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Aggregation in Social LCA Case Studies

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Aggregation in Social LCA Case Studies

1 Social Life Cycle Assessment (S-LCA) and aggregation

2 Requirements and issues of aggregation in S-LCA

3 Solutions applied in S-LCA case studies

4 Discussion and Recommendations

5 Outlook

1 Social Life Cycle Assessment (S-LCA) and aggregation

1 Social Life Cycle Assessment

- Holistic picture of the social impacts of a product, over its entire life cycle
- Recently (2009) developed in an international UNEP/SETAC Working Group
- High interest from policy and industry
- No software available
- First specific databases available

1 Social Life Cycle Assessment

- Holistic picture of the social impacts of a product, over its **entire life cycle**
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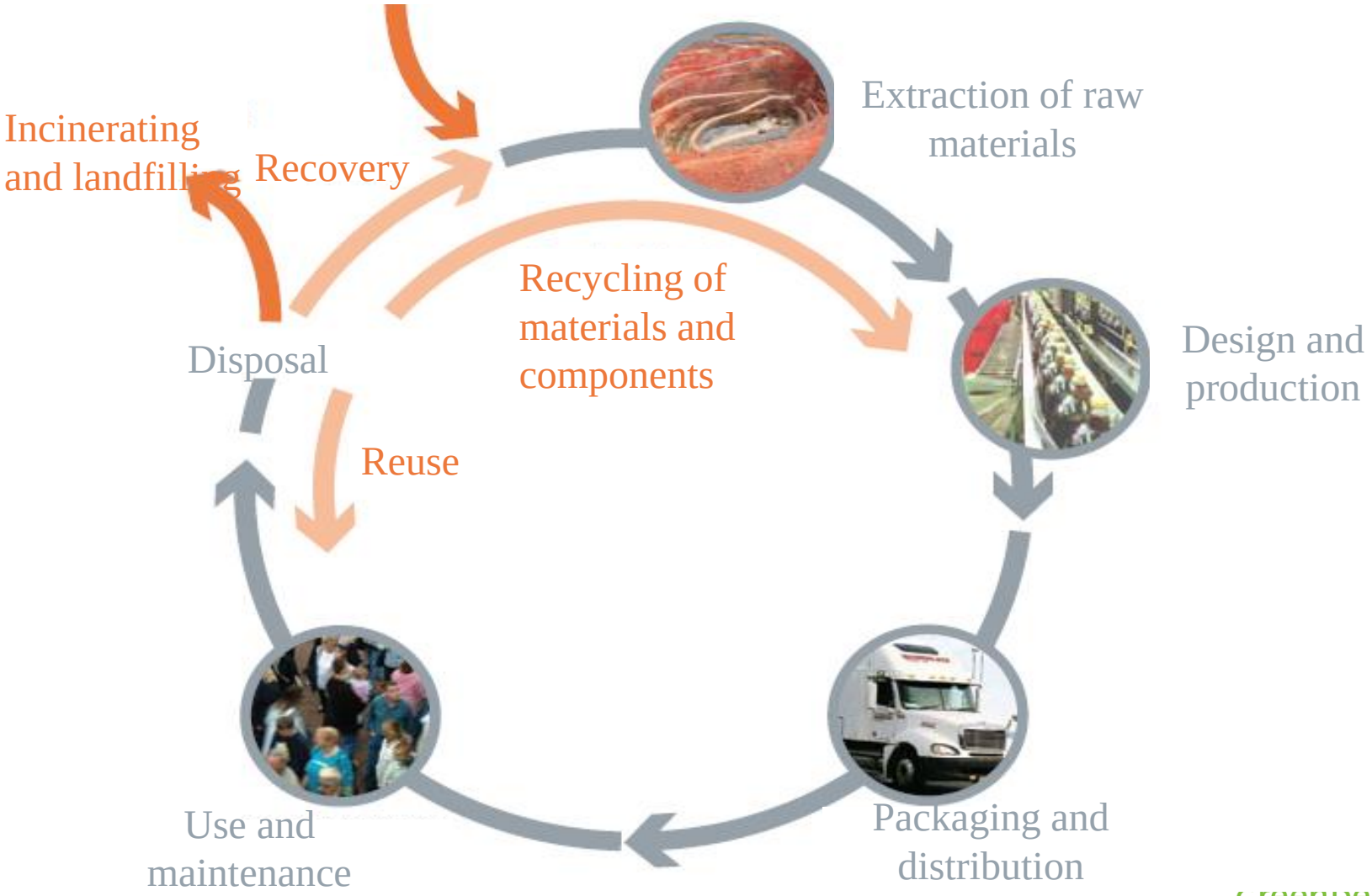
…and a life cycle



