# Chapter 8: The Social Hotspots Database Context of the SHDB

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# Chapter 8: The Social Hotspots Database

*Catherine Benoit Norris and Gregory A. Norris*

## Context of the SHDB

Social LCA has a daunting task: to MAKE REAL the circumstances of supply chain stakeholders, somehow translating into a meaningful and common language the experiences and working conditions of otherwise unrelated workers and citizens involved or impacted by the making of products. Product supply chains may span thousands of miles and involve hundreds of production activities taking place within a window of weeks, months or years. Information obtained from a Social LCA can help decision-making by end-producers, retailers, purchasers and consumers who are also located at various corners of the globe.

Before the industrial revolution, most everyone had a personal relationship with a large number of the service and product providers in their life. Mass production, technology and the appearance of modern money (institutions of credit and debt, money markets) have made it possible for people to exchange goods in a detached, abstract and often impersonal way.

> Money, we can say, is a means of bracketing time and so of lifting transactions out of particular milieux of exchange. Money is a means of time-space distanciation. Money provides for the enactment of transactions between agents widely separated in time and space (Giddens, A., 1991).

Today we are so detached from the producers of the products or services we use daily that we barely know a handful of them.

As Globalization has reached an unprecedented level, we need to piece back together the links tying us to the people offering their sweat and labor for helping us meet our needs and satisfy our cravings.

While it would be most accurate to speak with each one of the vested actors involved in each supply chain, the scale at which supply chains operate makes it impossible. To make Social LCA operational, we need to cut corners; we need estimates.

The needs for increased information, leadership and social change in supply chains are recognized by the United Nations Guiding Principles on Business and Human Rights. These Guiding Principles were developed through a six-year, all-encompassing stakeholder engagement process led by Professor John Ruggie, then Special Representative of the United Nations Secretary-General. The Guiding Principles affirm the State's duty to protect human rights, the corporate responsibility to respect human rights and the need for greater access to remedy for victims of business-related abuse. As a result of the United Nations endorsement of the Guiding Principles, we see the emergence of an international legal framework.

One of the key aspects of the Guiding Principles is its focus on due diligence. Human rights due diligence is defined by the Guiding Principles as: a business's ongoing processes for assessing its actual and potential human rights impacts, integrating and acting upon its findings, tracking its responses and communicating how its impacts are addressed.[1] Human rights due diligence should cover adverse impacts that the business may cause or contribute to through its own activities, or which may be directly linked to its operations, products or services by a business relationships. Consequently, these activities and business relationships set the scope of human rights due diligence. Due diligence is also a core component of ISO 26000[2] a business guidance document on social responsibility management.

In order to conduct supply chain due diligence, organizations require methods, models, data and tools. Social LCA and the modular social hotspots database system provide the necessary elements to conduct a thorough assessment.

## SHDB history and structure

It was with the ambition to make comprehensive and detailed information on supply chain human rights and working conditions available to everyone that the Social Hotspot Database (SHDB) project was launched in 2009. The SHDB is a project centered at New Earth, a U.S. based not-for-profit focused on information systems for sustainability. A key aspect of the project has been to ensure that users have full transparent access to information about working conditions and

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[1] United Nations Human Rights (2012). The corporate responsibility to respect

[2] International Organization for Standardization. (2010). ISO 26000 : Guidance on social responsibility. Geneva, Switzerland : International Organization for Standardization.

impacts in global supply chains, and also about the hundreds of sources drawn upon as well as the methods used to characterize risks within the SHDB. The SHDB development can be considered a follow-up initiative to the 2006-2009 development of the Social LCA Guidelines[3]. In 2009, New Earth received seed funding from Walmart Private Brands to develop the Social Hotspots database. The Sustainability Consortium and private companies later contributed funding for further development. The Sustainability Consortium also funded the application of the SHDB to seven case studies[4], and then the application of the SHDB to assess 100 product categories[5]. The development of the SHDB benefitted from the advice and support from the New Earth advisory board chaired by Raymond Robertson (Better Work Programme, Macalester college). The advisory board was composed of a group of 24 distinguished individuals from academia, industry, intergovernmental organizations, government and non-governmental organizations.

In 2013, New Earth made the SHDB publicly available through the SHDB website (www.socialhotspot.org) and through licenses that work in professional LCA software such as Open LCA and SimaPro. Since 2013, New Earth has been working on updates and further development of the database and making it available with different product system models.

*Structure of the SHDB*

The Social Hotspots Database is meant to be a modular system, which includes three main components:

1. A Global Input Output Model
2. A Worker Hours Model
3. Data on social risks and opportunities

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[3] UNEP-SETAC, Benoît, C. and Mazijn, B. (eds.). 2009. Guidelines for social life cycle assessment of products. Paris : United Nations Environment Programme.

