Normalisation and Weighting in Social LCA

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Overview

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Introduction
Single Score / Endpoints

- Single score/endpoint methods useful as supplement to midpoint methods

- Helps simplify interpretation, helpful for comparisons

Introduction
## Data interpretation remains a challenge

- Social data are often qualitative and therefore difficult to interpret

- Different impact categories are difficult to compare

- Most current practices leave it to the reader to interpret the mix of impact categories of S-LCA studies

➔ Single score is useful to apply the same interpretation and valuation of impact categories to allow for comparisons

Examples
Overview

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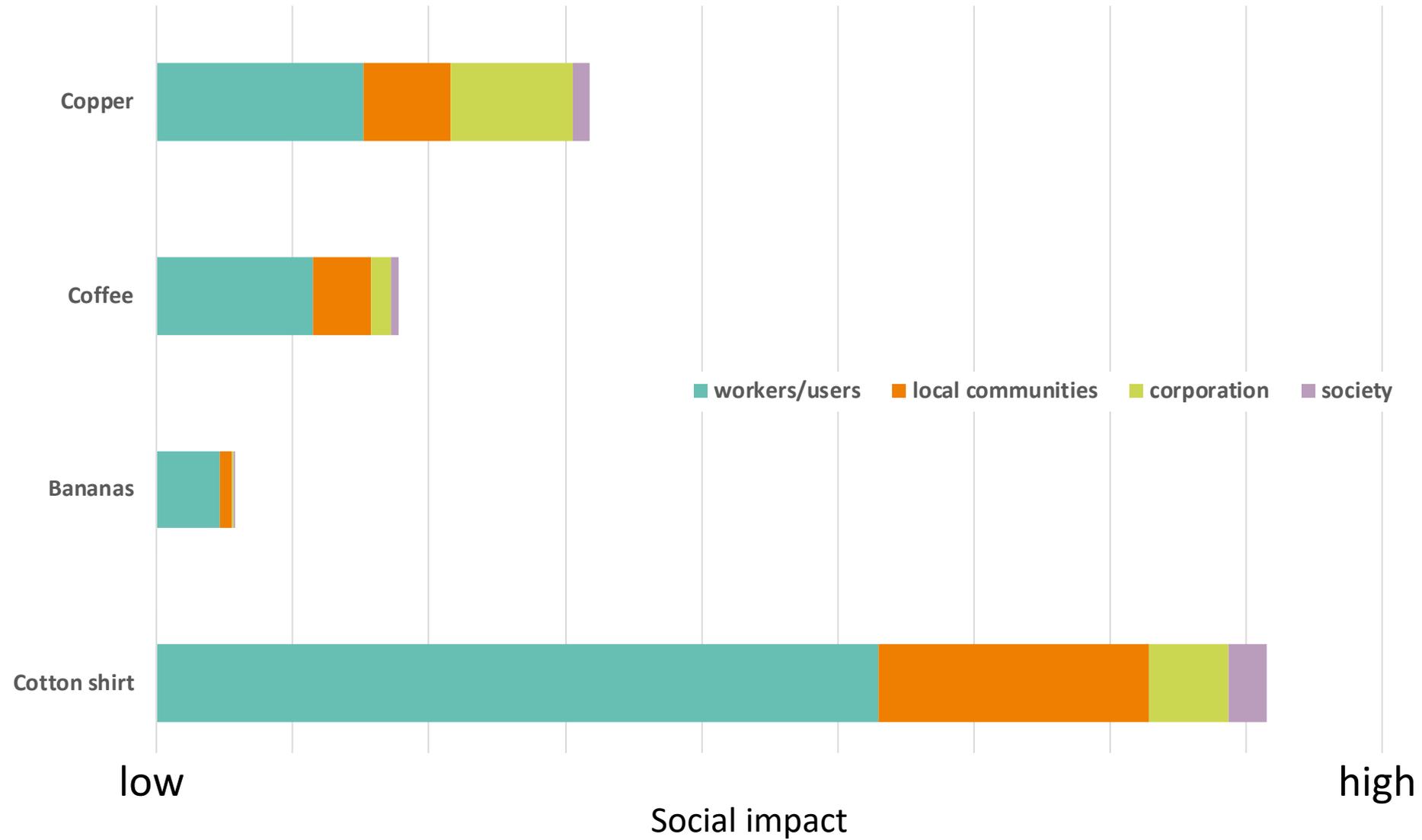
Examples
Contribution on level workers, cotton