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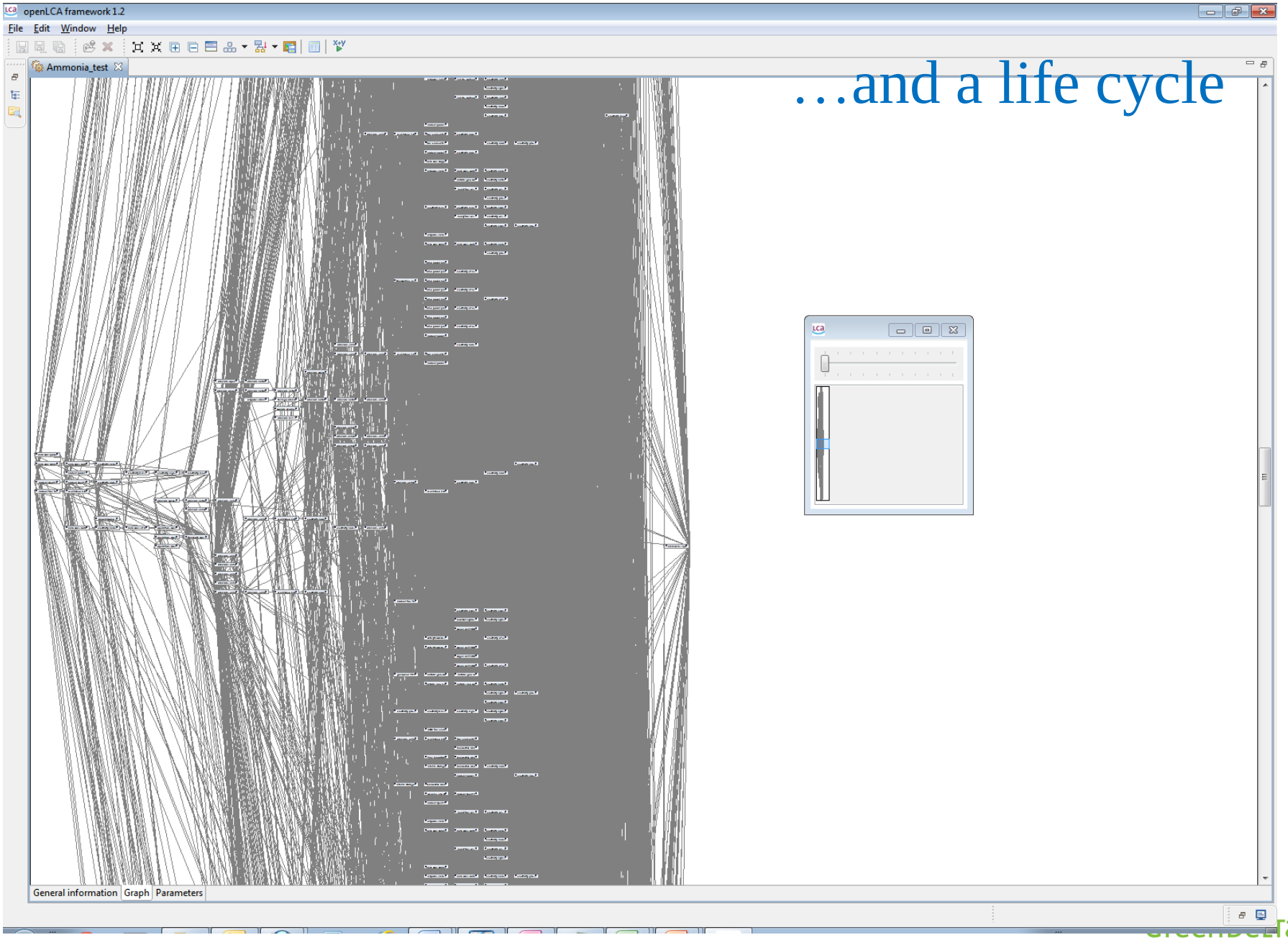
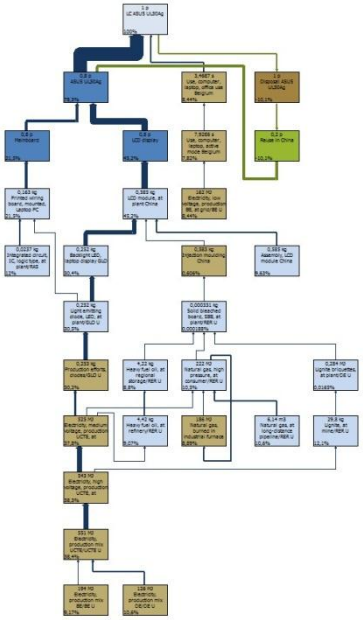


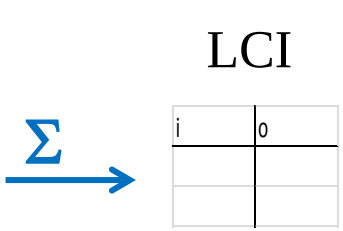
1 Aggregation over the entire life cycle:

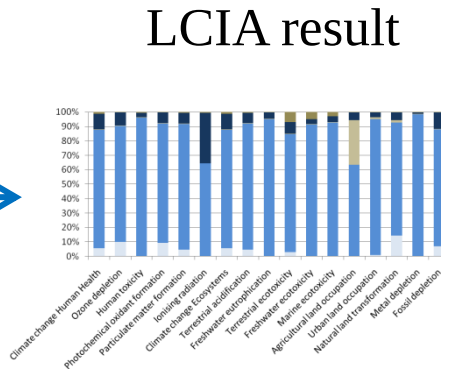
- In order to indeed get a holistic picture of the social impacts over the entire life cycle, aggregation is needed, because…
  - a life cycle model provides information for its smallest elements, processes, which are usually grouped into life cycle stages
  - There may be literally thousands of processes in a life cycle
  - This information needs to be "condensed" or aggregated in order to be understandable
  - At the same time, detailed results for single processes and life cycle phases may be useful, to understand hot spots and trade offs

1 Aggregation over the entire life cycle: The traditional (environmental) LCA approach

- Aggregate purely quantitative process inventories to a life cycle inventory, LCI
- "feed" LCI result into Life Cycle Impact Assessment, LCIA.







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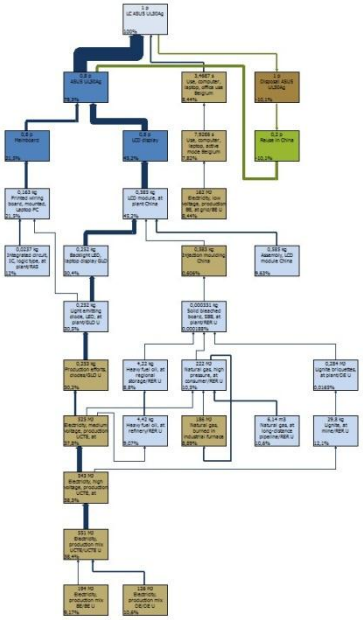
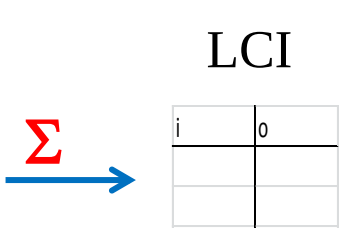
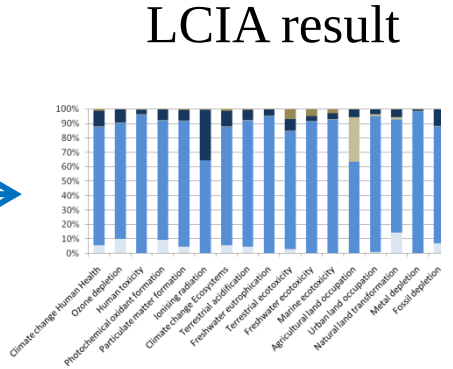
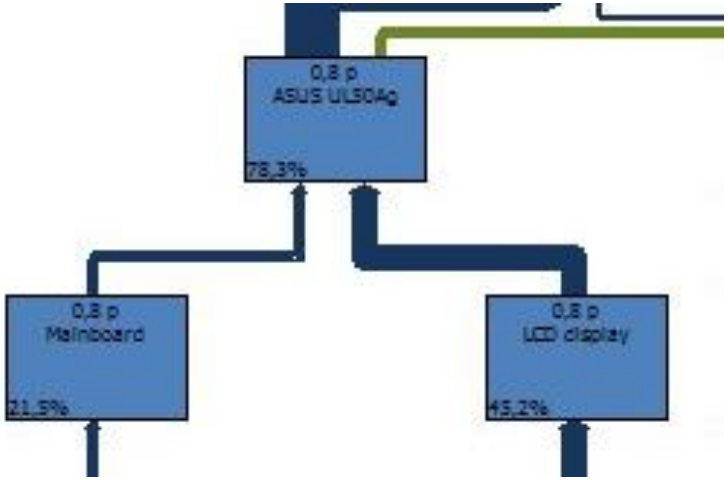






1 Aggregation over the entire life cycle: The traditional (environmental) LCA approach

- (contribution of each single process to the overall system, its "scale", is based on its mass / energy product flows into the system)



2 Requirements and issues of aggregation in S-LCA

Requirements of aggregation in S-LCA…

→ …concerning the aggregation result

a. Provide a good overall aggregation of the social assessment result
   - No introduction of biases, complete and "good" representation of the assessment results on process and LC stage level
   - Aggregation result easy to understand

b. Allow for hot spot and contribution analyses
   - Results must also be available on more detailed levels