[4] Benoît-Norris, C., D. Aulisio, G. A. Norris. 2012. Identifying Social Impacts in Product Supply Chains: Overview and Application of the Social Hotspot Database. MDPI, Sustainability.

[5] Benoît-Norris, C., D. Aulisio, G. A. Norris. 2014. Efficient Assessment of Social Hotspots in the Supply Chains of 100 Product Categories Using the Social Hotspots Database. Sustainability, 6, 6973-6984; doi:10.3390/su6106973

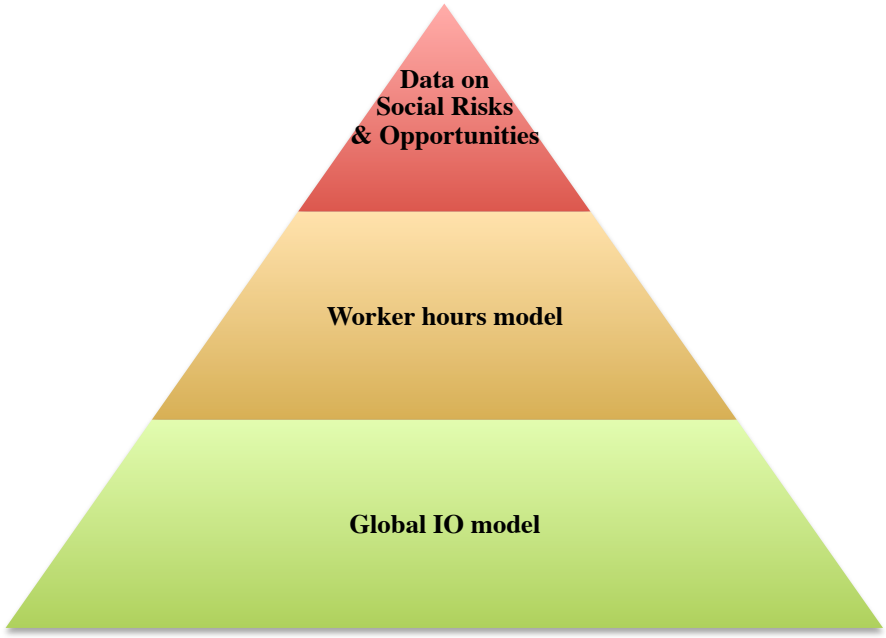


Figure 1: The SHDB structure
Source(s): Original artwork

Technically, the SHDB is an extended input/output Life Cycle Inventory database providing a solution to enable (1) the modeling of product systems and (2) the initial assessment of potential social impacts.

The main epistemological and methodological choice made was to model the SHDB database on the pre-existing structure of E-LCA databases integrated into LCA software. The SHDB is different from GaBi or Ecoinvent but it works harmoniously in the same software systems, once integrated.

In the approach adopted, the product system is considered to be the same whether it is modeled to study environmental or social impacts. The difference is that geographical information is needed to provide an estimate of the social risks. Note, however, that within the same product system, hot spots can be different from one type of impacts to another.

The SHDB system's[6] current Global IO model is based on the Global Trade Analysis Project Version 7, a global economic equilibrium model (GTAP, 2008). The total database contains data for 57 different sectors, in each of 113 different regions; most of these regions correspond to individual countries while others are

[6] Benoît-Norris, C., D. Aulisio, G. A. Norris. 2013. The Social Hotspots Database V2. New Earth.

regions containing multiple countries. Thus, there are 6441 unit processes in the database. However, the SHDB system can be used with other supply chain models including Eora, WIOD and process based models such as Ecoinvent. This part of the SHDB system is thus changeable depending on needs and preferences.

The labor intensity data were developed by converting GTAP data on wage payments into estimates of worker hours, skilled and unskilled, for each sector in each GTAP country/region. This was made possible by compiling and using wage rate data, for skilled and unskilled labor, by sector and region. These labor hour intensity factors are used together with the social risk level characterizations, in order to express social risks and opportunities in terms of work hours, by sector and country, at a given level of risk relative to each of over 22 social impact subcategories and nearly 150 different indicators. The risk data addresses five main impact categories: labor rights and decent work, human rights, health and safety, governance and community.

The SHDB project draws upon hundreds of data sources ranging from the International Labor Organization, the World Health Organization, the U.S. Department of Labor and State, the World Bank, and more. Quantitative statistics and qualitative information by country and sector are used to develop characterization models. These models assign a risk (or opportunity) level to the data so that users can identify target areas in their supply chains to verify or improve social conditions.

