

EESD 2004

Declaration of Barcelona

The preamble underlines the challenges to achieve “***a more just society based on respect for nature and human rights, and demands a fairer economy and greater solidarity towards different cultures and future generations.***”

The declaration itself describes the (future) abilities of an engineer, the way engineering education and the educational process is organised.

“***Incorporate disciplines of the social sciences and humanities.***”
is one of the 8 goals of organising engineering education.

Engineering Education for *Sustainable Development*, as outlined in the Declaration of Barcelona ?

“It seems little progress has been made at universities, including inter alia engineering faculties, over the last ten years to cope with the cited challenges by stimulating interdisciplinarity and setting up multidisciplinary teams.”

Cited from the paper.

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Engineering Education for *Sustainable Development*.

A couple of observations in that regard.

- One of the main reasons is that disciplinary ‘silos’ (faculties, departments ...) at universities are not a stimulating environment for communicating with experts who speak different ‘languages’.
- Note that within this context ‘interdisciplinarity’ should go beyond working together in a team of people all with an engineering background and/or coming from natural sciences.
- It should be about setting up interaction between engineering and social sciences.

“Are we really educating about sustainability?”
(Koppelman, 2013)

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EESD 2013 (Cambridge, 22-25/09/2013)

**Education in 'life cycle sustainability assessment':
caring for all 3 P's in one.**

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Content

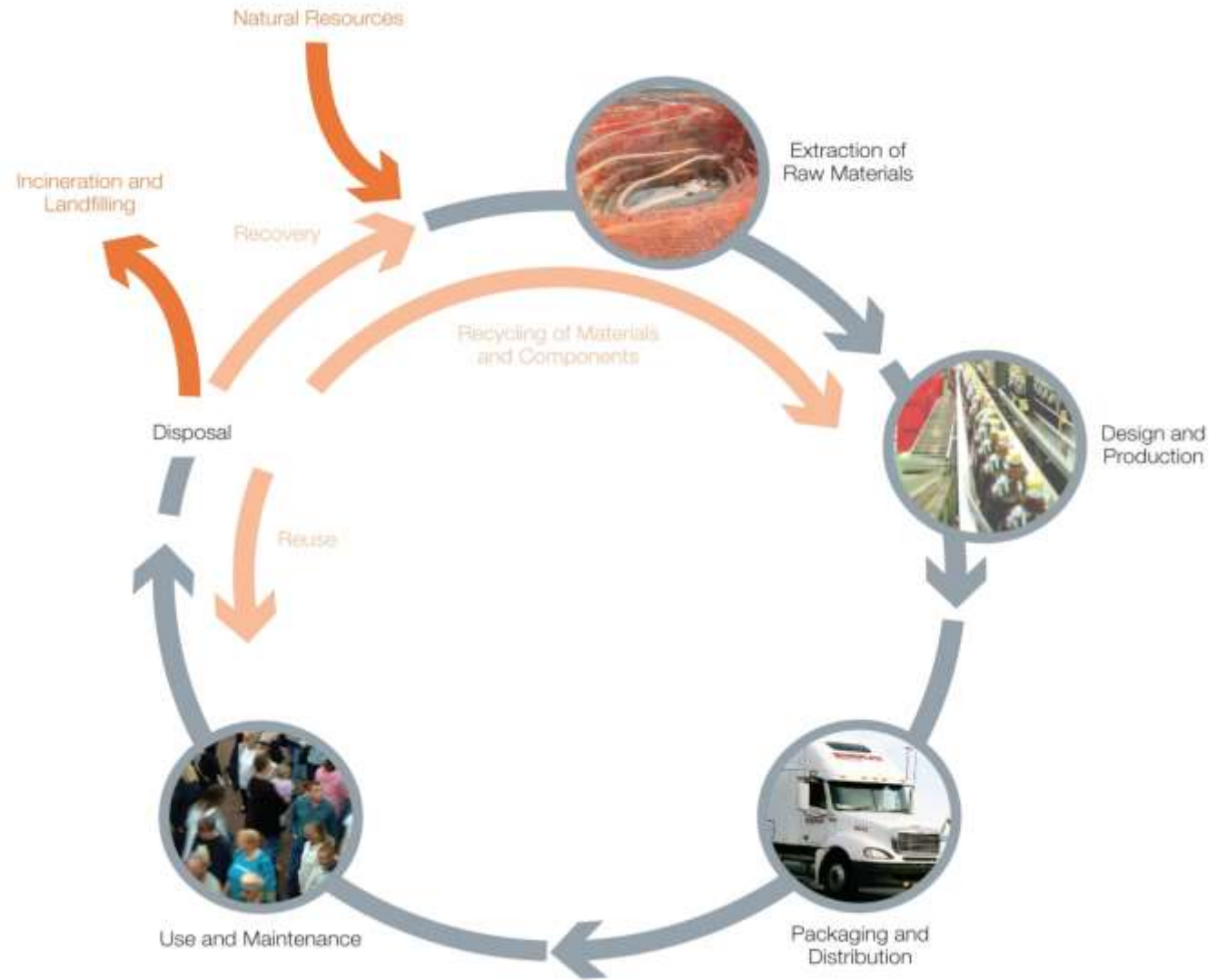
- Setting the scene
- What is Life Cycle Sustainability Assessment ?
- ‘Social justice’: the reference for a social LCA, a part of LCSA.
- LCSA Education in practice
- Conclusion



