned before proceeding with the inventory itself, as it is during consultation that different or additional topics of concern may be raised. At each geographic location in the value chain, social and socio-economic impacts may be observed by five main stakeholder categories (Table 1): (i) workers; (ii) local community; (iii) society; (iv) consumers; (v) value chain actors; 3. impact assessment: no specific LCIA methods are recommended in the Guidelines. There are generally two types of LCIA methods in SLCA:

- Type 1 sLCIA methods: performance reference point: do not use causal-effect chains;
- type 2 sLCIA methods: inventory data are aggregated to a midpoint or endpoint level through causal-effect chain modeling.

So according to ISO 14044 (2006) this phase is divided in three steps: choice of impact categories, subcategories and characterization models; connection of the inventory data to subcategories and impact categories (classification), determination and /or calculation of the indicator results subcategory (characterization) (UNEP/SETAC, 2009, p. 70); 4. interpretation: users of studies that are based on inventory results should develop their own judgement based on national requirements and ethical concerns carefully (UNEP, 2011).

Interest in using S-LCA is growing as demonstrated by its applications in several case studies both non-food (i.e. notebook, e-waste, roses, soap) and food products (wine, beefsteak tomato). Some studies revealed that a product with a good environmental performance is not necessarily produced along the life cycle in a socially responsible way (Franze & Ciroth, 2011).

S-LCA is based on E-LCA, with some adaptation, and they share the life cycle perspective, considering the full life cycle of products. The main difference between S-LCA and E-LCA is that E-LCA addresses environmental impacts, whereas S-LCA addresses social impacts, i.e. impacts on human beings and the society (Petersen, 2013). Another difference lies in the analysis of impacts that must be conducted at the enterprise level rather than process. To solve the problem of allocation policy is used the *share factor* by which a weight is attributed to the single company in the supply chain (Petti & Campanella, 2010). Moreover, S-LCA made greater use of qualitative and semi-qualitative data; this tool does not favor objective data and it combines generic data with site-specific data during the assessment phase. It becomes very useful, therefore, to measure and to compare the various dimensions of sustainability rather than dwelling to a single result, so giving an overall evaluation.

Table 1. Stakeholder categories and subcategories

| Stakeholder categories | Subcategories |
|--|---|
| Stakeholder "workers" | <ul style="list-style-type: none"> freedom of association and collective bargaining child labour Fair salary Working hours Forced Labour Equal opportunities/discrimination Health and safety Social benefits/Social security |
| Stakeholder "consumer" | <ul style="list-style-type: none"> Health and safety Feedback mechanism Consumer privacy Transparency End of Life Responsibility |
| Stakeholder "local community" | <ul style="list-style-type: none"> Access to material Resources Access to immaterial Resources Delocalization and migration Cultural heritage Safe and Healthy living condition Respect of indigenous rights Community engagement Local employment Secure living condition |
| Stakeholder "society" | <ul style="list-style-type: none"> Public commitments to sustainability issues Contribution to economic development Prevention and mitigation of armed conflict Technology development Corruption |
| Value chain actors (not including consumers) | <ul style="list-style-type: none"> Fair competition Promoting Social Responsibility Supplier relationships Respect of Intellectual property rights |

Source: UNEP/SETAC, 2009

The implementation of the S-LCA in the agri-food sector

In this part of the research we will highlight the results of the application of the S-LCA to show how it works and what information may be collected. Since this is a relatively recent, this tool is still poorly implemented, especially in the agri-food. Therefore, the originality of this study lies in bringing attention to the great benefit provided by the S-LCA, applied to the agri-food sector.

In order to analyse each case study, we used specific information suggested in literature (Rugani et al., 2013) which could characterize them. These information were: objectives, functional unit, year, system boundaries phases and cut-offs, impact assessment method, main results.

The applications of S-LCA in the agro-industrial are not numerous, this is a new instrument that is being validated at international level. In this study we were identified four works: 1) wine (Benedetto et al., 2014); 2) beefheart tomato (Ramirez, Petti, 2011); 3) bouquet of roses (Ciroth & Franze, 2009); 4) cheese (Paragahawewa et al. 2009).

The first case study aims at studying the social hot-spots of a white wine process within the Sella & Mosca company (Sardinia, Italy) but also to test the questionnaire which it was submitted to the various categories of stakeholders interviewed. The FU is a 750 ml bottle of white wine named "La Cala". The bottles produced by the company amounted to 500,000 / year. The guidelines of the UNEP / SETAC at this point suggest to identify the product system and define the boundaries of the system. The approach is of the "cradle to gate", i.e. ends inside the winery regarding the life cycle of wine production. For inventory data collection, a field study was conducted at sites where the wine is carried out.

