Reporting the social indicators to the functional unit for food product. Theoretical contribution regarding the collection of relevant data.

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ABSTRACT

Several conceptions of social LCA lend on two often implicit hypothesis i) the source of impacts, the stressor would be either from technical origin, either from social one. It stems from it that relating the quantity of impacts to the quantity of functional unit has to be done through the unit processes, as it is done in ELCA. ii) companies are singly and freely choosing their practice, and even imposing social behaviour. We expect pointing out that we may build another representation. The values of the social indicators may be related proportionally to the functional units, if we handle them at the relevant level. Suggestions about the potential levels for picking up the data will conclude this proposal.

Warning: In the social LCA field, all the authors agree that the conceptual framework (e.g. UNEP, 2009) is far from being comprehensive. Moreover, no one claim that there is a unique or even consensual framework (epistemological, theoretical), to date. So, **this paper is not a case study**. This paper is a modest contribution towards building a conceptual framework for social LCA. It doesn't provide a list of indicators, it doesn't address the choice of indicators. Because we consider that these steps can't be performed before setting a strong theory of "what really count" among the social impacts of products. And this theory is not available today. However, we can build together parts of the foundations for the social LCA of tomorrow. The modest objectives of this paper are: 1) Discussing two implicit hypothesis underpinning many social LCA case studies 2) Showing that using different hypothesis, we may relate the social indicators (even if we don't provide a list) to the functional unit. Here are the prudent objectives of this paper. We expect it to be seen like a small part of the foundations we claim for.

1. Introduction

Within the conceptual framework of the Life Cycle Assessment (Jolliet et al., 2004), it is worth the indications provided about the impacts to be related to the functional unit. This property means that- up to a point- the quantities of impacts will vary in the same direction and proportionately with the quantities of functional unit. The issue is as critical for the so-called social impacts as it is for the environmental ones. The users need to choose ex-ante between different scenarios able to provide equivalent goods. They therefore require results formulated in proportion with the functional unit. But Reap et al . (2008) underpin that most impacts on people are independent of the physical processes that make the product, and more dependent on company behaviour and as such the «relation of the impacts to the product [-] is no longer straightforward » (Dreyer et al., 2006). About this critical issue, Kruse et al. (2009) have made the distinction between two kinds of inventory indicators, the additive ones and the descriptive ones. The first ones relate to the functional unit (e.g. labour costs). The second may be assessed at each point of the chain, but the authors explain that they cannot be related to the functional unit (e.g. use of child labour). Norris (2006) has came up the same difficulty thanks to the « life cycle attribute assessment ». One indicator only amongst the additive ones proposed by Kruse is chosen. It could be the number of

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work hours spent by each company involved in the product life cycle. The features that Kruse would call "descriptive indicators" are becoming attributes in the new approach. Doing so, researchers can calculate the rate of work hours from local origin involved in one industry providing greenhouse tomatoes in Canada (Andrews et al., 2009).

Both conceptions lend on two often implicit hypothesis, worthy to be discussed: i) The source of impacts, the stressor (the element of pressure) would be either from technical origin, either from social one (Parent et al., 2010). It stems from it that relating the quantity of impacts to the quantity of functional unit has to be done through the unit processes, as it is done in ELCA. ii) Companies are singly and freely choosing their practices, like being observant of codes of ethics or not, and even imposing social behaviours.

Our objective is pointing out other hypothesis. Doing so, the values of the social indicators may be related proportionally to the functional units, if we handle them at the relevant scale. Suggestions about the different potential levels for collect will conclude this proposal.

2. Social impacts are not stemming from unit processes

Stressors causing the social or other impacts are all stemming from social origin. They are depending from numerous social factors, some of them offering drivers to policy-makers. The average life expectancy is influenced by drivers on the nationwide scale, like the health policy. Industry may or may not implement policies, embedded in the state policies, for preventing occupational injuries. Companies and moreover groups of companies (March et Simon, 1999) have chosen organisational and technological (Kloepffer, 2003) configurations, the unit processes of today as a result. The unit process is the LCA term to assign one composite body, a layout of diverse resources: human, material and symbolic, gathering people, objects, space, machines, documents, and given the responsibility of doing a particular task (Girin, 1995). In ELCA, the relevant unit processes are special composite bodies. The non-technical parts seem to be cancelled out by the Fordist standardisation, performed in order to secure the return on the machines. The unit processes are time and space stabilized enough for us to build data bases delivering how much X substance is released by the process Y per functional unit. In appearance, everything works as if the machine alone was creating the impacts! But modify the tuning, and the outputs will shift. The machines are not the cause of the social impacts. When Boje (2009) recounts a fatal injury, it is clear that the killer-machine is only one tiny part of the explanation: « social here refers to poverty that would prompt 14-year old Liu pan to work 72 hour weeks on an unsafe machine, at 60% of China's legal minimum wage, to the point of exhaustion »(page 3).