Content

- Setting the scene
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Assessment of the entire life cycle



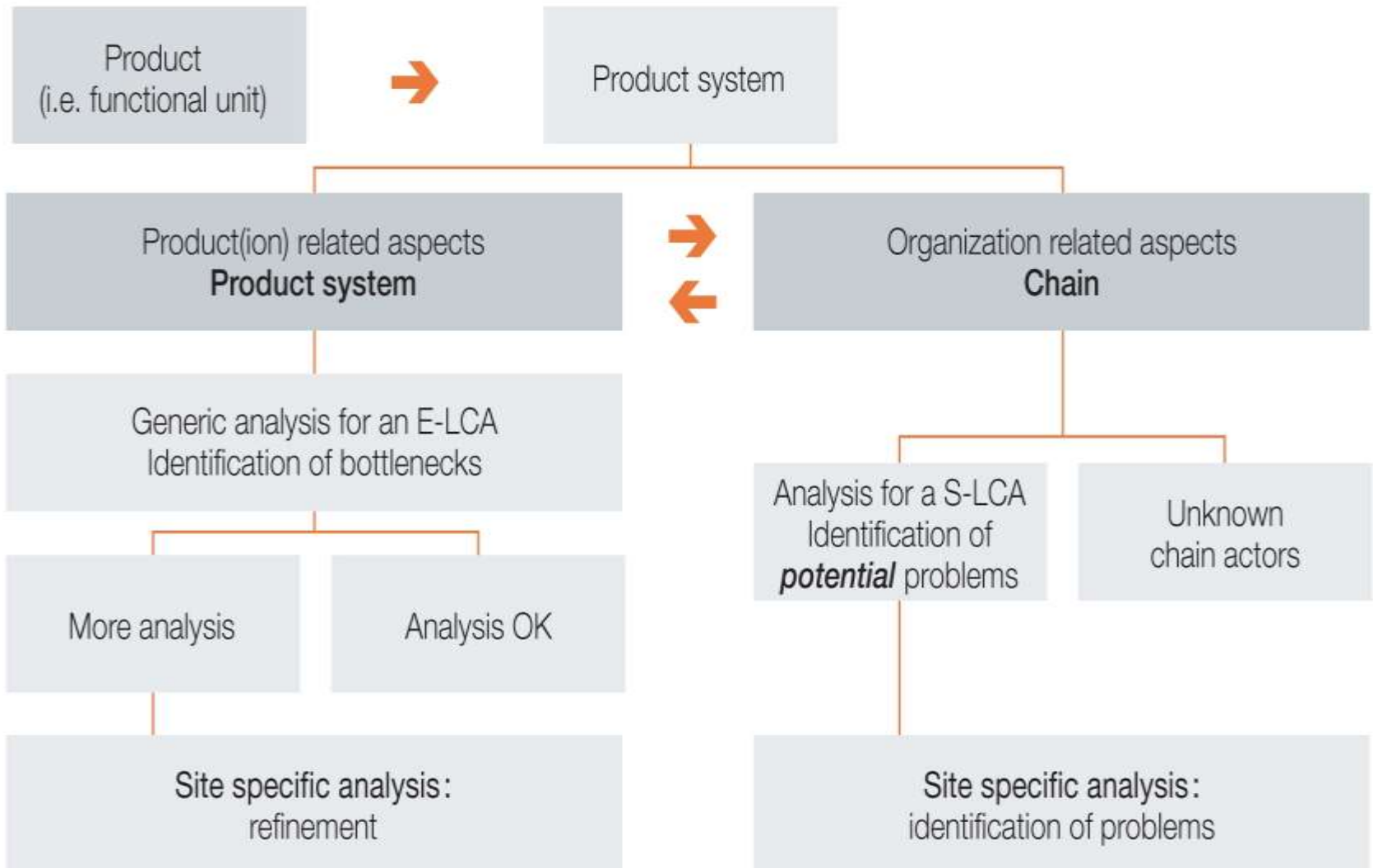
Source: Benoît C. and Mazijn B. (2009)