The SHDB is based upon life cycle attribute assessment (LCAA) a methodology developed by Norris (2006)[7]. Each unit process (that we define as country-specific sector when using global IO models) has a number of different attributes, or characteristics, relative to a large set of social issues. The activity variable used in the SHDB is worker-hours. Thus, the SHDB can be used to identify how many worker-hours are involved for each unit process in the supply chain, for a given final demand (final product or service output from the system). The sociosphere flows are expressed as worker-hours at a specified level of risk on a given risk indicator, per US $ of process output.

## Goal and Scope of the SHDB

The goal of the SHDB is to provide access to best available social risk and opportunity information at the most granular level possible as well as to provide methods and tools to calculate and summarize this information into a quantitative assessment of social performance across a product supply chain and life cycle.

The SHDB's end objective is to foster greater collaboration in improving social conditions worldwide by providing transparent information about social risks and opportunities in the global economy. The information provided can help supply chain stakeholders to improve their management of social responsibility issues and create incentives to collaborate and drive progress.

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[7] Norris, G.A. (2006). Social impacts in product life cycles towards life cycle attribute assessment. International Journal of Life Cycle Assessment, 11(1), 97-104. Doi:http://dx.doi.org/10.1065/lca2006.04.017

Country-specific sector risk results help provide understanding of the context in which firms operate, on average. This information is not produced to provide incentives to divest from high-risk regions. On the contrary, the data made available should direct attention to social issues and contexts that are in need of enhanced engagement – that pose indeed the greatest opportunities for achieving true improvement.

The SHDB includes information on five main social impact categories: Labor Rights and Decent Work, Human Rights, Local Community and Governance. Its structure is similar to the Social LCA Guidelines and the differences will be discussed in the Life Cycle Inventory Section.

When used in combination with Global IO models, the SHDB provides models of supply chains. By adding models of product use phase inputs (and processes) and end-of processes and their inputs, the entire cradle-to-grave life cycle of a product can be modeled and assessed. Social risk and opportunity information is available through the SHDB web portal; these data may be useful in creating models of use phase and end of life processes.

Table 1. Hotspot definitions in the LCA literature[8].

| |
|---|
| Guinée et al. define hotspots as the elements (inventory, inputs and emissions) that contribute most to an impact category, or the total environmental impact of a product (environmental burden). |
| Weidema et al. define hotspots as the processes and most important relationships to influence in a product system. |

[8] Guinée, J.B., Gorrée, M., Heijungs, R., Huppes, G., Kleijn, R., Koning, A. de, Oers, L. van, Wegener Sleeswijk, A., Suh, S., Udo de Haes, H.A., Bruijn, H. de, Duin, R. van, Huijbregts, M.A.J. (2002). Handbook on life cycle assessment. Operational guide to the ISO standards. I: LCA in perspective. IIa: Guide. IIb: Operational annex. III: Scientific background. Dordrecht, Netherlands : Kluwer Academic Publishers., Weidema, B. (2003). Market information in life cycle assessment. Danish Environmental Protection Agency. Retrieved from www.norlca.org/resources/780.pdf,
The Sustainability Consortium (2012). Retrieved from http://www.sustainabilityconsortium.org/

| |
|---|
| UNEP-SETAC defines hotspots as the elementary processes in a region or situation that may seem problematic, where social issues are at risk or, conversely, opportunities exist. |
| The Sustainability Consortium defines a hotspot as a unit process or a phase of the life cycle of a product that has a significant potential social or environmental impact. Social hot spots can also be associated with a geographical location. Even if there is no quantitative criterion for determining a hot spot, a hot spot should contribute substantially to the total impacts of an impact category. |

As we can see, all authors agree on the fact that a hot spot is a unit process that significantly contributes to the total impact or risk.

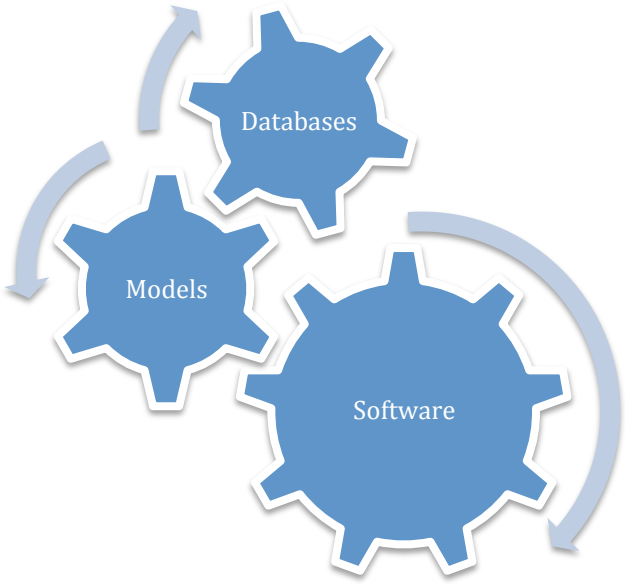


Figure 2. Relations between software, models and databases

There are relationships to manage between software, models, databases and ultimately the data. LCA software tools do not calculate product systems in the same way[9]. These procedural differences represent benefits and limitations specific to each tool. The type of model (process, IO, hybrid) and modeling (attributional, consequential) largely defines the scale at which the data is collected/produced. The availability of information, in particular the level of aggregation, affects the overall 'evaluation system'.