→ …concerning the aggregation procedure

c. Aggregation procedure should be practical, easy to be performed; ideally in an automated manner

…and the issues

(in addition to life cycles being potentially very large)

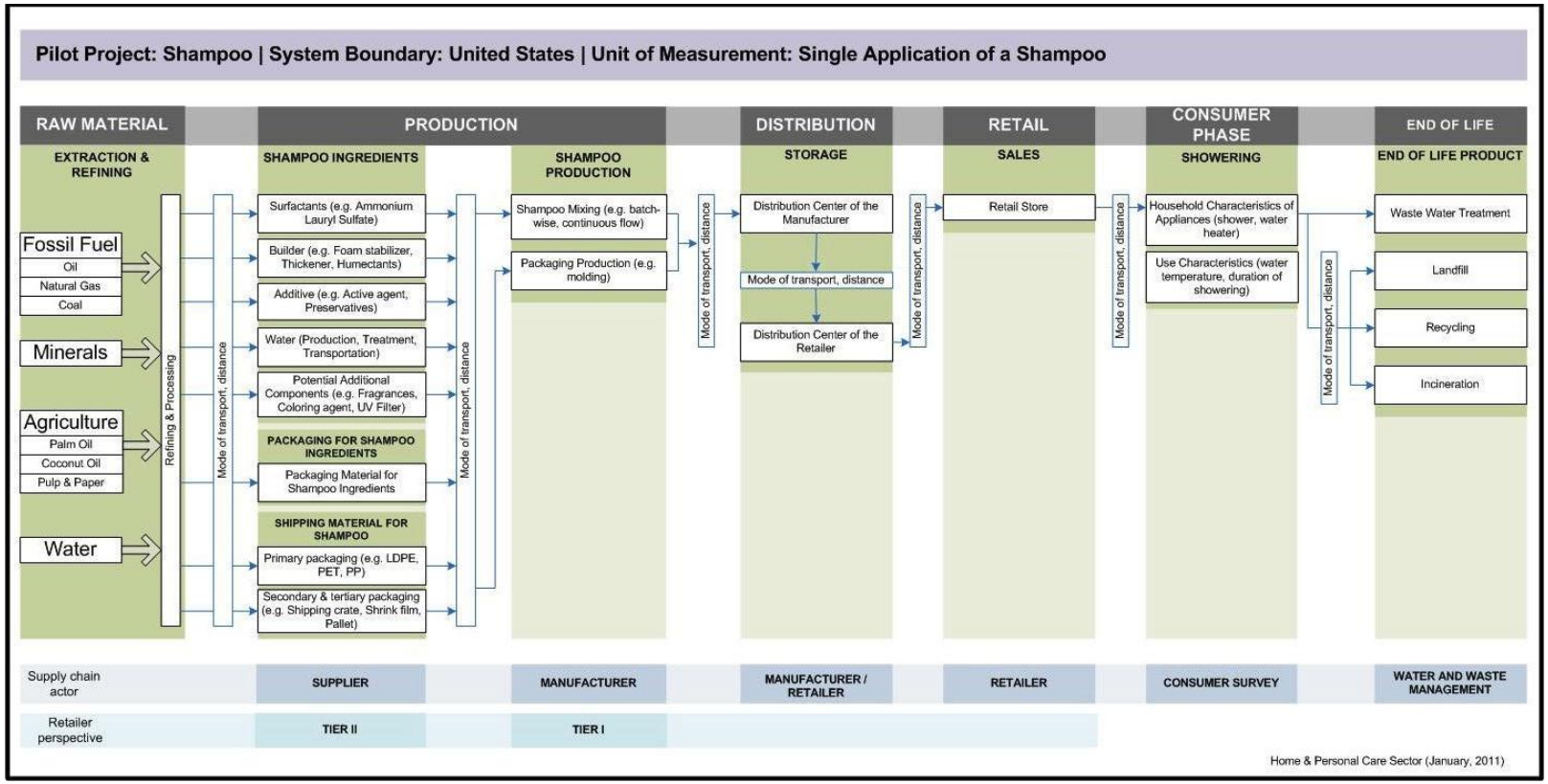
a. Data on social impacts of processes can be qualitative or quantitative,
b. impacts can be positive or negative,
c. and impacts are usually non-linear.

3 Solutions applied in S-LCA case studies

3.1 SHDB+ & Shampoo

- US-based shampoo product, investigated in a case by Catherine Benoit & colleagues, commissioned by TheSustainabilityConsortium
- Focus in my presentation: Social Hot Spot Database (SHDB) use
- Source:
  Catherine Benoît Norris, Studying the Social Hotspots of 100 product categories with the Social Hotspots Database and further research, LCA XII, Sept 25 – Sept 27, Tacoma, USA

3.1 SHDB+ & Shampoo



3.1 SHDB: risk

- Country and (usually) sector specific impacts
- A product produced in a sector, in a country has a risk of having the specified (negative) impact
- Risk data is obtained from official statistics and other sources but always quantitative.