LCA. Within the context of sustainable development.

	Planet	People	Profit/Prosperity
Externalities (costs or benefits)			
Private costs or benefits			

Source: adapted from Valdivia S. et al. (2011)

A twofold analysis



Source: Benoît C. and Mazijn B. (2009)

Life Cycle Sustainability Assessment (LCSA)

Life Cycle Sustainability Assessment (LCSA)

is a technique that aims to assess

the **environmental, social and economic aspects** of products

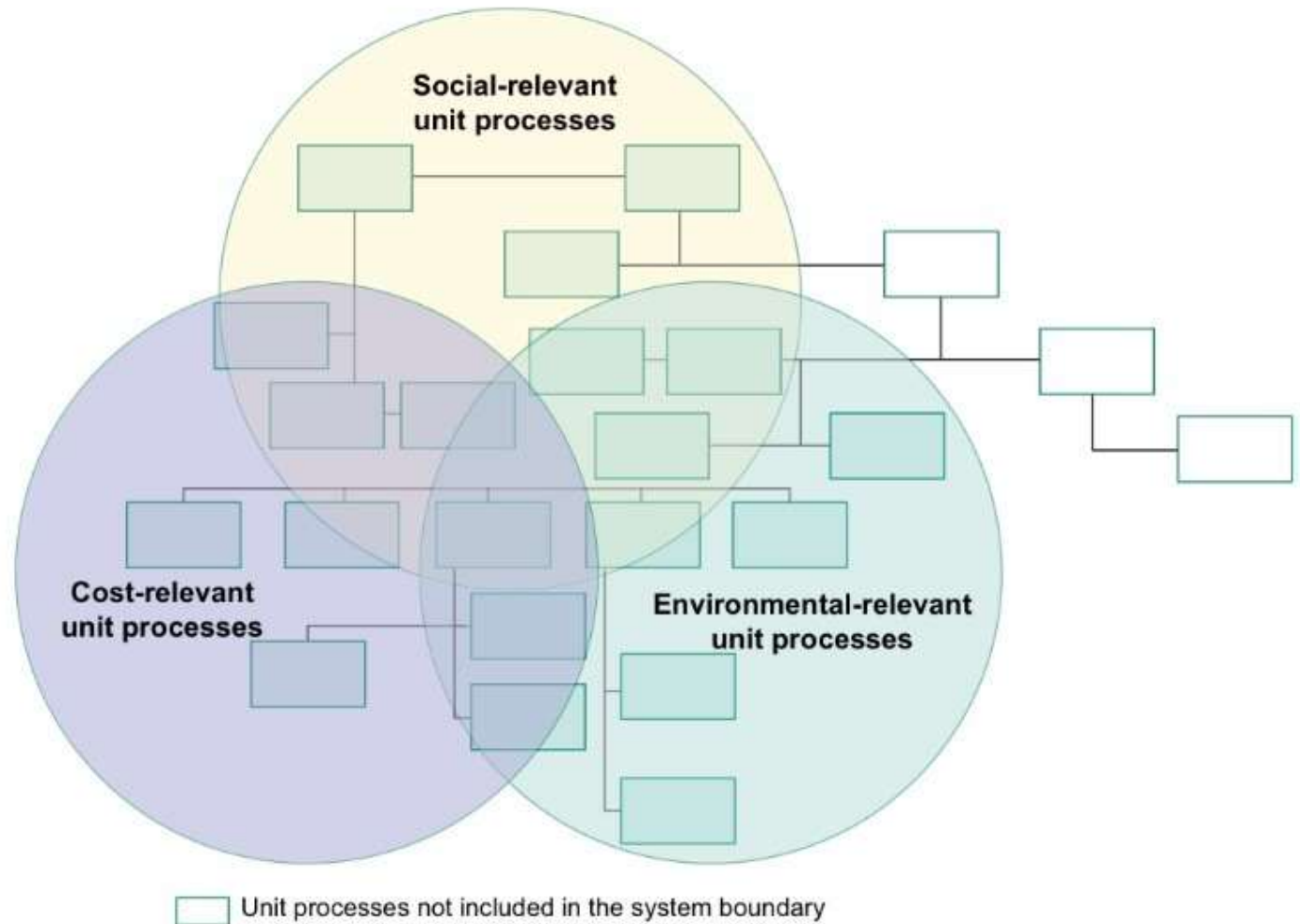
and their potential **positive and negative impacts**