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As we have seen, GTAP provides information on trade including 113 countries and regions and 57 sectors of the economy. The inputs of each sector, to

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[9] Ciroth, A. (2012). Software for life cycle assessment. In Curran, M. (ed.), *Life cycle assessment handbook :A guide for environmentally sustainable products (p. 143-158)*. Salem, MA : Scrivener Publishing; Hoboken, N.J. : Wiley.

produce a final product, are expressed quantitatively; the trade flows between countries and regions are also specified quantitatively. To support the assessment of global social issues in LCA, the system is enriched with data on the level of participation at work (working hours) by sector and region.

These data are necessary to implement the analysis of life cycle attributes.

Life Cycle Attribute Assessment requires activity variables. The literature describes some potential activity variables[10], with worker hours being the most popular activity variable. Other variables cited include added value, water use, costs and acres.

It is noteworthy that since 2010 no other activity variable has been identified and to our knowledge, only the variable of worker hours has been used in social LCAs.

Data on worker hours help identify where the human activity is occurring in supply chains. This information can be tapped to enable a first prioritization of data collection activities, to establish an action plan, or as part of the implementation of a social responsibility program.

Why use worker hours as an activity variable? Heymann and Barrera (2010) consider it important to identify who performs the majority of the vital work in supply chains. One reason is that the success of firms is correlated with the quality of work done by the people who contribute the majority of labor. However, the quality and productivity of employees who are at the bottom of the scale depend on the presence of decent working conditions[11].

More generally, worker hours are relevant because they represent evidence of the intensity of work required by each country-specific sector directly related to production. Work intensity is one of the criteria proposed to prioritize decision and action. Furthermore, if work intensity is important in a specific country and sector, not only the impacts of the stakeholder category for workers may be important, but also the impacts affecting all other categories of relevant stakeholders (local community, society, supply chain actors).

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[10] Norris, 2006, Hauschild, M.Z., Dreyer, L.C. and Jørgensen, A. (2008). Assessing social impacts in a life cycle perspective :Lessons learned. CIRP Annals - Manufacturing Technology, 57(1), 21-24. http://dx.doi.org/10.1016/j.cirp.2008.03.002

[11] Heymann, J. and Barrera, M. (2010). Profit at the bottom of the ladder : Creating value by investing in your workforce. Boston: Harvard Business Review Press.

Despite the fact that worker hours may be less directly linked to issues related to local communities and society, they remain to date the only activity variable that can be used to assess the scale of an issue within the context of the supply chain as a whole.

Another activity variable mentioned is value added. The concept of value added serves to designate the extra value that a company, through its activities, brings to the purchased inputs that it then transforms into a good or service for sale. Value added is an economic indicator of a company's wealth creation. We believe it is not an activity variable most suitable to calculate the percentage of a supply chain at risk of an issue, whether this issue affects the local community or society, because a process contributing a significant share of total life cycle value-added may not be associated with a significant share of total life cycle worker or community engagement.

In summary, if working hours are not a perfect activity variable at every level, they nonetheless provide a relevant and operational variable. Research may be conducted to identify other variables in the future.

The model of working hours is developed using information on the payment of wages for skilled, unskilled and total workers provided by GTAP. Payments are divided by the average wage for skilled, unskilled and total workers. Data for hourly wages are collected primarily from LABORSTA, but also from UNIDO and FAO RIGA. LABORSTA (now ILOSTAT) is a database developed, maintained and made available publicly by the Statistical Department of the International Labour Organization based on data submitted by national statistical services of each country. Although wage rate data were not available to complete the entire matrix (113x57), it was possible to fill 90% of the dataset. By using data for peer and similar country specific sectors, wages were then estimated for the remaining 10%. Robertson et al. (2009) estimate that wage rates are economic indicators collected accurately and with moderate completeness, indicating that the uncertainty in the data of the wage rate will be low[12].

## Life Cycle Inventory and SHDB

The Social Hotspots Database provides what we can call contextual information. Contextual data represent the typical social situation in a country and economic sector/industry. They can be used as 'background data' or in 'scoping assessments'. However, the actual performance of the supply chain can vary from the average, and so it is possible that the contextual data needs to be replaced by specific data according to the purpose and scope of the study. Companies' specific supply chains can't be attributed social impacts using contextual data. However, if there is a very high risk that an issue is present in a certain country and economic sector, a company active in that country and sector must necessarily face the challenges of the issue even if the company's response may address and manage that risk.