In general, we get only fuzzy ideas about the pathways between the set up of one milk container in one *brazilian assentamento* (homestead), and the literacy gain which seem to be its output. We feel that many others elements but the milk container itself, take place. The human component of the composite body is re-established. These pathways are neither standardized, nor brought in general use. « It is very difficult to find any consistent differences between different technologies or production routes involved in the production of any given product, simply because the social impacts are so site specific that the variation between sites exceed the variation between technologies or production routes » (Weidema, 2002). By « site specific », we understand "linked with human behaviour". The social impacts are not linkable with each process unit because they are dependent on non standardized human behaviours. Indeed, very numerous human decisions affect the pathway be-

tween the unit process and the result. The whole constitutes a "complex system integrating human actors", where the human being's attendance introduces specific types of complexity (Girin, 2000). This entails that the future social impact is unpredictable from the unit process state.

Moreover, it is logical to focus on stressors at the level which holds the drivers. Sometimes, the company is not the best relevant level.

3. Companies comply with institutional isomorphism

Companies are embedded within the social fabric. They create disruptive fields (Emery and Trist, 1965) which bend the fabric, while complying with it, in a common cultural milieu. It is the so-called phenomenon of institutional isomorphism (Di Maggio and Powell, 1983). It means that all the companies belonging to one industry tend to become similar along the time, even to borrow the same or complementary strategies. About 20 developed countries, Maria Gjoldberg (2009) highlights that differences in political-economic background will be reflected in differences in Corporate Social Responsibility (CSR) performance. The countries with the most developed strong CSR practices belong to two groups. The first ones (Switzerland, UK, ND) welcome a high rate of globalized companies, more exposed to the spotlight of watchdogs from NGOs and the media. The seconds ones (Nordic countries) are characterised by close, cooperative and consensual relations between state, business and labour, as well as long-standing tradition for involving civil society in policy making. Her paper concludes by pointing out the need to acknowledge the fundamental interdependence between traditional, "hard" government- corporatist regulation of business responsibilities and "soft" civil regulation of corporate responsibilities." (Gjolberg, 2009).

Dreyer et al (2010) implicitly acknowledge the influence of more macroscopic levels than the company's one, and the institutional isomorphism phenomenon, because they underpin that the labour rights violation risk depends on the contextual factors surrounding the company. Indeed, they include in those factors the « (1) existence and enforcement of national legislation concerning the issue, and social, cultural, economic and political practices at the location, and (2) the practices of members of the industry ». As an outcome, the number of child labour hours involved in the making of rice in China doesn't depend on the company choice and behaviour, but on the national cultural agreement about it. Even if a Chinese company makes advertisement on its website as being "child labour" free, it can't merely be true if child labour is the rule in the rest of the society (Boje, 2009).

4. What is the relevant level for picking up data?

Because the social impacts don't stem from the unit processes level, and because of the institutional isomorphism of companies, we speak in favour of assessing the social impact at the sector or industry's levels. The idea is accounting for the evolution of the average practices of the companies making the product in one given country, and not to focus upon the specific unit processes from the company X. At the sector or industry level, one may find a value for the inventory indicators that we may relate to the quantities of functional units. So, the number of hours of child labour by functional unit of the rice sold by the company under scrutiny, and its national suppliers as a whole, may be collected at the industry level. If available, the two indicators values to collect are: 1) the number of children

working into the rice industry ; 2) The quantity of rice processed in the country. You may calculate so a national indicator year 2010 of the number of child labour hours per functional unit of rice. Of course, it is a rough assessment, but not so bad, and including all the national companies involved in the chain under scrutiny. Weidema (2002) advices to filling any data gaps with default data, based on input-output tables extended with social parameters. We argue that these data will be more accurate than data drawn from auditing one company. Jorgensen (2008) too emphasizes how the generic data may be worthwhile « the quality of site-specific data is very dependent on the auditing approach and, therefore, not necessarily of high accuracy, and [-] generic data might be designed to take into account the location, sector, size and maybe ownership of a company, and thereby in some cases, give a reasonable impression of the social impacts that can be expected from the company performing the assessed process." Indeed, getting those values don't provide the pathways describing the impacts.