along their life cycle,

encompassing extraction and processing of raw materials,

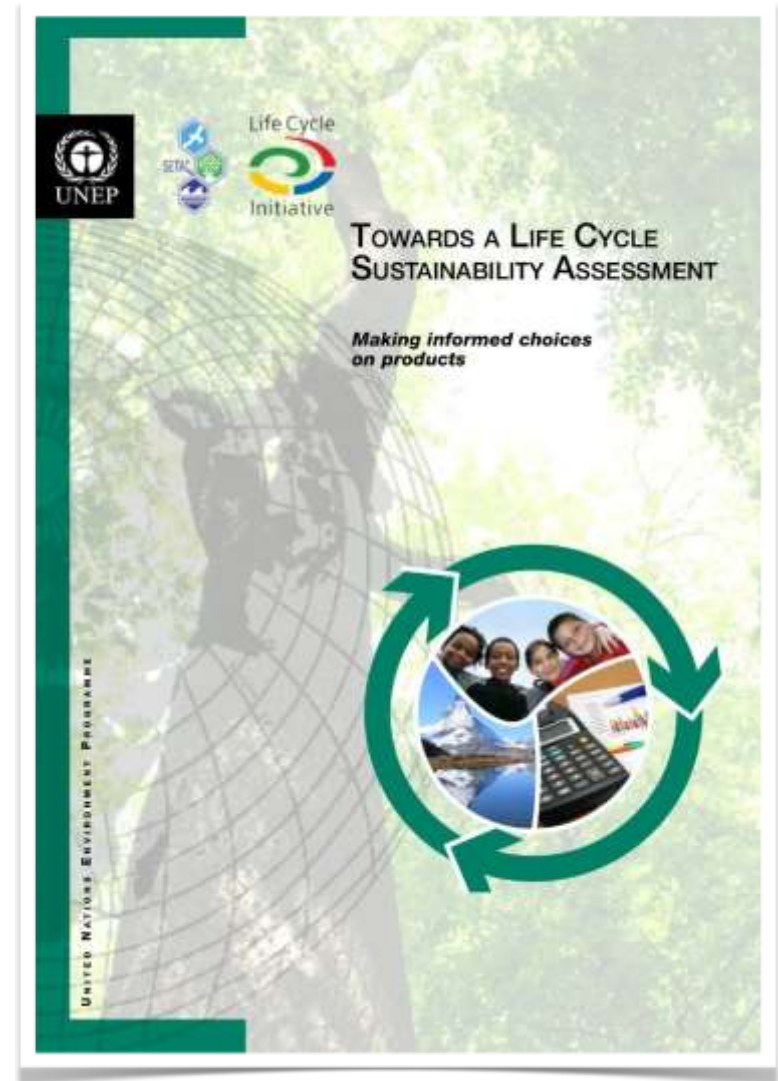
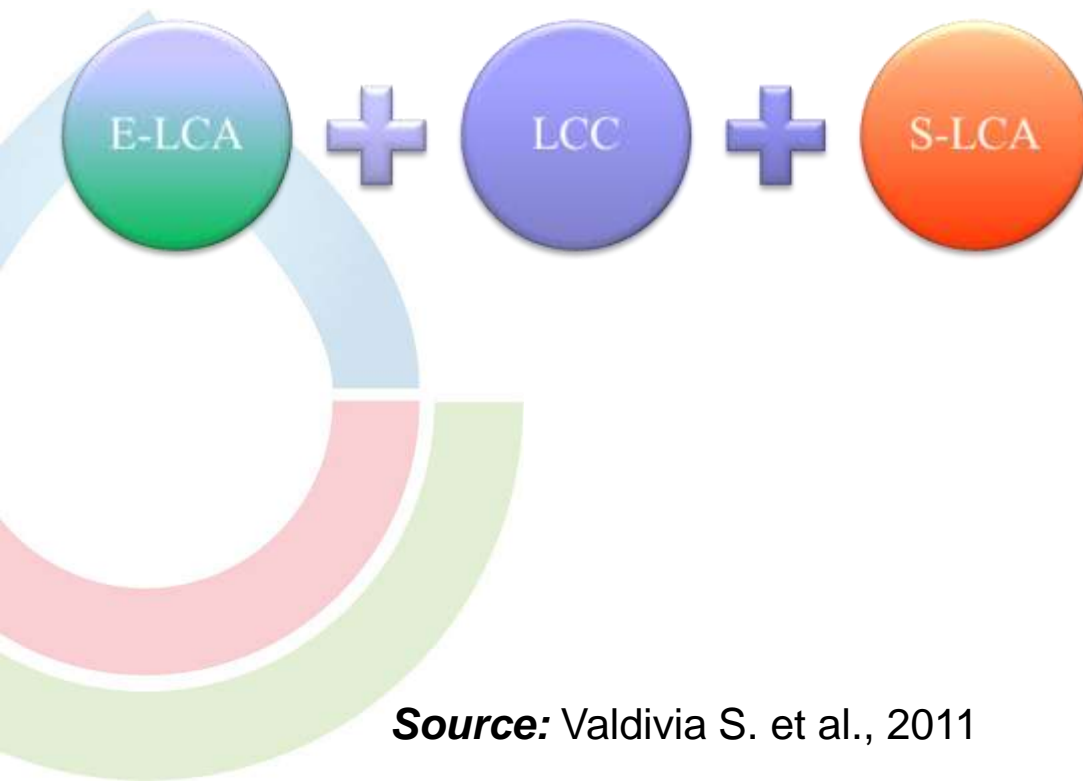
manufacturing, use, re-use, maintenance, recycling and final disposal.

System boundaries of the life cycle/value chain



Source: Valdivia S. et al., 2011

LCSA: integration of 3 techniques



Source: Valdivia S. et al., 2011

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Background

‘Justice as Fairness: A Restatement’

John Rawls (2001) (re)formulated the two principles as follows:

- each person is to have an equal right to the most extensive total system of equal basic liberties compatible with a similar system of liberty for all;
- social and economic inequalities are to be arranged so that they are both: a) to the greatest benefit of the least advantaged, and b) attached to offices and positions open to all under conditions of fair equality of opportunity.

