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Time-based indicators of forced labour, local employment and equal opportunities in social LCA

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Introduction

Much work within the social life cycle assessment (SLCA) field is based on so-called type-1 indicators, which relies on semi-quantitative ordinal scales, specifically on the assigning ordinal values (e.g. 1, 2, 3 and 4) to impacts occurring along the life cycle. Such ordinal-scale values typically reflect companies' ethical performance and legal compliance, for example with 3="fulfils basic requirements" and 4="proactive behaviour". However, this approach has been criticised for its mathematical limitations; strictly, it is not allowed to add, subtract, multiply and divide ordinal-scale values, since it is not certain that 2 is twice as much as 1, while this is still common practice in such SLCAs (Arvidsson, 2018). In contrast, there is also a type of indicators called type-2 indicators, which are effectively the same type of quantitative, cardinal-scale indicators as are typically used in conventional LCA. An example in the field of SLCA is the use of disability-adjusted life years (DALY) for assessing various health impacts. Type-2 indicators allow for any type of relevant mathematical operation, including addition, subtraction, division and multiplication. Since there is typically an interest in adding social impacts along product life cycles, type-2 indicators have a clear benefit, provided that such indicators can be developed to capture important social impacts. This can be difficult, since the impact pathways going from the product system, over midpoint impacts, to endpoint impacts are often challenging to map and quantify for social impacts.

This contribution contains a proposal of a number of type-2 indicators for use in SLCA. The indicators are based in time and inspired by the early SLCA work by Hunkeler (2006). He proposed labour hours as a social midpoint indicator and specifically conducted an assessment of two detergents. In that work, labour hours are understood as something positive, contributing to the local well-being by enabling jobs, incomes and subsequent tax revenues that can be used for health care, education and other important services. However, labour hours can also be socially problematic – for example, they can be in the form of forced labour or be unevenly distributed among e.g. females and males. In addition, as pointed out by Hunkeler, if labour hours indeed are to contribute to local well-being, the labour must also be conducted locally. A critique against the original labour-hour indicator proposed by Hunkeler can thus be that the labour hours in themselves give limited information about the social impacts related to the labour hours – they could be beneficial, hazardous, harmless, unequal, etc. In this sense, labour hours are more akin to inventory-level rather than midpoint-level indicators in LCA. For example, they are quite similar to the inventory-level indicator of land area occupied along the life cycle, measured in square metres, which is sometimes used as a simple indicator for land use. For this indicator too, it is clear that some square metres used are more problematic than others: occupying one square metre of cut down rainforest is arguably more damaging than occupying one square meter of set-aside land. The same goes for labour hours – one hour of interesting work under good conditions is less damaging (and might even be beneficial) compared to e.g. one hour of forced labour under harsh conditions. Consequently, it would be interesting to disaggregate the labour hours and categorise them into different relevant groups which better reflect social impacts.

Methods

The guidelines on SLCA by the United Nations Environment Programme and the Society for Environmental Toxicology and Chemistry (UNEP/SETAC) contain an extensive list of social impacts, referred to as subcategories (Benoît et al., 2009). Three of these fit well into the idea of defining more detailed categories of labour hours: forced labour, local employment and equal opportunities. For forced labour, it is in theory possible to quantify the share of the total number of labour hours that are forced (i.e. conducted under slavery-like conditions). In this way of thinking, the inventory data is the total number of labour hours (t) and the share of the hours conducted as forced labour (x_{FL}) becomes akin to a characterisation factor, enabling the calculation of the life-cycle forced labour impacts (I_{FL}) on a midpoint level over all life-cycle processes i:

$$I_{FL} = \sum_i t_i x_{FL,i} \text{ (Eq. 1)}$$

Exactly what constitutes "forced labour" can be debated, but modern interpretations of slavery include the "classical", chattel slavery where people are born, captured or sold as slaves, but also debt bondage slavery (trapped by loans for an undefined length of time) and contract slavery (trapped by fake contracts luring workers into trafficking and enslavement processes). Regarding local employment, it is possible to assess the share of labour hours occurring at some geographical location (x_{LE}), e.g. a place where the foreground

system is located and there is a wish to increase employment rates in order to increase incomes and tax revenues:

$$I_{LE} = \sum_i t_i x_{LE,i} \text{ (Eq. 2)}$$

where I_{LE} is a midpoint-impact indicator for local employment. Regarding equal opportunities, that can encompass many different things, but one part can be than both genders take part in labour and earn incomes, allowing them both a certain control over their lives. For this purpose, it is possible to quantify the shares of labour hours conducted by the respective genders (x_G, where G is either female or male):

$$I_{EO} = \sum_i t_i x_{G,i} \text{ (Eq. 3)}$$

where I_{EO} is a midpoint-impact indicator for equal opportunities.

Results and discussion

The three indicators proposed all have the unit time, e.g. "hour" or some other preferred time unit. Figure 1 shows a fictional, schematic result from applying the indicators. The first bar is the total labour hours, equal to the indicator proposed and assessed by Hunkeler (2006). Then comes the forced labour hours, which constitutes a share between 0 (best case) and 100% (worst case) of the total labour hours. The third bar is the labour hours conducted locally, which is also a 0-100% share of the total labour hours. Finally come two bars showing the share of female and male labour hours, which together make up 100% of the total labour hours (unless some gender-neutral or data-wise uncertain category is included). For all the three indicators, the *absolute values* can be interesting, e.g. for product comparisons. However, more interesting than that is probably the *distribution of impacts* along product life cycles. Specifically, for local labour hours, the distribution along the life cycle is key and built into the indicator – unless a significant share of the labour is conducted at a certain selected location along the life cycle, a product can hardly be claimed to contribute to local employment. For equal opportunities, the distribution between men and women is interesting, and so is the gender balance along the life cycle. This contribution provides the possibility to assess several important subcategories with type 2-indicators, although they remain to be tested in SLCA case studies. As for any newly developed indicators, data availability might be a challenge which needs to be addressed. Additional indicators might be developed by considering other relevant types of labour hours.
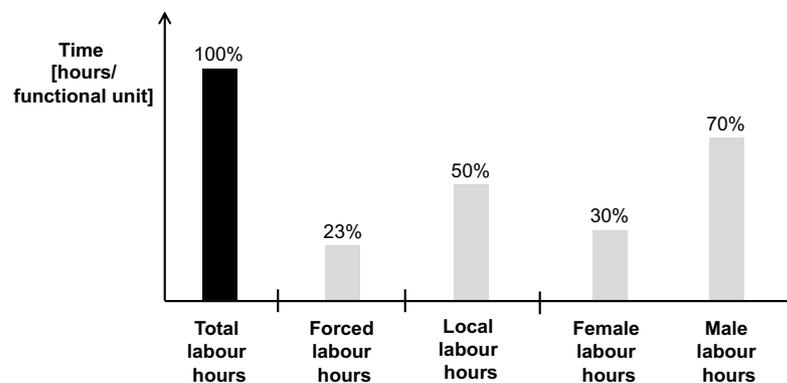

Figure 1: Fictional, schematic example results for the total labour hours (black bar) and the proposed time-based social indicators (grey bars).

References

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