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[12] Robertson, R., Brown, D., Pierre, G. and Sanchez-Puerta, M.L. (eds). (2009). Globalization, wages, and the quality of jobs: Five country studies. Washington, D.C. : The World Bank.

The shape of the database, providing a level of risk for each specific sector and country theme is analogous to that provided by financial sustainability indices. In 2005, FTSE4Good (ftse.com) published an index presenting the level of risk of corruption for a set of countries. The US Department of Labor also conducted work over a period of 5 years, which aimed to establish a database on performance and social risks, related to working conditions in countries worldwide (primarily countries being involved in or being beneficiaries of trade agreements). This project of the US Department of Labor known as Web Mils has not generated the desired response to the challenges of its staff. The staff wanted a system that would help them respond to requests made by various agencies about a country's government performance related to the protection of labor law in the context of trade agreements. Data on workers' rights risk did not precisely provide an appraisal of the quality and quantity of a government's labor inspections and policies for instance. Moreover, other issues related to the consistency of the results were raised.

Social issues are organized as tables of risks and opportunities. 22 social issues are included in the database. The Social LCA Guidelines provide a definition for themes or social issues which read as follows: "Social themes of interest represent issues that are considered as threatening social well-being or that may contribute to its further development. Social themes of interest include but are not restricted to: human rights, work conditions, cultural heritage, poverty, disease, political conflict, indigenous rights."

The Social Hotspots Database seeks to classify the presence and intensity of phenomena or social issues for each of the countries and economic sectors. It seeks to identify, in particular, countries and sectors that are most vulnerable to being subject to the non-respect of human rights or other relevant social issues. It seeks to establish a comparative scale of risk levels, without identifying the underlying causes of the issues.

The tables of social issues (social theme tables) use both qualitative and quantitative data. The strategy is quite pragmatic. It is important to present 'best available information' even if the information is partial (choice of indicators, number of countries and sectors for which data are available, etc.). However, the choices made are documented for each of the tables. The collected data are all secondary data, that is to say the data collected by other researchers/ organizations and collected for other uses than the one considered.

Not all relevant issues included in the Guidelines (2009) are present in the database due to a lack of resources. Indeed, the work of identification, collection, characterization model of development and final integration to the database system is long and requires significant financial resources. It was therefore not possible to integrate all desired topics. The issues included in the database were selected:

1) Among the impact subcategories proposed by the Guidelines.

2) Among those suggested by the members of the SHDB advisory committee.
3) Because they were required by the funders of the database development.

But it was also necessary that the data be available for the preferred issues.

For each issue, the development process includes:
1. Identification and review of available data sources.
2. Choice of treatment of the issue by country or by country and sector.
3. Selection of 'best evidence' from those available.
4. Development of characterization models.

Data integrated are selected based on the following specific criteria:
1. The number of countries and sectors of the economy for which data are available.
2. Legitimacy (Public acknowledgment) of the source.
3. The reliability of the methods used by the source to perform data collection.
4. The availability of quantitative data.
5. Data are representative of the topic under consideration (meaningfulness).

The first criterion means that since the database covers 225 countries and territories and 57 economic sectors, if an indicator is only available for 5 countries, it is not relevant to the objectives of the database to include it. Other projects could make the choice to include all available indicators but because of problems of large files and development of characterization model, it was decided to include only indicators available for a large number of countries. This 'large' number varies from one table to another depending on the context of the availability of data.

The second criterion refers to the legitimacy of the source. Typically, legitimacy is perceived as being greater if the source is well known (Global NGOs, intergovernmental organization e.g. UN, ILO, FAO, OECD, international unions, governmental sources in countries recognized for the excellence of their statistics such as Union European, US, Canada).

The third criterion relates to the reliability of the methods used to carry out data collection. Challenges for secondary data are well known.

> "A vast majority of social indicators found in international databases are based on information obtained from national censuses. It is well-known that many countries do not have the resources to conduct accurate censuses. No country conducts a yearly national census and some countries conduct them at irregular intervals. Data for the intervening years have to be estimated. Given these and a number of methodological problems, the data tend to be incomparable both between countries at a given point in time and within given countries over time. As a consequence, differences among countries in the values of social indicators are difficult to interpret. Yet, these problems do not provide

grounds against the use of social indicators per se, but grounds for attempting to improve their reliability" (McGillivray, 2007)[13].

It is through a subjective assessment that this criterion is satisfied applying criteria put forward by the International Monetary Fund and described in the OECD guidance[14]. The International Monetary Fund uses five dimensions for evaluating the quality of the data that we also use:
1. Assurance and integrity
2. Relevance of the methodologies used
3. Accuracy and reliability
4. Updates and availability
5. Accessibility

The fourth criterion indicates that quantitative data will be integrated if present. Since there is great demand for quantitative indicators and because they are often easier to manage and evaluate, we integrate them if they also meet our other criteria.