Life Cycle Sustainability Assessment (LCSA)

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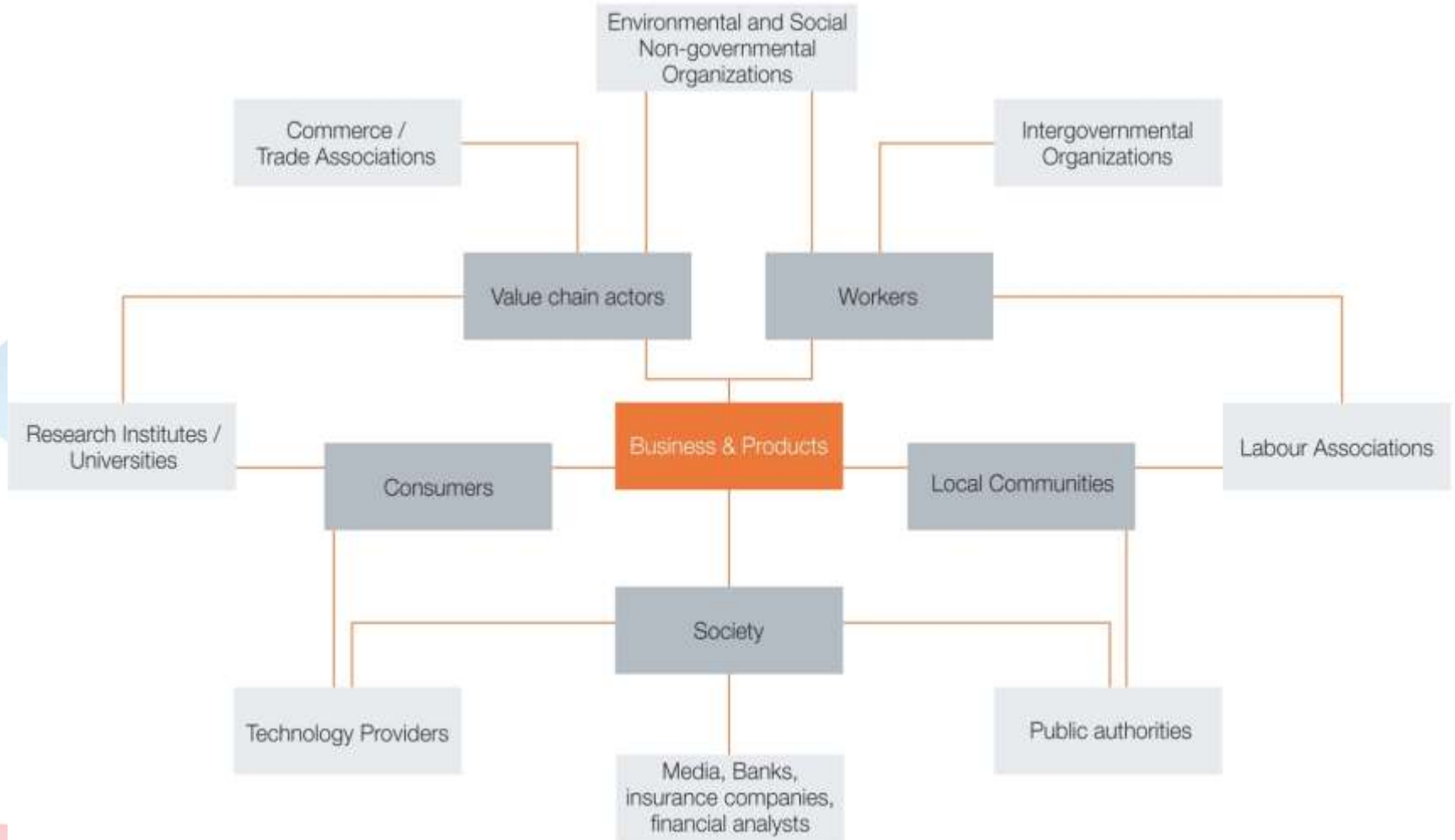
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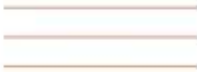








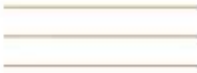


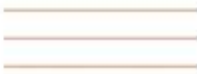
manufacturing, use, re-use, maintenance, recycling and final disposal.