Legend:
- Child labour — 9%
- Gender wage gap — 40%
- Fair Salary — 8%
- Frequency of forced labour — 11%
- Health and safety at the workplace — 7%
- Association and bargaining rights — 13%
- Social security expenditures — 6%
- Weekly hours of work per employee — 6%
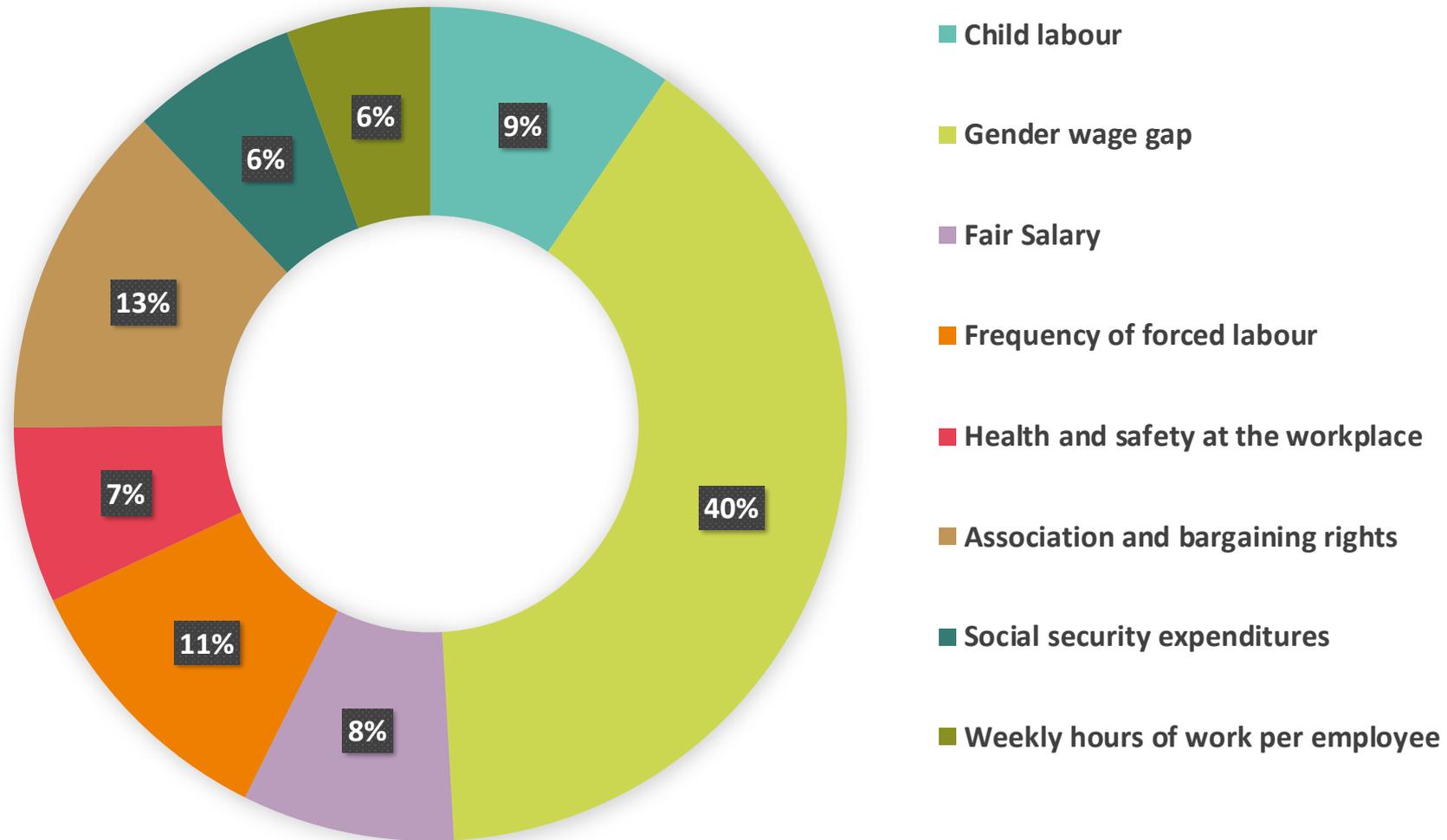
Background information
Used indicators