The fifth criterion is one of relevance. It is not because a dataset meets all other criteria that it is relevant to integrate. For example concerning the status of migrant workers, there is an abundance of reliable, quantitative and legitimate indicators about remittance. However, these indicators are not relevant for measuring the risk on the working conditions of migrants.

The OCDE Handbook for constructing composite indicators suggests selecting indicators on the basis: "of their analytical soundness, measurability, country coverage, relevance to the phenomenon being measured and relationship to each other. The use of proxy variables should be considered when data are scarce" (OCDE, 2005).

We cover all the criteria suggested except the one about the relationship between indicators. Since we do not seek to provide explanatory model, this criterion does not apply as described in OECD (2005). In addition, we add to the OECD list of criteria, the criterion of legitimacy of the source that was supported by New Earth advisory committee and The Sustainability Consortium. The latter uses a decision tree that determines the weight assigned to information according to the legitimacy of the source. The weight information is used to distinguish a hot spot and a hot topic in The Sustainability Consortium system. Another criterion that could be on this list

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13 McGillivray, M. (ed.). (2007). Human well-being : Concept and measurement. UNU-WIDER, Studies in Development Economics and Policy. Basingstoke : Palgrave MacMillan.

14 OECD. (2005). Handbook on Constructing Composite Indicators. Retrieved from http://www.oecd.org/std/42495745.pdf

is that of the timescale. We favor recent sources and define a temporal floor to integrate data for each table. However, this criterion was not included from the outset in the documentation of the work done despite its relevance. It will be integrated in future editions.

Data were collected from the best available secondary data sources for the theme under study. The SHDB uses more than 200 references. These sources include, but are not limited to the International Labor Organization, World Bank, CIA, US Department of State, the World Health Organization, the OECD, FAO etc. Data were also collected from non-governmental organizations and trade unions.

Each table consists of four main items:
1) Raw secondary data (qualitative or quantitative) organized by country and specific sectors of the country,
2) The results of the characterization (risk assessment)
3) The model and the characterization factors (which are used to assign a level of risk)
4) References

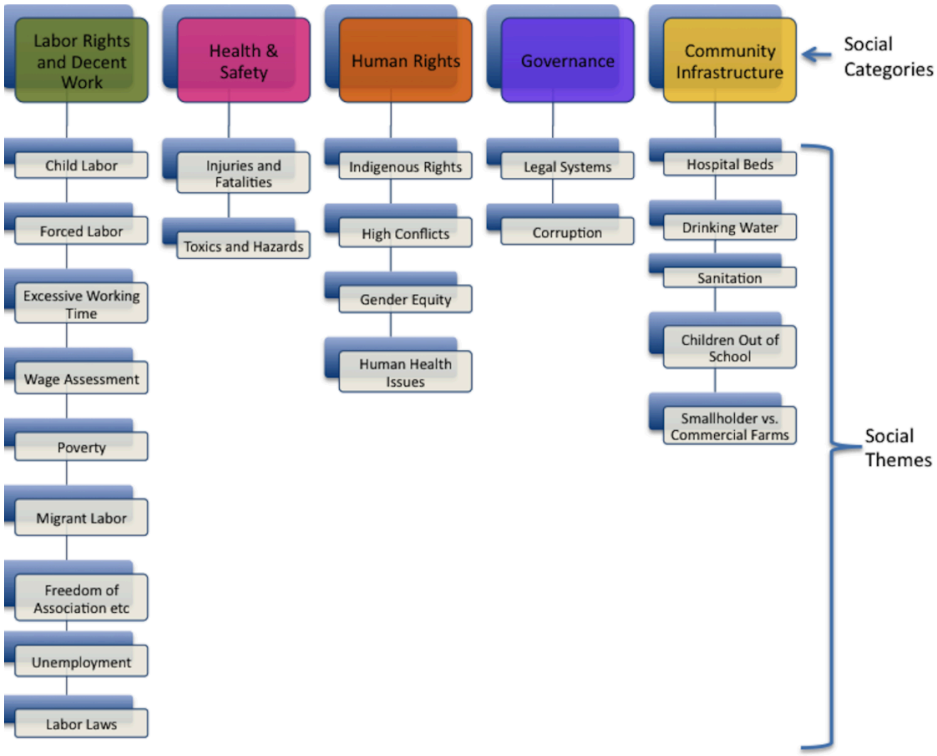


Figure 3. SHDB Social themes tables

The analytical work consists in developing characterization models. In environmental life cycle assessment characterizations are not applied during Life

Cycle Inventory analysis. However, the SHDB applies an initial impact assessment at this data/risk compilation stage. That is to say, underlying or initial data are interpreted (thus, "characterized") in order to arrive at an estimate of risk levels. Characterization models are thus embodied in, and employed during the creation of, the database itself. The definition of characterization models offered by the Guidelines is more general than in the ISO standards to include more specifically qualitative data and evaluation of the impact / performance at several levels of the study.