Stakeholder diagram





















Source: Benoît C. and Mazijn B. (2009)

Assessment system


















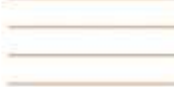
Stakeholder categories		Subcategories	Inv. indicators	Inventory data
Workers				
Local community				
Society				
Consumers				
Value chain actors				
				

Source: Benoît C. and Mazijn B. (2009)

Assessment system

Impact categories	Subcategories	Inv. indicators	Inventory data
Human rights			
Working conditions			
Health and safety			
Cultural heritage			
Governance			
Socio-economic repercussions			

Assessment system

Stakeholder categories	Impact categories	Subcategories	Inv. indicators	Inventory data
Workers	Human rights			
Local community	Working conditions			
Society	Health and safety			
Consumers	Cultural heritage			
Value chain actors	Governance			
	Socio-economic repercussions			

Source: Benoît C. and Mazijn B. (2009)

Stakeholder categories	Subcategories
Stakeholder "worker"	<ul style="list-style-type: none"> Freedom of Association and Collective Bargaining Child Labour Fair Salary Working Hours Forced Labour Equal opportunities/Discrimination Health and Safety Social Benefits/Social Security
Stakeholder "consumer"	<ul style="list-style-type: none"> Health & Safety Feedback Mechanism Consumer Privacy Transparency End of life responsibility
Stakeholder "local community"	<ul style="list-style-type: none"> Access to material resources Access to immaterial resources Delocalization and Migration Cultural Heritage Safe & healthy living conditions Respect of indigenous rights Community engagement Local employment Secure living conditions
Stakeholder "society"	<ul style="list-style-type: none"> Public commitments to sustainability issues Contribution to economic development Prevention & mitigation of armed conflicts Technology development Corruption
Value chain actors* not including consumers	<ul style="list-style-type: none"> Fair competition Promoting social responsibility Supplier relationships Respect of intellectual property rights



