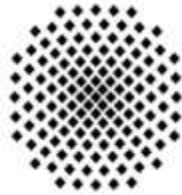


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# Quantifying and assessing working environment related social aspects along product lifecycles – the LCWE approach



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# Quantifying and assessing working environment related social aspects along product lifecycles – the LCWE approach

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Department Life Cycle Engineering (GaBi), University of Stuttgart



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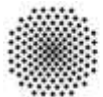
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# Outline

- ▶ LCWE approach
- ▶ Indicators developed
- ▶ Data preparation
- ▶ Determination of value added
- ▶ Data aggregation
- ▶ Implementation in software – data sources
- ▶ LCWE case study results
- ▶ Conclusions



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# LCWE – Life Cycle Working Environment approach LBP-GaBi

- Consideration of social aspects in the working environment related to a product / functional unit (see Guidelines for Social Life Cycle Assessment of products)
- Consistent and comprehensive background database with social information for all unit processes implemented in the next GaBi version
- Database can be used to identify hotspots

## Assumptions:

Within an industry sector (with similar types of processes)...

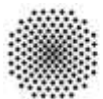
- Social impacts are proportional to the amount of human labour carried out
- The amount of human labour carried out is proportional to the added value



## Indicators developed and integrated

Group	Indicator	Unit
Qualified working time	General Qualification level A (GQL A)	[sec]
	General Qualification level B (GQL B)	[sec]
	General Qualification level C (GQL C)	[sec]
	General Qualification level D (GQL D)	[sec]
	General Qualification level E (GQL E)	[sec]
	Total working time	[sec]
Health and Safety	Lethal accidents	[cases]
	Non-lethal accidents	[cases]

→Not all indicators integrated that are addressed in guidelines but a feasible starting point

