Social Life Cycle Assessment and Life Cycle Sustainability Assessment

Sonia Valdivia, Cássia Maria Lie Ugaya.
Life cycle of a product begins in the extraction of natural resources and ends when the product is finally disposed off, considering all processes, including material production, manufacturing, assembly, use, recycling and transportation.
Environmental Life Cycle Assessment
Organizations do not want to be related to negative social impacts
Social Life Cycle Assessment (S-LCA)

• S-LCA is a technique to evaluate positive and negative social impacts of a product along the life cycle

• UNEP, 2009
Social LCA (S-LCA) Goals

• Purpose of using S-LCA:
  • Provide social information for decision making,
  • Social information between production and consumption
  • Provide information for social improvement.

• Aims
  • To go beyond the legislation
  • To achieve benefic impacts
(environmental) LCA x S-LCA

**Commonalities**

- Extensive data demand
- Iterative
- Provide information for decision makers
- Average or generic data gives the potential and not necessarily the real impact
- Based on functional unit

**Differences**

- In S-LCA the stakeholders perspective is relevant
- Subjective data is used in S-LCA
Data collection comparison

Organization level

Site

Process

<table>
<thead>
<tr>
<th>Site</th>
<th>Company company along the life cycle</th>
<th>Company + one</th>
<th>Life cycle</th>
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<tr>
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<td>Environmental Impact Assessment</td>
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S-LCA follows ISO with adaptations

Goal and Scope Definition

Inventory Analysis

Impact Assessment

Interpretation

Limits of the study

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Goal and Scope Definition

Functional Unit

- Spongebob and steel spongebob?
- Washing machine and Washing service?

Why are them comparable?

Same function

Functional Unit is the amount of function required!
• Additionally, a better description of the product can be added (product utility)
  • Funcionality
  • Technical quality
  • Additional services
  • Aesthetic
  • Product Image
  • Costs
  • Environmental and social characteristics
Functional unit

- Product utility example:
  - Funcionality: cover the body
  - Technical quality: without buttons, short sleeves, durable, washable
  - Additional services: cloth to clean the floor
  - Aesthetic: fashion
  - Product Image: known brand
  - Costs: medium class
  - Environmental and social characteristics: organic cotton from small communities

Functional unit is not the product!
• **Which** product and **how many** of the product is needed to supply the functional unit?

• **One** red or a green **T-shirt**
Hands on!

- Define the reference flow for the functional unit ‘ONE relevant communication’
Product system

Cut-off criteria: working hours
System boundaries and the Product system

- To be considered:
  - Life cycle stages: cradle to gate, cradle to grave, gate to grave, gate to gate
  - Infrastructure
  - Services
    - Advertising
    - Engineer
    - Designers
  - Overhead
    - Employees transportation
    - Maintenance
- Recommendation: begin simple
Cut-off criteria in S-LCA: working hours

Social relevant unit processes
• Establish a product system for the reference flow for a ‘relevant communication’
Definition of relevant issues based on stakeholder perspective

<table>
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<th>Inventory indicator</th>
<th>Inventory data</th>
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</thead>
<tbody>
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Hands on!

- Think of relevant stakeholders for the reference flow for a ‘relevant communication’ defined and why did you choose them
Social Life Cycle Assessment

S-LCA

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UNEP/SETAC subcategories

• *Top-down*
  • Internationally recognised
    • OIT
    • GRI
    • ISO 26000
    • PROSA
Working subcategories

Freedom of association and collective bargaining
Child labour
Forced labour
Fair salary
Working hours
Equal opportunities and discrimination
Health and safety
Social benefits and social security

Workers
Consumers subcategories

Health and safety
Feedback mechanism
Consumer privacy
Transparency
Responsibility along the life cycle
<table>
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<tr>
<th>Subcategorías de impacto</th>
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<tbody>
<tr>
<td>Material resources access</td>
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<tr>
<td>Immaterial resources access</td>
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<tr>
<td>Delocation and migration</td>
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<tr>
<td>Cultural heritage</td>
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<tr>
<td>Healthy and safety condition</td>
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<tr>
<td>Respect to indigenous rights</td>
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<tr>
<td>Community engagement</td>
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<tr>
<td>Local employment</td>
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<tr>
<td>Assuring Life condition</td>
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</tbody>
</table>
Value chain subcategories

Fair competition
Promotion of social responsibility
Supply relationship
Respect to intellectual property rights
Society subcategories

Public commitment with sustainability
Contribution to the economic development
Prevent and mitigation of armed conflicts
Technological development
Corruption
31 subcategories

Non restrictive list
Exclusions must be justified

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Subcategory methodological sheet

- **Subcategory**
  - Name
  - Definition
  - Measurement unit
  - Monitoring
- **Political relevance**
  - Purpose
  - Relevance to sustainable development
  - International convention and agreements
  - International target or recommended standards

- **Method description**
  - Concept and definition
  - Measurement method
  - Indicator limitation
  - Methodological status
  - Other subcategory definition