3.1 SHDB and risk: e.g., indigenous rights

GTAP	Country/Region	Indigenous Population (x=yes)	Tribal Names if known	Source(s)	Total Country Population (000's)	Population of Indigenous (000's)	% Population Indigenous (000's)	Characterization of % Indigenous, see footnote	Source(s)	Countries that have ratified ILO 169 Convention Concerning Indigenous and Tribal Peoples 1989	Countries that have not endorsed United Nations Declaration on the Rights of Indigenous Peoples (o = against, * = abstention)	Characterization of conventions, see footnote	# of laws to protect Indigenous peoples (ILO NATLEX)	Characterization of Indigenous laws, See footnote
ALB	Albania							Low				na		na
ARG	Argentina	x	31 groups: e.g. Guarani/Mbyá, Quechua, Aymara, Mapuche, Toba, Wichi/Mataco, Chiriguano	Indigenous World 2010 (IWGIA), World Directory of Minorities and Indigenous Peoples 2008 (UNHCR), State of the World's Indigenous Peoples (UNDESA 2009)	39,882	600	1.50%	Medium	Indigenous World 2010 (IWGIA)	x		Low	7	Low
ARM	Armenia							Low				na		na
AUS	Australia	x	Aboriginal Australians (many groups), Torres Strait Islanders	Indigenous World 2010 (IWGIA), Indigenous Peoples, Poverty and Development (2010), State of the World's Indigenous Peoples (UNDESA 2009)	21,431	520	2.43%	High	Indigenous World 2010 (IWGIA)			Medium	44	Low
AUT	Austria							Low				na		na
AZE	Azerbaijan	x	Lezgins, Talysh, Avars, Tsakhurs, Aghuls, Rutuls	World Directory of Minorities and Indigenous Peoples 2008 (UNHCR), Ethnic groups worldwide by David Levinson (1998)	8,680	350	4.03%	High	World Directory of Minorities and Indigenous Peoples 2008 (UNHCR)		^	Medium		High
BGD	Bangladesh	x	45 groups: e.g. Chakma, Garo, Marma, Santal, Tripura	Indigenous World 2010 (IWGIA), Indigenous Peoples, Poverty and Development (2010), State of the World's Indigenous Peoples (UNDESA 2009), World Directory of Minorities and Indigenous Peoples 2008 (UNHCR)	160,000	2,500	1.56%	Medium	Indigenous World 2010 (IWGIA)		^	Medium	1	Medium
BLR	Belarus							Low				na		na
BEL	Belgium							Low				na		na
BOL	Bolivia	x	36 groups: e.g. Quechua, Aymara, Guarani, Chiquitano, Ese Ejja, Moseño	Indigenous World 2010 (IWGIA), Indigenous Peoples, Poverty and Development (2010), Indigenous peoples, poverty & human development in Latin America 1994-2004 (2006, World Bank), State of the World's Indigenous Peoples (UNDESA 2009), World Directory of Minorities and Indigenous Peoples 2007 (UNHCR)	9,694	6,010	62.00%	Very High	Indigenous peoples, poverty & human development in Latin America 1994-2004 (2006, World Bank), World Directory of Minorities and Indigenous Peoples 2007 (UNHCR)	x		Low	17	Low
BWA	Botswana	x	San (BaSarwa), Bakala, Nama	Indigenous World 2010 (IWGIA), Indigenous Peoples, Poverty and Development (2010), Rights of indigenous peoples in 24 African countries 2009 (ILO), State of the World's Indigenous Peoples (UNDESA 2009)	1,921	63	3.28%	High	Indigenous World 2010 (IWGIA)			Medium	1	Medium
BRA	Brazil	x	Yanomami, Tukano, Urueu-Wau-Wau, Awá, Arará, Guarani, Nambiquara, Tikuna, Makuxi, Wapixana and Kayapó, Tapeba, Tremembe, Kaiowa, Nandeva Guarani	Indigenous World 2010 (IWGIA), State of the World's Indigenous Peoples (UNDESA 2009), World Directory of Minorities and Indigenous Peoples 2007 (UNHCR)	191,971	734	0.38%	Medium	Indigenous World 2010 (IWGIA), World Directory of Minorities and Indigenous Peoples 2007 (UNHCR)	x		Low	19	Low
BGR	Bulgaria							Low				na		na
KHM	Cambodia	x	20 groups such as Khmer Leou (hill tribes)	Indigenous World 2010 (IWGIA)	14,562	179	1.23%	Medium	Indigenous World 2010 (IWGIA)			Medium		High

