

Is there a scientific justification for the current use of child labour and working hours in social LCA?

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1. Context and scope

The main idea behind social life cycle assessment (SLCA) is to assess social impacts of products and services in a similar manner as environmental impacts are assessed in environmental LCA (ELCA). In 2009, guidelines for SLCA were published (Benoît et al. 2009), hereafter referred to as the UNEP/SETAC guidelines. A number of LCA case studies have since then been conducted, some that claim to follow the UNEP/SETAC guidelines, and some that do not. The methodological variations that can be found in these case studies implicate the need for further methodological discussions. This need was also identified in the UNEP/SETAC guidelines, in which elaboration of social indicators was one specifically identified area for future research.

One important feature of ELCA is its foundation in the natural sciences. Descriptions of environmental impacts such as global warming and acidification can be found in basic environmental science textbooks. Environmental indicators such as the life cycle global warming potential of a product thus rest on a natural science foundation. It has been recommended that sustainability indicators in general (Meadows 1998) and social indicators in particular (Noll 2002) should rest on a scientific basis. Suggested subcategories in the UNEP/SETAC guidelines, however, are adopted from political standards and documents published by international organizations. This implies an agreement of the UNEP/SETAC guidelines with such political documents. The extent to which these politically-based subcategories are in agreement with how they are described in the scientific literature calls for an investigation.

In a previous article, some of us pointed out that some subcategories recommended in the UNEP/SETAC guidelines could be interpreted differently depending on cultural background and on political, ethical and ideological views (Baumann et al. 2013). In this article, we continue the analysis by examining the scientific findings in the wide research literature related to two subcategories suggested in the UNEP/SETAC guidelines: *working hours* and *child labour*. The chosen subcategories are among the most frequently utilized in SLCA case studies. Only Clift et al. (2013) and Jørgensen et al. (2010) have previously evaluated the use of child labour as social topic in an SLCA context.

2. Method

A multi-disciplinary review of the research literature was carried out in order to obtain an understanding of the current knowledge pertaining to the two topics selected for examination, working hours and child labour. First, we investigated the ways in which the subcategories were handled and discussed in conducted SLCA studies and in the UNEP/SETAC guidelines. Then, we conducted a review of the non-SLCA scientific literature. This scientific literature was obtained through searches on “working hours” and “child labour OR child labor” in the scientific database Sciencedirect (<http://www.sciencedirect.com/>). We considered the first 1 000 hits for each topic. From these 1 000 publications, studies that were considered to be of high relevance based on the content of their titles were selected. The articles were then subject to further relevance scrutiny by consideration of their abstracts and main texts. The studies identified were mainly from the fields of social science and economics, including labour economics, development economics, development studies, ergonomics, and anthropology. In addition to these, two studies of high relevance for the topic child labour were included. Content analysis in a framework of positive and negative associations was conducted on both the studied SLCA case studies and the wider research literature, in a similar manner as was done by Boholm and Arvidsson (2014). Note that a topic can be regarded as having positive social value by either causing benefits or preventing harm. Similarly, a topic can be regarded as having negative social value by either causing harm or preventing benefits. Note also that the classification of something as being a harm or benefit was not done by us, but deduced from the writing in the reviewed literature. The contrast between the SLCA case studies and the wider research literature provides the basis for our discussion.

3. Working hour results

Working hours is used in several SLCA case studies (Bouزيد and Padilla 2014, Ciroth and Franze 2011, Ekener-Petersen and Finnveden 2013, Franze and Ciroth 2011, Hunkeler 2006, Manik et al. 2013, Martínez-Blanco et al. 2014). Notably, it is used in two different ways. Some calculate number of working hours required per functional unit. Other studies do not quantify the number of working hours required per functional unit, but instead report the working hours per person and week for workers along the product life cycle. In these studies, working hours are often related to a threshold level, which is often 48 hours per person and week, above which the working hours are considered socially adverse. Employment, or rather its opposite unemployment, is an issue much interlinked with working hours. *Local employment* is a subcategory suggested in the UNEP/SETAC guidelines for the stakeholder category local community, and is also used in a number of SLCA case studies (Ciroth and Franze 2011, Ekener-Petersen and Finnveden 2013, Franze and Ciroth 2011, Hosseinijou et al. 2014, Weldegiorgis and Franks 2014). In those cases, an increase of local employment is considered beneficial.