The social indicators proposed in the following publications were used for this analysis:

- UNEP Guidelines for social life cycle assessment of products, and
- "The Methodological Sheets for Sub-categories in Social Life Cycle Assessment (S-LCA)" (2013).

A total of 37 different indicators are listed which characterise the various social problems.

Background information
The SOCA database

- The SOCA database links the ecoinvent database with the PSILCA database.

- The ecoinvent database is a life cycle assessment database that contains information on the entire process chain, from cradle to grave, of a product or service. For example, information on how much ore is needed to produce 1 kg of steel, from which countries the ore comes, where and how it is processed.

- Based on the country-specific information of PSILCA, the corresponding social indicators for the process inventories from ecoinvent v3.3 were compiled in the SOCA database.

- The SOCA database is based on the UNEP "Guidelines for social life cycle assessment of products" and the UNEP Methodological Sheets for Sub-categories in Social Life Cycle Assessment (S-LCA).

Background information
Social Impacts from Global production

Production area
Aluminium
Chemicals
Coffee
Copper
Electricity, low voltage
Gold
Heat, natural gas and other than natural gas
Paper
Maize grain
Palm oil
Several plastics
Potato
Red meat
Steel, low-alloyed
sugar beet and sugarcane
Textile, woven cotton
Wheat grain

Limitations
Method

- Social Impact Points - SIP (normalized and weighted mean risk hours) as a measure of S-LCA are a very abstract benchmark for measuring social risks.

- It is only through comparison with other products that the SIPs become somewhat tangible.

- Global production for normalisation is incomplete

- Validation of data used

- Possible double counting

- Only social risks for employees, the community, companies and society are considered. Economic or ecological aspects are not considered.

Background information
Normalisation and Weighting

➡ In order to determine the relevance of the various social impacts, these are standardised with the global impacts.

- This shows the share of the effects of the investigated system in the total social impacts.
- The result of the normalization is dimensionless quantities.

➡ Weighting to a fully aggregated indicator:

- The normalized indicators are aggregated to a final size using a weighting set (based on Manik et al. 2013, adapted).
- For better comprehensibility, we have introduced the term "Social Impact Points - SIP" for the final figure.

➡ This procedure makes it possible to combine the 37 indicator statements into one indicator.