The following categories of stakeholders have been considered: the company; workers; the local community; and consumers. The study made use of site-specific data collected through social audit and specifically resorting to the use of questionnaires developed by UNEP/SETAC.

The company employs 98 permanent employees and 82 adventitious (average 2012-2013) from the adjacent areas (common Alghero, Ittiri, Sassari and Villanova). About gender, only 11.6% are women.

Depending on the application of the model of characterization of impacts through the SAM (Subcategory Assessment Method) method (Ramirez et al., 2014) allowing to transform qualitative data into quantitative data, the company appears to have a poor performance in sub-categories: 1. equal opportunities / discrimination; 2. transparency; 3. feedback mechanisms; 4. access to intangible resources.

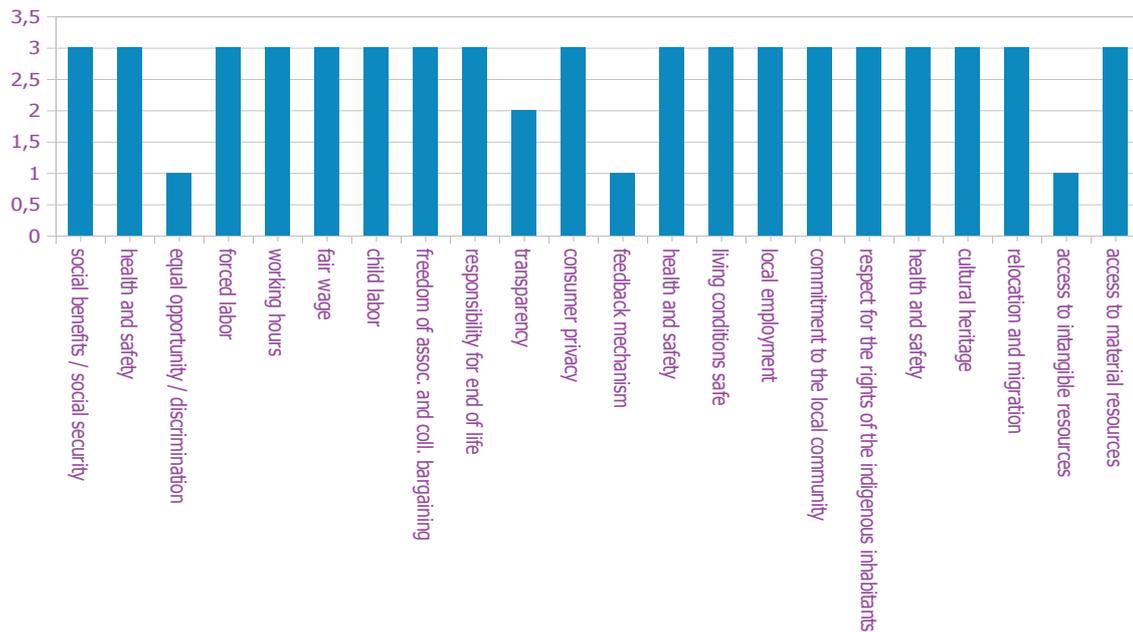
Consistent with this approach for each stakeholder was built a table concerning the allocation of a score with respect to the requirement Base (BR).

It is observed a total lack of pro-activity by the company and an inadequate behavior and worse than the context in which it operates on some sub-categories of impact.

The sub-categories which are low-scoring:

- -pari opportunities / discrimination on the macro-class workers;
- -transparency, for macro-class consumers;
- -facilities feedback, for the macro-class consumers;
- -access to intangible resources, for the macro-category Local Community.

Figure 1. Evaluation Diagram



Source: Benedetto et al., 2014

The second one has the purpose of identifying and presenting the social aspects of the supply chain of the tomato beef heart of the Ortogranda company (Piedmont, Italy). The product in question is the tomato beef heart, and the functional units is 1kg of beefsteak tomatoes. The boundaries of the system are represented by the phases of the life cycle ranging from cradle to grave (cradle to grave), and therefore, were considered the stages of production, processing / packaging and distribution. This study, focused attention on three stakeholders: employees, local community and consumers.

The analysis highlights the lack of proactive action against suppliers and other players in the value chain. More particularly, the company highlights, poor management of customer satisfaction systems, in fact, in this regard, it could represent a significant improvement and an excellent showcase for the product in question, the realization of a web site, for direct contact with the customer. The decision to apply the S-LCA is to contribute to greater awareness of the company for a pro-active attitude towards the local community itself.