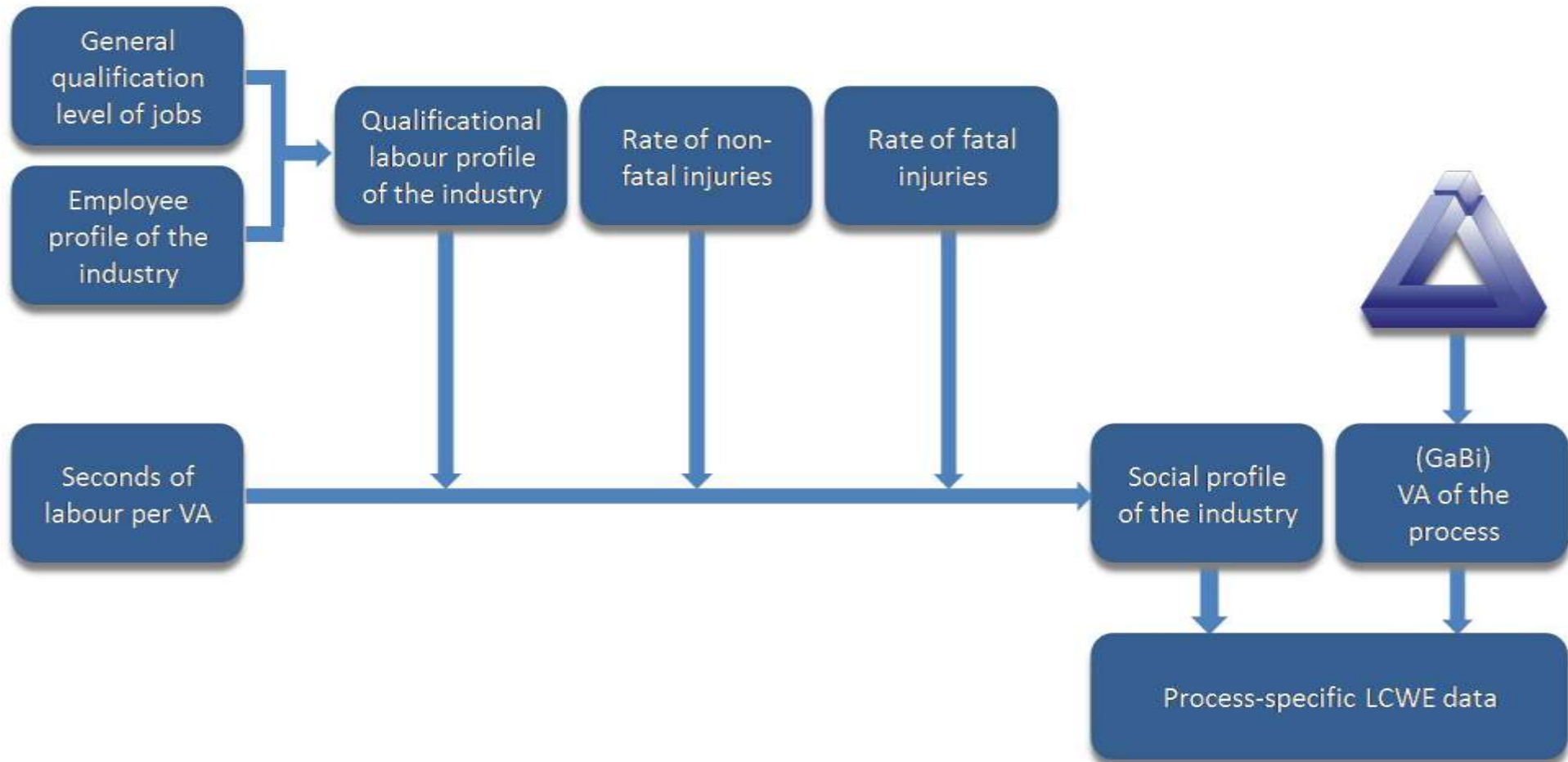


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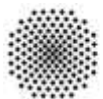
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# Data preparation



→ De-facto economic allocation of social data via seconds of labour per value added

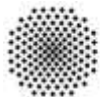
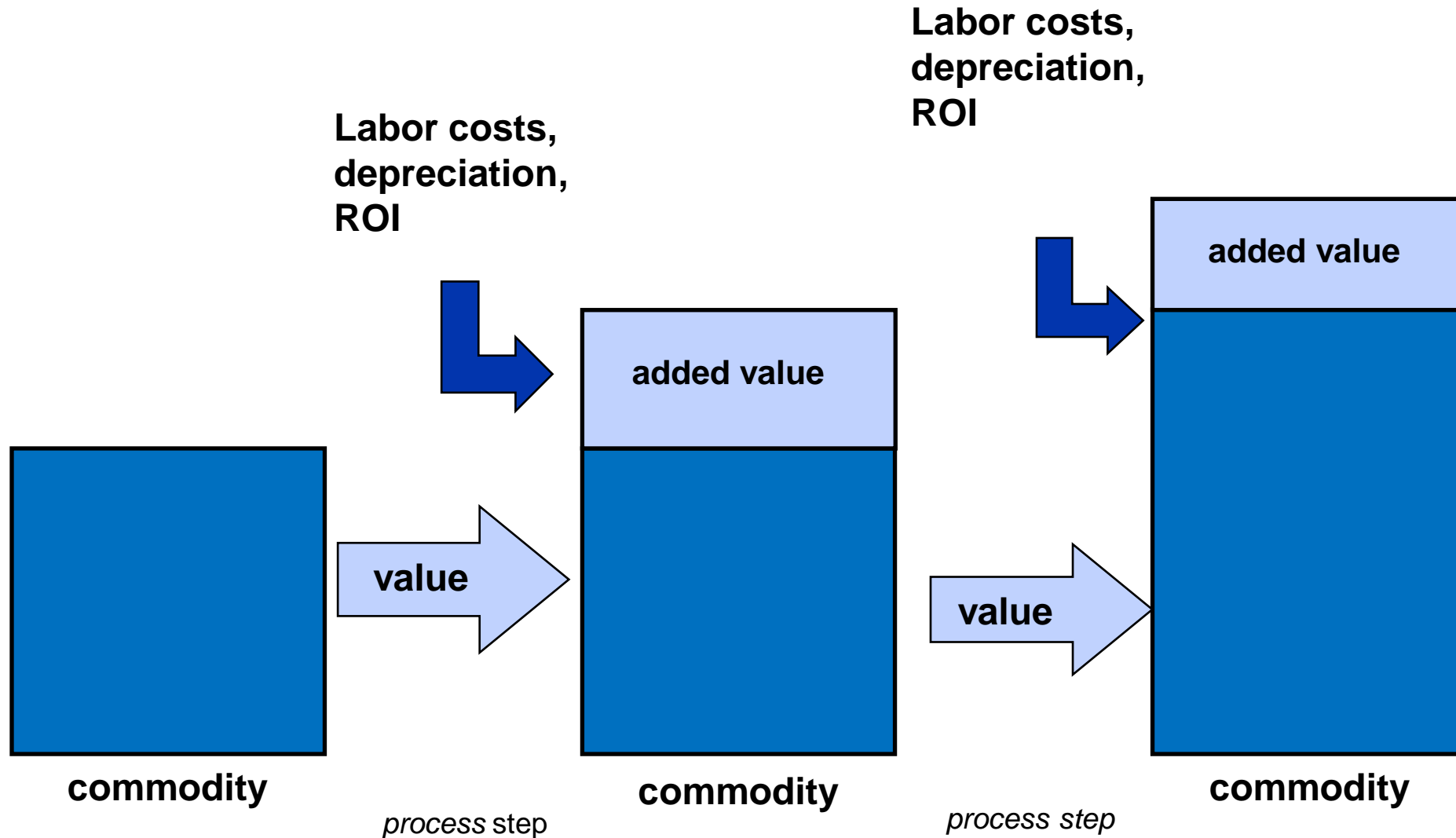


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# Determination of value added