According to the Guidelines (2009):

> "The characterization models are the formalized, and - not always – 'mathematical' operationalization of the social and socio-economic Mechanisms. They may be a basic aggregation step, bringing text or qualitative inventory information together into a single summary, or summing quantitative social and economic inventory data within a category. Characterization models may also be more complex, involving the use of additional information such as performance reference points."

Some characterization models were developed specifically for generic data[15]. The characterizations of SHDB data were most often developed through consideration of the range and distribution of values exhibited across the full population of sectors and countries. Classes (risk - very high, high , medium or low ) were thus determined based on data distribution, expert judgment, and literature. The characterization factors were developed to describe the severity of the presence of a serious situation or opportunity to facilitate data interpretation and visualization of results. For example: a low / medium / high / very high child labor risk in the country / sector. In all cases, the thresholds and algorithms used in the characterization models of the SHDB are transparently reported in its documentation.

## Life Cycle Impact Assessment and SHDB

Life Cycle Impact Assessment (LCIA) is the "what does it mean" step. The Guidelines define LCIA as being "the phase of a S-LCA that aimed at understanding and evaluating the magnitude and significance of the potential impacts for a product system throughout the life cycle of the product." The SHDB impact assessment method is called the Social Hotspots Index.

The Guidelines present two types of LCIA but neither of the two truly captures the LCIA method included in the SHDB. The Guidelines differentiate between performance assessment (type 1) and causal chain modeling (type 2).

Type 2 methods assess social impacts using impact pathways. Each impact pathway makes use of a specific characterization model that translates inventory results in midpoint and endpoint impacts. The latter attempts to isolate cause-effect chains caused by a specific pressure. For example, requiring excessive working time may cause workers to experience higher stress levels; high stress levels may cause depression (a midpoint); depression will result in a loss of (psychological) wellbeing and human health (endpoints).

Type 1 methods use performance reference points in order to assess the relative position of the state of a unit process impact subcategory (or indicator) in reference to one or more international instruments or best practice (threshold). This LCIA method helps understand the magnitude and the significance of the data collected in the inventory phase. Most of the characterization models developed applies performance assessment. This method requires collecting information specific to these performance reference points.

The impact could be calculated using Type 2 methods in the SHDB if these methods were to be available to implement in a software tool. Progress is currently being made in developing the methods and making them accessible.

The SHDB characterization models implemented in the Life Cycle Inventory phase are similar to Type 1 methods.

As discussed earlier, during SHDB development, raw data are interpreted or "characterized" during the compilation of the Life Cycle Inventory data. This is done in part to enable the use of qualitative and semi-quantitative data in the database, which greatly improves the quantity and meaningfulness of data available. A characterization step is also implemented on quantitative data during the Life Cycle Inventory. However, the quantitative data could be made available in their raw form to be characterized with Life Cycle Impact assessment methods during the LCIA in the future.

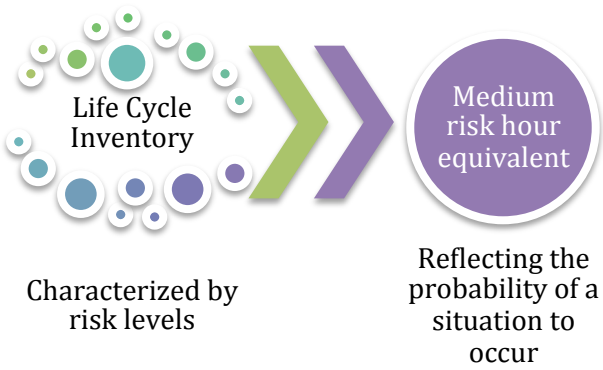


Figure 4. SHDB LCIA

In the SHDB, the final LCI indicators are called characterized issues. They represent the transformed raw data now available by risk level. Characterization models transform the raw data. They are formula used to assign a risk level to the countries and sectors relative to the theme. Characterization models were discussed in the LCI section.

In order to aggregate impacts for the entire supply chain and help highlighting potential hotspots, a Life Cycle Impact Assessment method has also been developed. Considering the risk characterizations contained across the entire database, we developed a weighting that represents the relative probability of an adverse situation to occur. Relative probabilities are expressed in relation to the medium risk level.