The third case has the general aim to "try out" the method proposed by UNEP/SETAC Guidelines, due to the novelty of the approach, and also to present a S-LCA implementation to compare the impacts of rose production in Ecuador and Netherlands. Furthermore the objective is to identify differences and similarities in environmental and social life cycle modelling and both social and environmental hot spots in each of the life cycles. Data are mainly obtained from governmental and non-governmental organisations. For the calculation of the environmental burden a screening type LCA is conducted including midpoint impact assessment. The Functional Unit is a bouquet of roses with 20 caulis per spray packaged and transported to the flower auction in Aalsmeer, Netherland. The S-LCA scope involves the rose blossoms producing process and the harvesting process; the system boundaries is "gate to gate", so the culture of rose plants and the cottage are out of examination. The relevant

categories identified were: workers, supply chain actors, local community, society and consumers.

The main results are that the rose production in Ecuador is associated with a multitude of social issues. So social ills become even worse through rose plantations, in spite of providing jobs in rural regions, which are very important for the rural population. "The low payment, the exploitation of (child) labour, and the impacts of careless pesticide use have nevertheless a negative contribution to living conditions. Each red, orange, and yellow coloured indicator represents a problem area with many direct and indirect effects; a detailed description of each goes beyond the scope of this paper. Since also the closing of the rose farms would have serious consequences for the local society, an improvement of the situation is recommended. The Dutch rose production induces mainly positive social impacts. One disadvantage is the low employment rate due to the high automatization. On the other hand, this high degree of automatization leads to only very little health effects" (p. 377).

The last one is a project focused to discuss the evolution of S-LCA with a view to constructing effective methods to include the social aspects of agricultural production activities from a life cycle perspective: cheese production in New Zealand. In this study no assessment was performed, just the proposal of an appropriate methodology.

Conclusions

This paper has tried to highlight the importance of S-LCA methodology in measuring the social responsibility of a firm, focusing the attention on the agro-industrial sector. Some work has been done to establish the framework, but much more is needed to make this methodology a useful tool for agro-industrial firms to assess the social sustainability of their product.

The main problems associated with the application of S-LCA are essentially related to its practicality at the corporate level, especially with regard to the ability of the companies to verify the implementation by the suppliers and customers of the principle of social responsibility.

How have highlighted the results of the applications considered, often games market are so strong that the company can not prefer one provider over another, often the provider is a monopolist (as in the case of the sale of glass bottles). The company also looks after the economic advantage in the purchase of inputs, paying no attention to social aspects.

Again, the evaluation of the entire life cycle of the product is not always possible by the company. Then there is the difficulty of defining a set of common indicators, given the importance of the local geographical context; the lack of characterization factors leading to the transfer of inventory data in impacts.

Since this is a very useful technique that produces a positive effect on improving the quality of life of workers, the public welfare and the social and economic development in general, it is appropriate to continue its spread across the enterprise, especially in a sector such as agriculture and food which involves a multiplicity of actors.

The S-LCA has the potential to contribute significantly to the eco-efficiency and sustainable production and consumption of products from a social perspective and can help inform decision making for sustainable development.