In the wider research literature, the relationship between working hours, happiness and health is investigated in several studies. These studies typically report that the relationship between working hours on one hand and happiness and health on the other follow an inversed U shape relationship. When increased from a low level, additional working hours typically increase happiness and health, possibly due to higher status and more social contacts. Additional working hours can, however, affect both happiness and health negatively. The extremes of high working hours, such as workaholism, are clearly deteriorating for health and happiness. It is also clear that individual preferences have a large influence on whether high or low working hours cause increased or reduced happiness and health. It is also noted in many studies that when the work takes place (e.g. day work or night work) is important. A number of authors discuss flexible working hours, typically concluding that variable working hours were associated with poor health and well-being. The relationship between working hours per person and unemployment is also discussed in several studies, with differing results. Some suggest that working hours reduction increase unemployment, whereas other suggest the opposite.

The results from the review of working hours in the wider research literature are summarized in Table 1. The summary implicates a delicate balance between working too much, causing stress and other health problems, and working too little, with the extreme of unemployment and subsequent losses of salary and well-being as result. This balance is individual, and one crucial aspect seems to be the degree of freedom one has to distribute the working hours over time. There also seems to be a complex correlation between working hours and unemployment. This summary points to a difficulty with current measurement of working hours owing to the equivocal positions on this topic.

4. Child labour results

Child labour is the employment of people under a certain age. In the UNEP/SETAC guidelines, it is clear that much child labour is considered to be socially adverse. Child labour is also assessed in several SLCA case studies (Bouزيد and Padilla 2014, Ciroth and Franze 2011, Ekener-Petersen and Finnveden 2013, Franze and Ciroth 2011, Hosseinijou et al. 2014, Manik et al. 2013, Martínez-Blanco et al. 2014).

There are several records of children suffering from child labour in the non-SLCA scientific literature. Examples include children with lower body mass index (BMI) and delayed genital development in India, children working with small-scale gold mining with symptoms of mercury intoxication, children exposed to various health hazards and abuse in Jordan industry, abused children in factories in Turkey, and several health- and comfort-related problems of child labourers in Venezuela. But there are also other studies in which social benefits of child labour are emphasized while distinguishing between different forms of child labour. Beneficial forms include labour that helps building the child's character in terms of, for example, punctuality

and discipline, such as newspaper delivery and baby-sitting. It is further reported that poverty causes child labour, prompting the need for any extra income. In such studies, it is argued that any reduction or prohibition of child labour will lead to socially more undesirable outcomes unless some mitigation for loss of income is offered.

Table 1 summarizes the results from the review of the wider research literature on child labour. This summary points to problems of using child labour as a social topic. A certain amount of child labour, corresponding maybe to a part-time or summer job, seems to be beneficial for building of character and learning discipline and punctuality. Little or no child labour may result in poverty in regions where neither parents nor society have the financial possibility to provide for the child. Note that this adverse social impact does not exist in high income countries. With a higher amount of child labour, however, stress and health problems are likely to occur, although this may depend on the type of work and working conditions. This distinction of child labour into the worst forms and other, not so problematic or even beneficial forms, is not done in the SLCA literature. In addition, problems of loss of income from reduced child labour are not included in the SLCA literature, although they may be crucial for the child labourer and his or her family.

Table 1: Summarized results from the review of the wider research literature on working hours and child labour.

Social topic	Benefits caused	Benefits prevented	Harm caused	Harm prevented
Increased amount of working hours	Happiness, status, health	Happiness, health, well-being	Workaholism, dissatisfaction	Dissatisfaction
Reduced amount of working hours	Health, increased wages	Health, well-being, money, development of skills, social interactions	Dissatisfaction, unemployment	Workaholism, dissatisfaction, unemployment
Increased amount of child labour	Building character, punctuality, discipline, income	Health	Abuse, injuries, many types of health problems, dropping out of school	Poverty
Reduced amount of child labour	Health	Building character, punctuality, discipline, income, welfare of households, sending children to school	Increased child labour, poverty, vulnerability on the labour market	Abuse, many types of health problems

5. Recommendations

Whereas the SLCA literature suggests that working hours and child labour cause social harms, the wider research literature reports a more complex picture of social benefits and harms. Table 1 shows how these two topics contribute to both socially benefits and harms, both for individuals and for society as a whole. Sometimes, studies suggest that the same topic both causes and prevents the same benefit or harm. This ambiguity, or perhaps even pluralistic character, of the studied topics leads us to question the usefulness of these topics in SLCA studies. We recommend future developments of SLCA methodology be based also on insights from the social sciences, in combination with systematization of empirically experiences (Baumann et al. 2013).