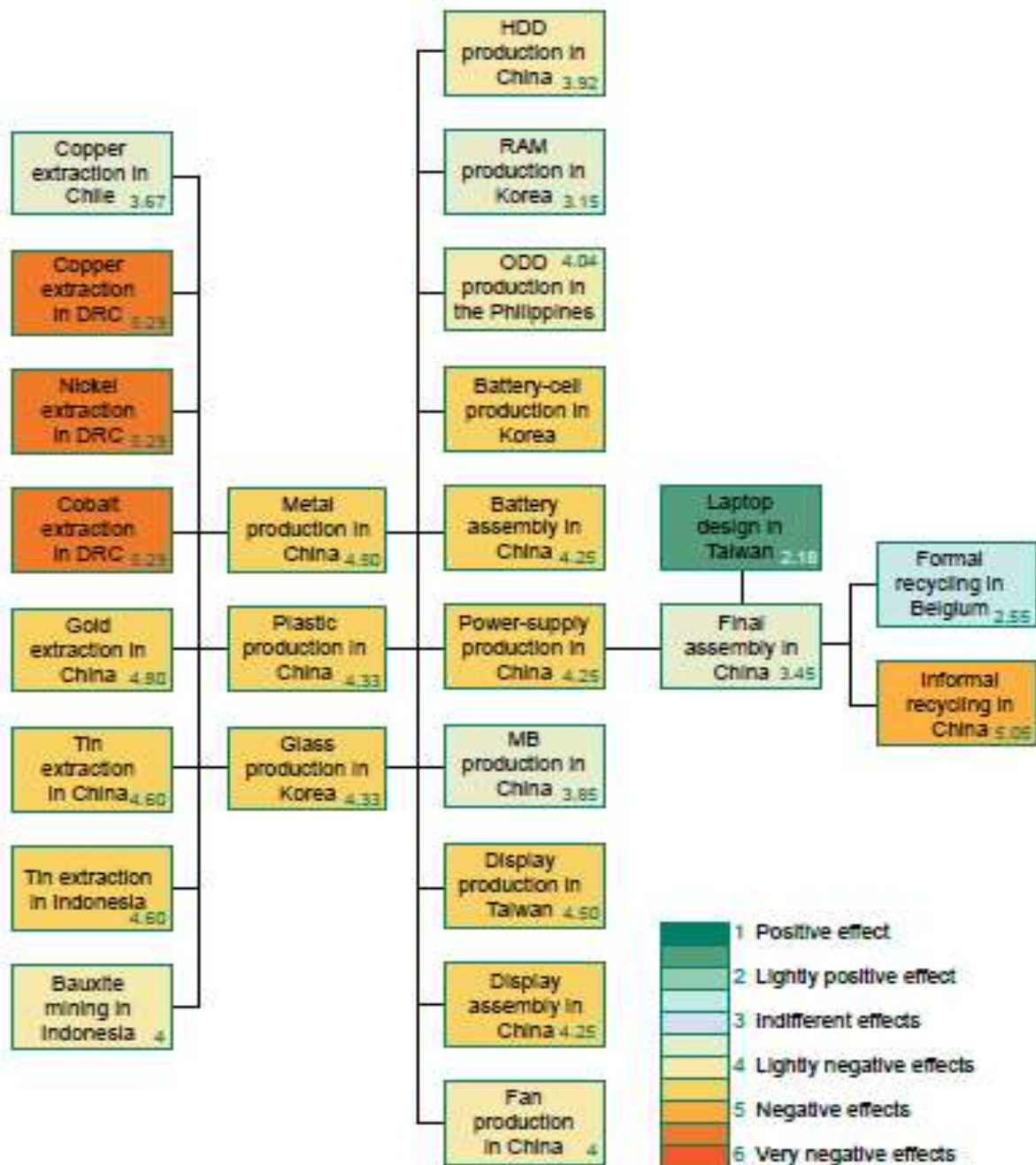
Het Europese Eco-label

De producten

De criteria

Nieuwtjes

Getuigenissen



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Education in LCSA in practice (1)

Formal education: LCSA (incl. social LCA) has been part of courses – at least - at the following universities:

- Ghent University –Belgium;
- Federal University of Technology of Paraná – Brazil;
- University of New Hampshire – United States;
- ...

Non-formal education: LCSA training sessions have been set up in – at least - the following countries:

Belgium, Brazil, Chile, France, Germany, Canada, United States, Israel, Sweden ...

Education in LCSA in practice (2)

Objectives of formal and non-formal education:

- understanding of the background and the need of LCSA;
- understanding the differences between different instruments of 'social responsibility';
- understanding of the three techniques, incl. complementarities and differences;
- understanding of the different supporting tools for LCSA;
- understanding of the applications of LCSA and its limitations;
- ability to analyse and/or report the results of a LCSA within a broader context.

Education in LCSA in practice (3)

From their education experience, incl. the interaction with students/participants, the authors of this paper can put to the front the following points:

- participants in training sessions and students at universities are interested to learn, preferably in an inter- and multidisciplinary setting, about all dimensions of sustainable development through a tool for evaluating the sustainability of products and their global value chains;
- more examples from practice are needed to be used in the educational material, inter alia to make problem-based learning more in line with the specific curricula;
- in engineering education students are learning to deal with other types of problems (see below)
- there is difference of learning with regard to the maturity of participants/students and the duration of the training/teaching: educational material should be adapted accordingly;
- a specific follow-up instrument for evaluating the training/teaching by the participants/students should be developed.

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Conclusion

- Education in LCSA is learning about “*a more just society based on respect for nature and human rights, and demands a fairer economy and greater solidarity towards different cultures and future generations.*” (cf. challenge of the Barcelona Declaration)
- Education in LCSA “*Incorporate disciplines of the social sciences and humanities.*” (cf. one of the goals of the Barcelona Declaration).
- Students looking for an answer on the question ‘What is a sustainable product?’ by using LCSA are learning to deal with **complexity** and **uncertainty**; differences in **system boundaries, quantitative versus qualitative indicators, stakeholder involvement**, etc.
- Furthermore, during education it can be emphasized that LCSA can in fact be part of the well-known PDCA-cycle and link it to ‘life cycle management’ leading to continual improvement.



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