References

- Benedetto G., Corinto G., Rugani B., Vázquez-Rowe I., Benetto E. 2013, The evolution of Life Cycle Assessment (LCA): some guidelines for future research in the wine sector, L Annual SIDEA Conference, Lecce, Italy.
- Benedetto G., Petti L., Ugaya C.M.L. 2014, Social-LCA (S-LCA) in the agri-food sector: the case study of a sardinian wine, SETAC 24th Conference, Basel.
- Benoit C., Mazijn B. (eds), 2009, Guideline for social life cycle assessment of products. UNEP, druk in de weer, Belgium: ISBN: 978-92-807-3021-0.
- Benoit C., Norris G.A., Valdivia S., Citroth A., Moberg A., Bos U., Prakash S., Ugaya C., Beck T. 2010, The guidelines for social life cycle assessment of products: just in time!, The International Journal of Life Cycle Assessment, vol. 15, 2, pp. 156-163.
- Birch D. 2008, Analysis of CSR: principles and concepts, Social Responsibility Journal, vol. 4, (1-2), pp. 129-35.
- Carroll A., 1999, Corporate social responsibility: evolution of a definitional construct, Business and Society, 38 (3), pp. 268-95.
- Commission of the European Communities 2001, Promoting a European Framework for Corporate Social Responsibility, Commission of the European Communities, Brussels.
- Commission of the European Communities 2002, Communication from the Commission Concerning Corporate Social Responsibility: A Business Contribution to Sustainable Development, Commission of the European Communities, Brussels.
- Di Iacovo F. 2007, La responsabilità sociale dell'impresa agricola, Agriregionieuropa, n. 8.
- Di Iacovo F., Fonte M., Galasso A. 2014, Agricoltura civica e filiera corta. Nuove pratiche, forme d'impresa e relazioni tra produttori e consumatori, Gruppo 2012 WP. 22, luglio 2014.
- Dreyer L.C., Hauschild M.Z., Schierbeck J. 2006, A framework for Social Life Cycle Impact Assessment, The International Journal of Life Cycle Assessment, vol 11 (2), pp. 88-97.
- Dreyer L.C., Hauschild M.Z., Schierbeck J. 2010, Characterization of social impacts in LCA. Part 1: development of indicators for labour rights, The International Journal of Life Cycle Assessment, vol 15 (3), pp. 247-259.
- Franze J. & Citroth A. 2011, A comparison of cut roses from Ecuador and the Netherlands, International Journal for Life Cycle Assessment, (16) 4, pp. 366-79.
- Gauthier C. 2005, Measuring Corporate Social and Environmental Performance: The Extended Life-Cycle Assessment, Journal of Business Ethics, vol. 59 (1-2), pp. 199-206.
- Gough D., Thomas J., Oliver S. (2012), Clarifying differences between review designs and methods, Systematic Reviews 1:28, <http://www.systematicreviewsjournal.com/content/1/1/28>.
- Hauschild M.Z., Dreyer L.C., Jorgensen A., 2008, Assessing social impacts in a life cycle perspective – lesson learned, CIRP Annals – Manufacturing Technology, vol. 57, pp. 21-24.
- Jones B., Bowd R., Tench R. 2009, Corporate irresponsibility and corporate social

- responsibility: competing realities, *Social Responsibility Journal*, vol. 5 iss.3, pp. 300-310.
- Jorgensen A., Le Bocq A., Nazarkina L. 2008, Methodologies for social life cycle assessment, *The International Journal of Life Cycle Assessment*, vol. 13 (2) pp. 96-103.
- Korhonen J. 2003, Should we Measure Corporate Social Responsibility?, *Corporate Social Responsibility and Environmental Management* (10), pp. 25-39.
- Marotta G., Nazzaro C. 2012, Modelli di responsabilità sociale nell'impresa agricola multifunzionale, *Agriregionieuropa*, anno 8 n. 29, 2012, p. 63.
- Nestlé, 2006, Nestlé ed il concetto di Responsabilità Sociale delle imprese, marzo 2006.
- Rugani B., Vázquez-Rowe I., Benedetto G., Benetto E., A comprehensive review of carbon footprint analysis as an extended environmental indicator in the wine sector, *Journal of Cleaner Production*, 54: pp. 61-77.
- Paragahawewa U., Blackett P., Small B. 2009, Social Life Cycle Analysis (S-LCA): Some Methodological Issues and Potential Application to Cheese Production in New Zealand, *agresearch farming, Food and Health*. First.
- Petersen E.E. 2013, Tracking down Social Impacts of Products with Social Life Cycle Assessment, Doctoral Thesis in Planning Decision Analysis with specialisation in Environmental Strategic Analysis.
- Petti L., Campanella P. 2009, The Social LCA: the state of the art of an evolving methodology, *The Annals of the "Stefan cel Mare" University of Suceava. Fascicle of the Faculty of Economics and Public Administration*, vol. 9, n. 2-10.
- Pulina P. 2010, Etica e responsabilità sociale delle imprese della grande distribuzione alimentare, *Agriregionieuropa*, n. 20.
- Ramirez P.K.S., Petti L. 2011, Social Life Cycle Assessment: methodological and implementation issues, *The Annals of the "tefan cell Mare" University of Suceava. Fascicle of the Faculty of Economics and Public Administration*, vol. 11, 1 (13).
- Sodano V., Hingley M. 2013, The food system, climate change and CSR: from business to government case, *British Food Journal*, 115 (1).
- Traverso M. 2010, Sviluppi metodologici nella Social Life Cycle Assessment. Convegno della Rete Italiana LCA <http://www.reteitalianalca.it/attività/organizzazione->
- UNEP, 2011, *Towards a Life Cycle Sustainability Assessment, Making Informed choices on products*, ISBN: 978-92-807-3175-0.
- Welford R. 2002, Globalisation, Corporate Social Responsibility and Human Rights. *Corporate Social Responsibility and Environmental Management* (9), pp. 1-7.