In theory, we are able to calculate the number of hours provided by children for each process unit in the world (for instance for each fruits drying rack) from real world data. All we have to do is to draw up a typology of « drying racks in their social context » (it means taking into account the technique, the place, time, and other social relevant items). And yet, these so precious data will turn out to be very instable along the time, while no one could explain ex-ante the causes of the variations. And so, the final impact measures would be so error-prone, that they would become unusable (Lenzen, 2006). Indeed, the alternate conversions from former outputs into impact measures are linked with characterisation factors matched with incertitude slot. The longer the chain between the first event (here it is the dryer rank functioning) and the final impact is, the larger the incertitude slot becomes.

The more the data will be picked up at macroscopic level, the more the data will be stable along the time. They will provide a final impact measure as accurate (with narrow incertitude slot) as the causality chain (between the driver and the end-point) will be shorter. Despite they advice us to pick up data at the level of the « companies in which the processes occur », Dreyer et al. (2010) acknowledge the role of more macroscopic levels : « the translation from performance score [within the company] to risk involves the assessment of the context of the company in terms of geographical location and industry and of the typical level of social impacts that these entail, and interpretation of the company's management effort in the light of this context » (page 247).

If data are lacking at the sector level, it is worth getting them from the immediately inferior level, which is from the industry level or from a group of companies. As one goes along down till the unit processes, data become more and more unstable, because the phenomenon whose data account for, is less and less dependent on these inferior level (the drivers belong to upper levels). However, this idealistic scheme assumes that the drivers are really triggered at each level, initiating with the upper and more general one. National State is assumed to spread its health policy in order to improve the inhabitants' life expectancy, the sectors are assumed to implement their occupational injuries prevention programmes and so on. In case of deficiency from upper levels, the first decision level triggering the drivers will be the relevant one to perform the collect of inventory data.

The table 1 highlights the different levels for picking up the inventory data in the food products field. We provide two examples often quoted in the literature: changes in life expectancy at birth and using child labour. From the bottom of the table (unit processes) it is clear that the company level is the first one where some decisions take place, for instance about the work organisation, which could influence the corresponding impacts. But the stability of the data along the time is worst than at any upper level. So, choosing the rele-

vant level for data picking is a compromise between data availability, the best stability along time as possible, and the smallest incertitude slot about the final impacts.

It is worthy of note to set aside efforts in order gathering data of great worth for making up data basis reusable by other researchers.

Table 1: Stability of collected data and existence of drivers, according to the level of the collect, within the agri food field.

Level for collecting data	**Time stability**	**Example 1: Where are the drivers for moving the life expectancy of workers in rice industry?**	**Example 2: Where are the drivers for using or not child labour?**
State level	Very stable	The average life expectancy at birth depends on drivers handled at the Nation level.	It is a cultural issue, so if drivers exist, they are handled at the Nation level.
Agri food sector level	Stable	Some features of the sector (e.g. often outdoors working conditions) entail differences around the average. Some drivers are handled at this level.	Some features of the sector (e.g. low qualification level needed) entail differences. Some drivers are handled at this level.
Rice industry level (companies processing rice)	Stable	Some features of the industry (e.g. localisation of the rice industry in remote areas) entail differences around the former average. Some drivers are handled at this level. .	Some features of the industry (e.g. localisation of the rice industry in remote areas) entail differences around the former average. Some drivers are handled by this level.
Group of companies level within the rice industry	Average stability (depends on the size of the group compared with the industry size)	Depends on the size of the group within the industry	Depends on the size of the group within the industry
Company level (e.g. packaging plant)	Between weak and average stability	When the former drivers are not triggered, a company alone may handle drivers, depending on the type of company.	There may be huge differences according to the type of company (e.g. globalized versus local company) if the former drivers are not triggered.
Agricultural itinerary	weak	No relationship	No relationship
Unit processes level	weak	No relationship	No relationship

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