- **Data evaluation**

- **Reference**

http://lcinitiative.unep.fr

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Specific issues in S-LCA

Data collection along the life cycle is as demanding as in (environmental) LCA
How to identify a hotspot?
Data collection

Certification of management systems

Working hours

Unit process

Organization

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Life Cycle Inventory: data collection

- Data collection
  - Specific
    - Interviews
    - Questionnaires
    - Data from the company
  - Generic
    - National statistics
    - Data from the region
Life Cycle Inventory: verifying data

- Data triangulation
  - Comparison of data providers:
  - Example: Manager, worker, employee, NGOs, union
How to express a non-quantitative indicator?
Hands on

- Give examples of social inventory indicators for a ‘relevant communication’
Marble case

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<th>IND_NAME</th>
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Hands on!

- Define a functional unit and a reference flow for a ‘relevant communication’
Third LCA Phase

Goal and Scope Definition

Inventory Analysis

Impact Assessment

Interpretation

To evaluate the social impacts
Environmental LCA

Elementary flows

Impact categories

- Climate change
- Acidification
- Eutrophication
- Human toxicity
- Ecotoxicity

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From inventory data to stakeholder

<table>
<thead>
<tr>
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From inventory data to impact through subcategories

<table>
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</table>
From inventory data to impact through pathways

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[Diagram with a flow from inventory data to impact through pathways]
Fourth LCA Phase

Goal and Scope Definition

Inventory Analysis

Impact Assessment

Evaluating the results according to the Goal and Scope

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Discussion

- Consider the red and green T-shirt (A and B)
- The life cycle of A presented 2 children working and in B, 5.
- Which option has a better social condition?

Qualitative x quantitative
Discussion

• Product A: half of the work force is women
• Product B: Women workers represent 20% of the working force
• One if the women in A feels she has no opportunities
• Which is the product with better social life cycle?

Subjective x objective
Future steps in S-LCA

- Case studies
  - Application
  - Review
- Dissemination
  - Capacity building
  - Data and tools
  - Communication
- Models
Life cycle sustainability assessment (LCSA) refers to the evaluation of all environmental, social and economic negative impacts and benefits in decision-making processes towards more sustainable products throughout their life cycle.

What is an LCSA?

Life cycle sustainability assessment (LCSA) refers to the evaluation of all environmental, social and economic negative impacts and benefits in decision-making processes towards more sustainable products throughout their life cycle.

Sustainable development, that of the Brundtland Commission of the United Nations (UN) in 1987:

‘Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’
Conclusions

It is **feasible** worldwide

It is **NOT** re-inventing the wheel

It is our contribution to the upcoming United Nation Conference on Sustainable Development Rio +20
Benefits

Clarifying trade-offs

Achieving sustainability by considering all three pillars

Promotes sustainability along the value chain

Support identification of weaknesses to promote improvement along the life cycle
Benefits

Support prioritization of actions with chances of positive impacts

Support sustainable consumption

Stimulates innovation in enterprises and suppliers

Potentially inform labeling initiatives

Credibility of enterprises

Guiding principles to achieve SCP
• How to arrange a common scope for the 3 techniques?
Towards a Life Cycle Sustainability Assessment

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Reviewers: 20 stakeholders and reviewers worldwide
System boundaries

Social-relevant unit processes

Cost-relevant unit processes

Environmental-relevant unit processes

Unit processes not included in the system boundary

Klöpfer, 2006
Sonia Valdivia, Cássia Maria Lie Ugaya
Data collection

- Certification of management systems
- Working hours
- Water

UNIT PROCESS

- Costs
- CO₂
- Product
- N₂O

ORGANIZATION

LCC data
S-LCA data (environmental)
LCA data

Sonia Valdivia, Cássia Maria Lie Ugaya
Impact assessment
## Marble Case

### SLCA

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Hands on!

• Define few environmental LCA indicators and Life Cycle Costing indicators for a ‘relevant communication’ as functional unit
Life Cycle Sustainability Dashboard was introduced by Traverso & Finkbeiner,
Hands on!

- Where do you see the trade-offs among the three sustainability pillars for the reference flows defined before?
Conclusions

It is **feasible** worldwide

It is NOT re-inventing the wheel

It is our contribution to the upcoming United Nation Conference on Sustainable Development Rio +20
What is next?

Applications

Develop technical expertise

Discuss LCSA principles and criteria

Explore how to read the results of the LCIIAs for each technique
  • Considering the ‘trade-off’ analysis
  • Avoiding double counting

More research on the assessment of product utility and sustainability to avoid the unethical use of the tools

Address the perspective of the future generation
Common understanding and consensus of the areas of protection (endpoints) within an LCSA

Software and databases businesses are asked to facilitate user friendlier and low cost techniques to promote more LCSAs

Provide more guidance and examples of stakeholder involvement in LCSAs and review processes

Validate a clearer communication format of LCSA results to decision-makers to support better informed choices on sustainable products


Gracias!

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