3.1 SHDB and risk: e.g., indigenous rights

# of laws to protect Indigenous peoples (ILO NATLEX)	Characterizat on of Indigenous laws, See footnote
	na
7	Low
	na
44	Low
	na
	High
1	Medium

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# of laws to protect Indigenous peoples (ILO NATLEX)	Characterizat on of Indigenous laws, See footnote
	na
7	Low
	na
44	Low
	na
	High
1	Medium

3.1 SHDB: risk

- The severity of the (potential, risk) impact is scaled, e.g. from 1 to 4
- Any process in the life cycle that happens in an assessed sector and country obtains the respective score

- The contribution of each process in the life cycle to the overall life cycle is assessed by the working hours spent there

3.1 SHDB: risk

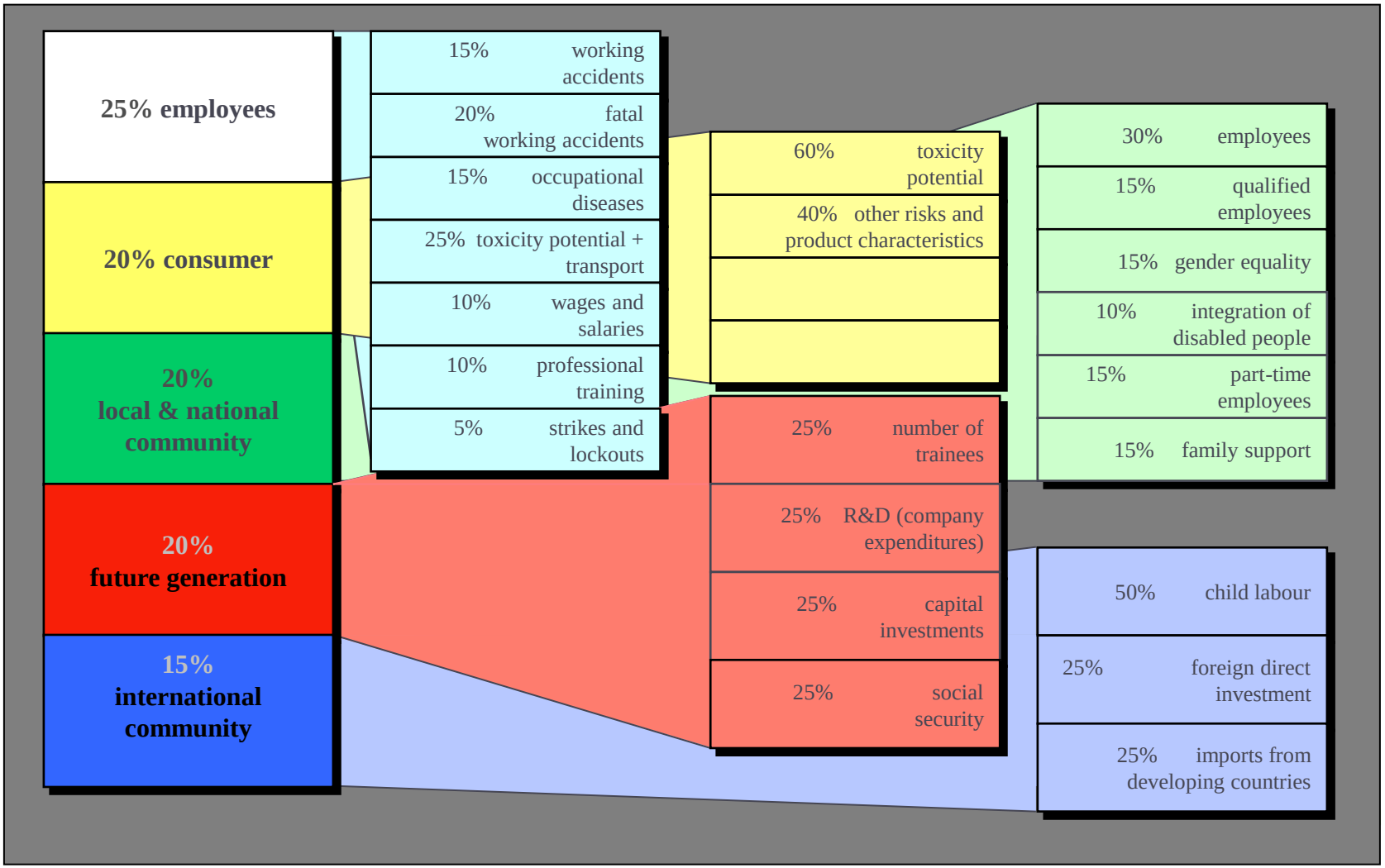
- (The contribution of each process in the life cycle to the overall life cycle is assessed by the working hours spent there)

→this allows an overall aggregation
(which is however not performed? But a hot spot index 0…100 is calculated)