Table 2. SHDB Impact Assessment method

| | |
|---|---|
| **Very High Risk** | **10** |
| **High Risk** | **5** |
| **Medium Risk** | **1** |
| **Low Risk** | **0.1** |

This weighting will augment or lower the number of workers hours depending of the risk level. In doing so, it helps identify hotspots or country specific sector where the risk is elevated and the contribution to total worker hours is important.

This basic Life Cycle Impact Assessment Method is offered with the SHDB. It can be modified to serve specific needs. For instance, sometimes practitioners do not want to include low-risk country specific sectors in their results so the LCIA characterization factor can be changed to zero in the Life Cycle Impact Assessment method.

The table below provides an example of the SHDB structure, from impact category to characterized issues.

Table 3. Theme, indicators and characterized issues examples

| Category (5) | Table Theme | Data Indicator | Characterized Issue | Sector Data | Weight in SHI |
|---|---|---|---|---|---|
| Labour Rights and Decent Work | Wage assessments | Country Non-poverty Guideline (NPG) without Health Care (HC) Costs ($) | Risk of Sector Average Wage being lower than Country's Non-poverty Guideline | | 0.5 |
| | | Country Minimum Wage ($) | Risk of Sector Average Wage being lower than Country's Minimum Wage | | 0.5 |
| | Poverty | Percent of population living on under $2 per day | Risk of Wages being under $2 per day | | 1 |
| | Child Labor | Percent Total Child Labor in Country | Risk of Child Labor in sector, Total (qualitative) | x | 1 |
| | Forced Labor | Evidence of Forced Labor in Sector - Qualitative | Risk of Forced Labor by Sector | x | 1 |
| | Excessive Working Time | Percent of Population working >X hrs per week, >60 hrs per week | Risk of excessive working time by sector | x | 1 |

All issues are weighted equally in the Social Hotspots Index. That means that if an issue is being addressed by several indicators in the database, its weight will be divided by the number of indicators used.

## SHDB application (Getting started)

The SHDB can be applied to identify supply chain social hotspots at various levels, such as national, organizational, company division, investment portfolios,

product categories etc. It can also be applied in application to an existing environmental LCA.

These different scopes entail different methodological approaches. We will describe two basic situations but keep in mind that there are several.

In order to apply the SHDB to a product category a user has two choices:

1. Studying a product using simply a sector
2. Building a product system

The definition of the functional unit can first be based on physical attributes (weight, surface, calories) that can then be translated into economic value form using prices. The Guidelines and many other LCA documents provide informative discussion on how to define a functional unit. The economic value will then need to be converted to USD and be translated using a deflator into USD 2002 because the current version of the Global IO models available in the SHDB is based on USD 2002.

The first situation will require selecting the most relevant sector. For instance we are interested to study the social hotspots of plain yogurt. The most relevant GTAP sector is Dairy products. We have selected to study the entire production of plain yogurt by company Y for one year. The company is based in the United States. Therefore, the country specific sector selected will be dairy products from United States. Our functional unit will be expressed as X 2002 USD of plain yogurt from United States.

If we are interested for instance to study strawberry yogurt, we might want to build a product system using the most relevant country specific sectors. For instance, we would need to find out, how much of each input (in USD 2002), from each relevant country specific sector, is used to produce X 2002 USD of strawberry yogurt in one year by company Y.

Table 4. Information needed to get started with the SHDB

| **Inputs** | **Quantity** | **Country** | **Economic sector** |
|---|---|---|---|
| Sugar | X | Guatemala | Sugar cane and sugar beets |
| Strawberries | X | China and United States | Vegetables and Fruits |
| Dairy | X | United States | Dairy products |

## Future outlook

The Social Hotspots Database is a system that is opening up a new way to study supply chains that is more holistic and comprehensive. It can help the economy to know itself better.

It brings together economic IO models with social statistics including qualitative data. As such, the SHDB is a pioneering tool. While the current limitations are numerous, the opportunities are huge to make it better, smarter and more efficient.

Table 4. Some SHDB research avenues

| Research avenues |
|---|
| Development of more granular IO models |
| Development of calculation model for uncertainty and indicators quality |
| The development of information on how to manage risks and on the root causes of impacts |
| The development of a positive impact index |
| The integration of multi-criteria analysis method |
| The refinement of characterization models |

Our hopes with the SHDB are 1) to provide information to help people make better decision on supply chains social responsibility, knowing more about the national and sectoral or even commodity contexts where the production activities are located throughout the supply chains; and 2) to bring practitioners, users and experts together to make sure the SHDB is the best it can be, using best available data and research and providing the most useful information.

Human Rights Due Diligence and the societal pressure on companies to report on their sustainability impacts provides a ripe context for the SHDB that will not fade away. As the context evolves, the SHDB will have to follow suit and stakeholder engagement will be key. We would love to hear from you.

## Suggested Further Readings

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