Given that our literature review was limited to 1000 publications for each topic, it is likely that a more comprehensive literature review would have produced an even richer understanding and more diversified positions than what was summarized in Table 1. We find it likely that the fields of social science and economics may contain additional valuable insights for topic and indicator development in SLCA. In addition, related fields also pursuing methods for social assessment exist, for example, social impact assessment, social certification (SA8000 and ISO26000), and the recently developed field of happiness studies, devoted to studies of the subjective well-being of humans. This warrants further study and comparison of approaches.

References

- Baumann, H., Arvidsson, R., Tong, H., and Wang, Y., 2013. Does the production of an airbag injure more people than it saves in traffic? Discussing an alternative approach to S-LCA methodology. *Journal of Industrial Ecology*, 17 (4): p. 517-527.
- Benoît, C., Mazijn, B., Andrews, E.S., Barthel, L.-P., Beck, T., Ciroth, A., Cucuzzella, C., Gensch, C.-O., Hébert, J., Lesage, P., Manhart, A., Mazeau, P., Methot, A.-L., Moberg, A., Norris, G., Parent, J., Prakash, S., Reveret, J.-P., Spillemaeckers, S., Ugaya, C.M.L., Valdivia, S., and Weidema, B.P., 2009. *Guidelines for Social Life Cycle Assessment of Products*. Nairobi. United Nations Environment Programme and Society of Environmental Toxicology and Chemistry
- Boholm, M. and Arvidsson, R., 2014. Controversy over antibacterial silver: implications for environmental and sustainability assessments. *Journal of Cleaner Production*, 68: p. 135-143.
- Bouزيد, A. and Padilla, M., 2014. Analysis of social performance of the industrial tomatoes food chain in Algeria *New Medit*, 13 (1): p. 60-65.
- Ciroth, A. and Franze, J., 2011. *LCA of an Ecolabeled Notebook - Consideration of Social and Environmental Impacts Along the Entire Life Cycle*. Berlin. GreenDeltaTC GmbH
- Clift, R., Sim, S., and Sinclair, P., 2013. *Sustainable Consumption and Production: Quality, Luxury and Supply Chain Equity*, in *Treatise on Sustainability Science and Engineering*, Jawahir, IS, SK Sikdar, and Y Huang, Editors. Springer Netherlands: Dordrecht. p. 291-309.

- Ekener-Petersen, E. and Finnveden, G., 2013. Potential hotspots identified by social LCA—part 1: a case study of a laptop computer. *The International Journal of Life Cycle Assessment*, 18 (1): p. 127-143.
- Franze, J. and Citroth, A., 2011. A comparison of cut roses from Ecuador and the Netherlands. *The International Journal of Life Cycle Assessment*, 16 (4): p. 366-379.
- Hosseinijou, S., Mansour, S., and Shirazi, M., 2014. Social life cycle assessment for material selection: a case study of building materials. *The International Journal of Life Cycle Assessment*, 19 (3): p. 620-645.
- Hunkeler, D., 2006. Societal LCA methodology and case study. *International Journal of Life Cycle Assessment*, 11 (6): p. 371-382.
- Jørgensen, A., Lai, L.C.H., and Hauschild, M.Z., 2010. Assessing the validity of impact pathways for child labour and well-being in social life cycle assessment. *International Journal of Life Cycle Assessment*, 15: p. 5-16.
- Manik, Y., Leahy, J., and Halog, A., 2013. Social life cycle assessment of palm oil biodiesel: a case study in Jambi Province of Indonesia. *The International Journal of Life Cycle Assessment*, 18 (7): p. 1386-1392.
- Martínez-Blanco, J., Lehmann, A., Muñoz, P., Antón, A., Traverso, M., Rieradevall, J., and Finkbeiner, M., 2014. Application challenges for the social Life Cycle Assessment of fertilizers within life cycle sustainability assessment. *Journal of Cleaner Production*, 69 (0): p. 34-48.
- Meadows, D., 1998. Indicators and Information Systems for Sustainable Development - A Report to the Balaton Group. Hartland Four Corners. The Sustainability Institute
- Noll, H.-H., 2002. Towards a European System of Social Indicators: Theoretical Framework and System Architecture. *Social Indicators Research*, 58 (1-3): p. 47-87.
- Weldegiorgis, F.S. and Franks, D.M., 2014. Social dimensions of energy supply alternatives in steelmaking: comparison of biomass and coal production scenarios in Australia. *Journal of Cleaner Production*, In press.