3.2 SEEBalance & AgBalance, BASF

- SEEBalance: Purely quantitative approach, including also an environmental and an economic life cycle analysis.
- Developed by BASF since 2004
- Recently further development into a method dedicated for agricultural products, AgBalance.
- Sources: Kicherer: The Socio-Eco-Efficiency Analysis: SEEbalance®, 2005; AgBalance: AgBalance Technical Background Paper, BASF, www.agro.basf.com/agr/AP-Internet/en/function/conversions:/publish/upload/sustainability/AgBalance/307736_BASF_Tech-E_Paper-AgBalance.pdf

3.2 SEEBalance Social Assessment: Indicator categories, indicators and their weighting



3.2 SEEBalance, BASF

→ All indicators are quantified.

e.g. gender equality, AgBalance, p. 24:

"In the assessment of upstream and downstream industrial production steps, this indicator is calculated by referencing the number of female managers (higher level) in the respective industry sectors."

(for assessing agricultural products; unit: Working years)

Indicators are assessed per industrial sector (→ SHDB!)

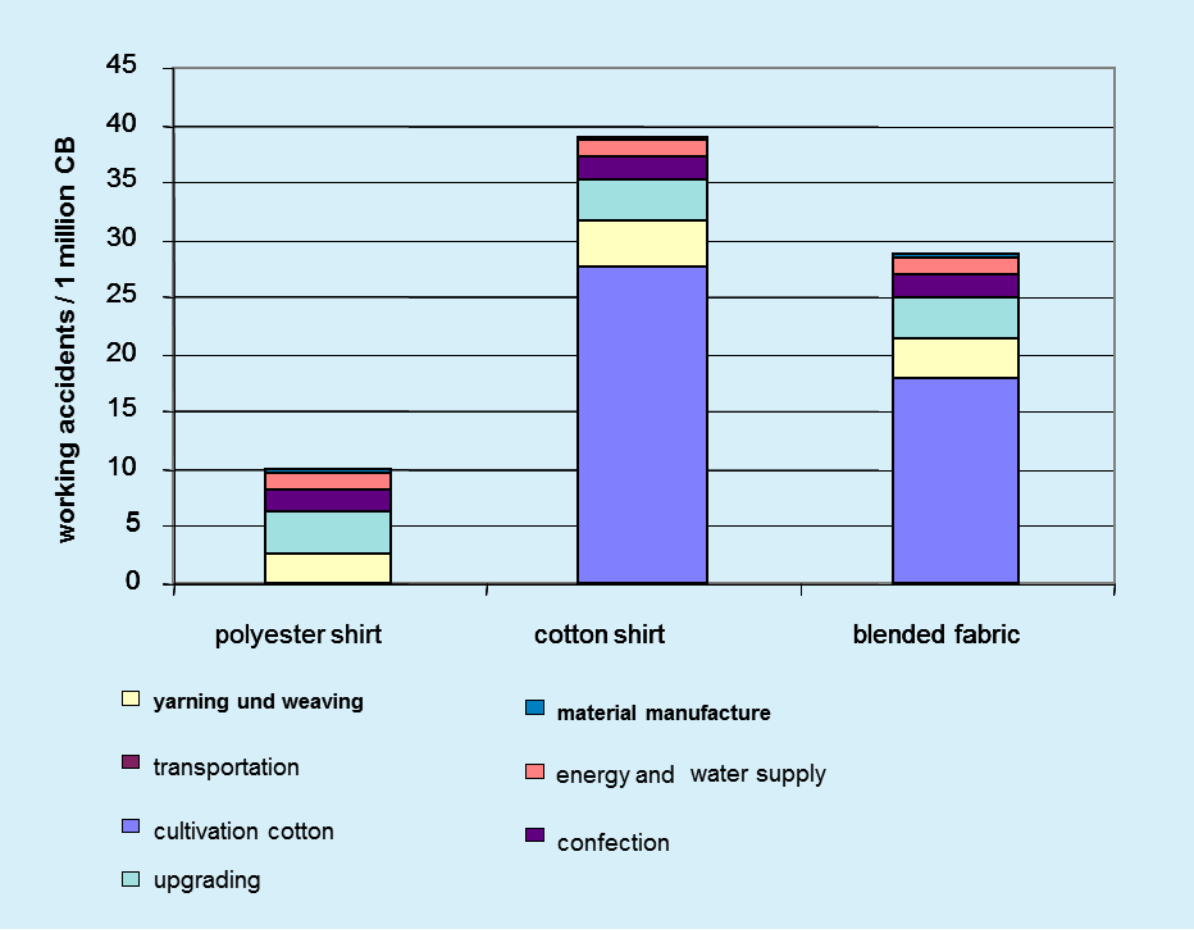
Since each process can be assigned to a sector, quantitative indicators are available for each process in a life cycle

3.2 SEEBalance, BASF

→ Contribution of each process to the overall system is calculated by its mass or energy contribution.