Examples
Overview, equal weighting

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Outlook
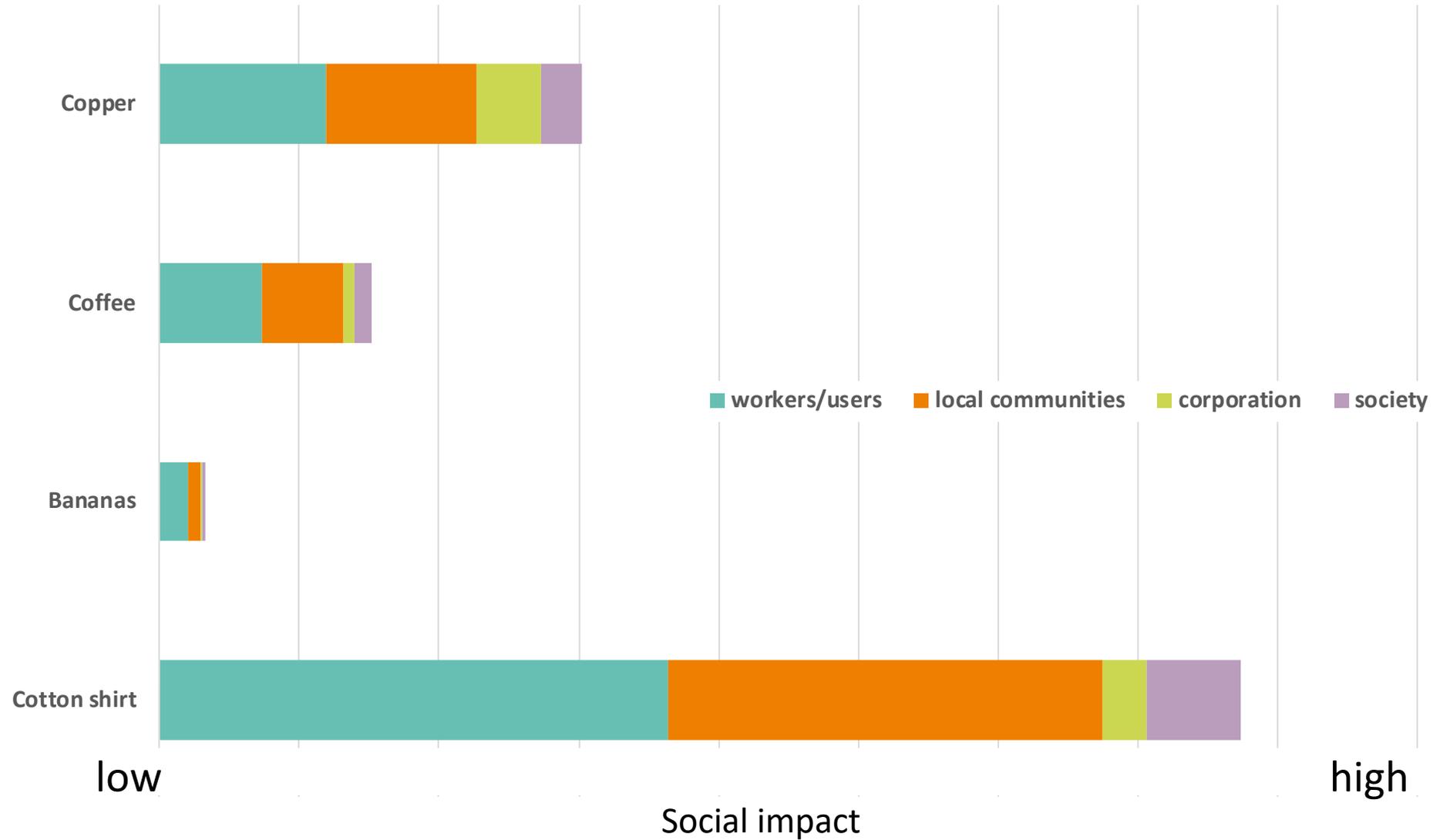
- Normalisation based on monetary value or working hours in sector

- Refine global production for normalisation

- Include positive impacts and effects

References

o Ciroth, A., & Eisfeldt, F. (2016). PSILCA – A Product Social Impact Life Cycle Assessment database. GreenDelta GmbH.

o ecoinvent. (2016). ecoinvent 2016: Version 3.3. Swiss Center for Life Cycle Inventories.

o Eisfeldt, F. (2017). Soca v.1 add-on – Adding social impact information to ecoinvent. GreenDelta GmbH.

o Manik et al., (2013). Social life cycle assessment of palm oil biodiesel: a case study in Jambi Province of Indonesia, (Int. Journal of Life Cycle Assessessment, 7), 1386–1392.

o UNEP (2009). „Guidelines for social life cycle assessment of products"

o UNEP (2013). "The Methodological Sheets for Sub-categories in Social Life Cycle Assessment (S-LCA)".

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Thank you
for your attention!

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