→ Thereby, the social assessment can be treated just as the environmental and economic assessment

3.2 SEEBalance, BASF: Life Cycle result indicator working accidents, T-Shirts



Source: Kicherer, 2005

3.3 Franze/Ciroth

- Developed in the course of a study for a notebook computer, 2011: LCA of An Ecolabeled Notebook - Consideration of Social and Environmental Impacts Along the Entire Life Cycle, Ciroth, A., Franze, J. (2011), ISBN 978-1-4466-0087-0
- Principles:
  - Perform a social inventory first, for each indicator, and if relevant, for each stakeholder (workers, local community, society, life cycle actors): What is the status for each process in the life cycle.
  - Assess this inventory, on the process level, on a scale from 1 to 6 (very bad), concerning
    a) Status of the indicator, social performance
    b) Contribution to the selected impact categories

3.3 Franze/Ciroth: Social inventory example, process level

Copper from Chile, stakeholder worker (detail, incomplete)

Subcategories	Indicators	Status
	country/sector	besides Chile ratified the ILO conventions no. 29 and 105 against forced labour.[273] However, there are cases of forced labour, primarily for domestic bondage and prostitution.[274] The mining sector is not linked to forced labour.
	Description of kind of forced labour in the sector	-
Fair salary	Specification of living wage and minimum wage in the country	The minimum wage in Chile amounts 222.34 EUR per month in 2010.[275] The living wage exceeds this value; probably it is around 400 EUR per month.[276] Poverty is an issue. Approximately 18% of population lives below poverty line.[277] However, Chile is better off in comparison to other Latin American countries.
	Wage level of the worker with lowest income and description of payment performance of the sector	Copper miners are considered as good earners. Due to rising prices of copper, unions negotiate wage increases and bonuses in the course of collective bargaining periodically. A copper mine worker with a higher education earns in average 1,300 - 1,600 EUR per month, while the wage of the worker with lowest income amounts ca. 420 EUR.[278]
Working time	Hours of work per employee and month in average	The average working time in the mining sector in Chile amounts 45h/week.[279]
	Number of days without work per week	Miners work in shifts. The shift system is different from mine to mine. At least miners have more than one day off in two weeks.[280]
	Description of how overtime is handled	The workers have detailed labour contracts, which regulate overtime. Overtime is voluntary and excessive overtime does not occur.
Discrimination	Percentage of women in the labour force in the sector	Around 11% of women are employed in industry.[281] The share of women in the mining sector is inherently low. Moreover women have no admittance to mines due to superstitious reasons. However, females are employed in administration. For instance, at Escondida the share of women is 5% of total staff.[282] Codelco employs 1,379 women, what comes up 7.1% of the total work force.[283]
	Country gender index ranking	Rank 26 of 102[284]
	Occurrence of discrimination in	Discrimination against women is persistent. Women suffer from employment discrimination and are

3.3 Franze/Ciroth: Assessment example, process level

Copper from Chile, stakeholder worker (detail, incomplete)

Stakeholder group	Subcategory	Performance assessment	WC	HS	HR	SER	IR	G	Impact assessment
Workers	Freedom of association and collective bargaining	2	✓	✓	✓	✓	(✓)	(✓)	1
	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Amount	4.00							5.00

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	Child labour	1	✓	✓	✓	✓	✓	✓	1
	Discrimination	5	✓	✓	✓	✓	✓	✓	6
	Amount	4.00							5.00

Also: Aggregation of assessment results (on process level)

3.3 Franze/Ciroth: Assessment example, notebook life cycle (main processes), stakeholder worker

4 Discussion & recommendation

4 Discussion

- **Full quantification**
  - is convenient and allows treating social assessment "just as" environmental and economic assessment
  - Especially the aggregation is then easily possible
  - Quantification is not always possible, more or less surprising "constructions" are required (#of women in upper management of farms; # of laws)
- **Assessment scores** are quantitative per se and therefore straightforward to aggregate
- **Assessment** on the life cycle **level** (→ env. LCA approach) tends to overlook non-linear effects; an assessment is therefore more adequate on the process level

4 Discussion

- **Aggregation over the entire life cycle** is still a challenge. Process contributions to the overall social life cycle impact may *not* depend on mass flows or working hours (esp. for other stakeholder than workers)
- Without an overall life cycle result, hot spots can already be determined

- Currently, an overall aggregated social Life Cycle result "needs to be treated with care"

5 Outlook

5 Outlook

- Aggregation is important in order to come to a comprehensive, holistic picture of life cycle impacts.
- There will be probably more alignment within currently varying approaches for aggregation (at least I hope so), and also a better understanding of its importance
- At the same time, I expect to see also new solutions for detailed problems, such as the scaling / contribution of processes to the overall life cycle

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Thank you..

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