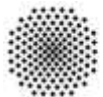
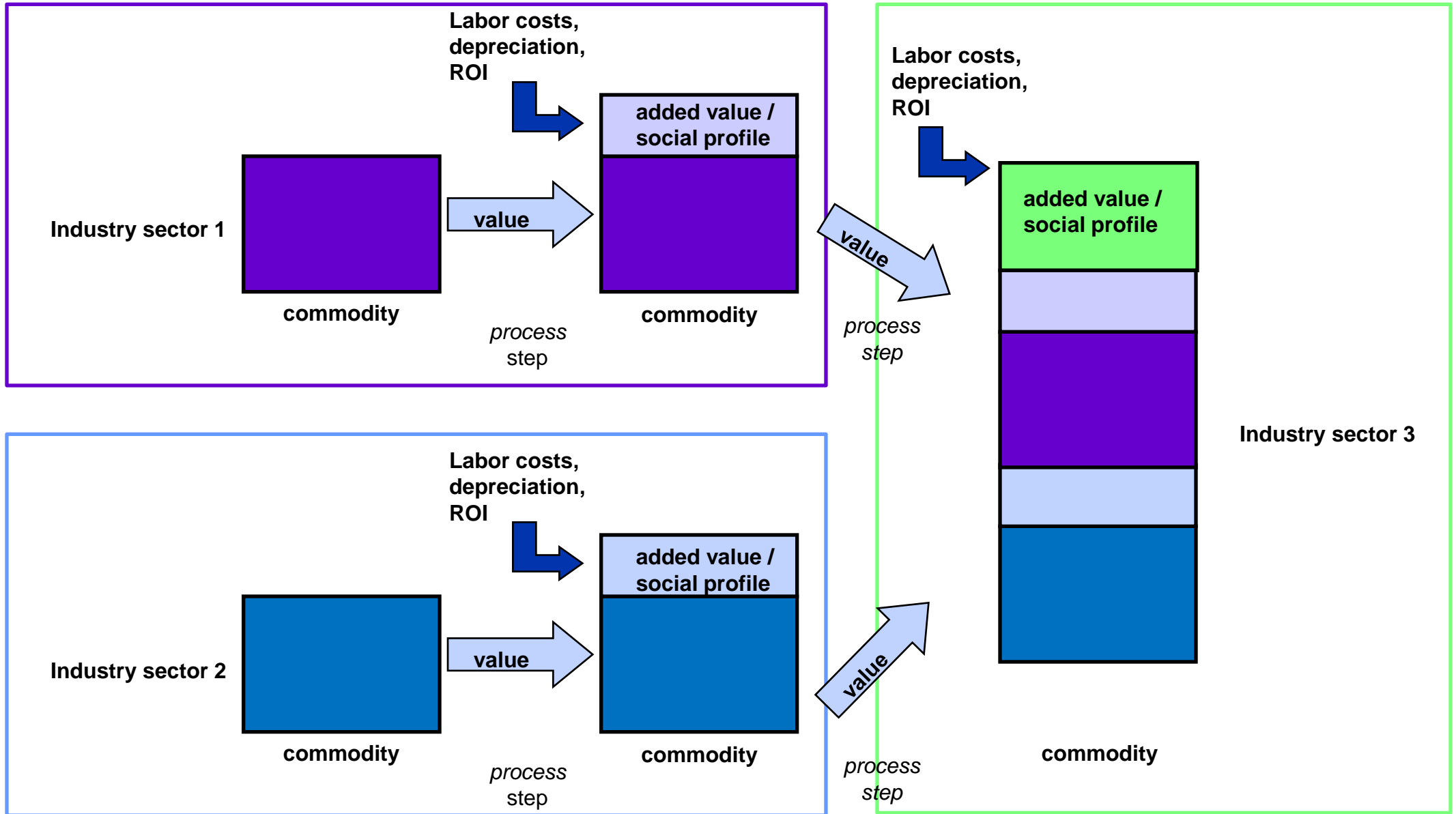


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# Data aggregation



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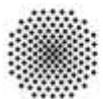


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# Implementation into software GaBi – Data sources

## Data sources

- ▶ Standard Occupational Classification
- ▶ Standard Industry Classification (SIC)
- ▶ North American Industry Classification System (NAICS)
  
- ▶ US Economic Census
- ▶ Master Crosswalk
- ▶ US Import/Export History



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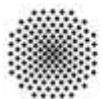
# LCWE case study A

## **LABELAGRIWASTE – Labelling Agricultural Plastic Waste for Valorising the Waste Stream**

EC 6<sup>th</sup> framework program (Collective Research), 01/2006 – 07/2009

Labelling agricultural plastic waste for disposal at the European level to facilitate a better and economic feasible environmental management of agricultural plastic waste at farm-enterprise level and at the agricultural community social and environmental level in a unique way throughout Europe.

The main objective of the prenormative research project was to develop standardised procedures and methodologies to label the agricultural plastic waste streams in order to facilitate their routing to the best alternative processing and final disposal (most environmental friendly, economic and technically feasible).



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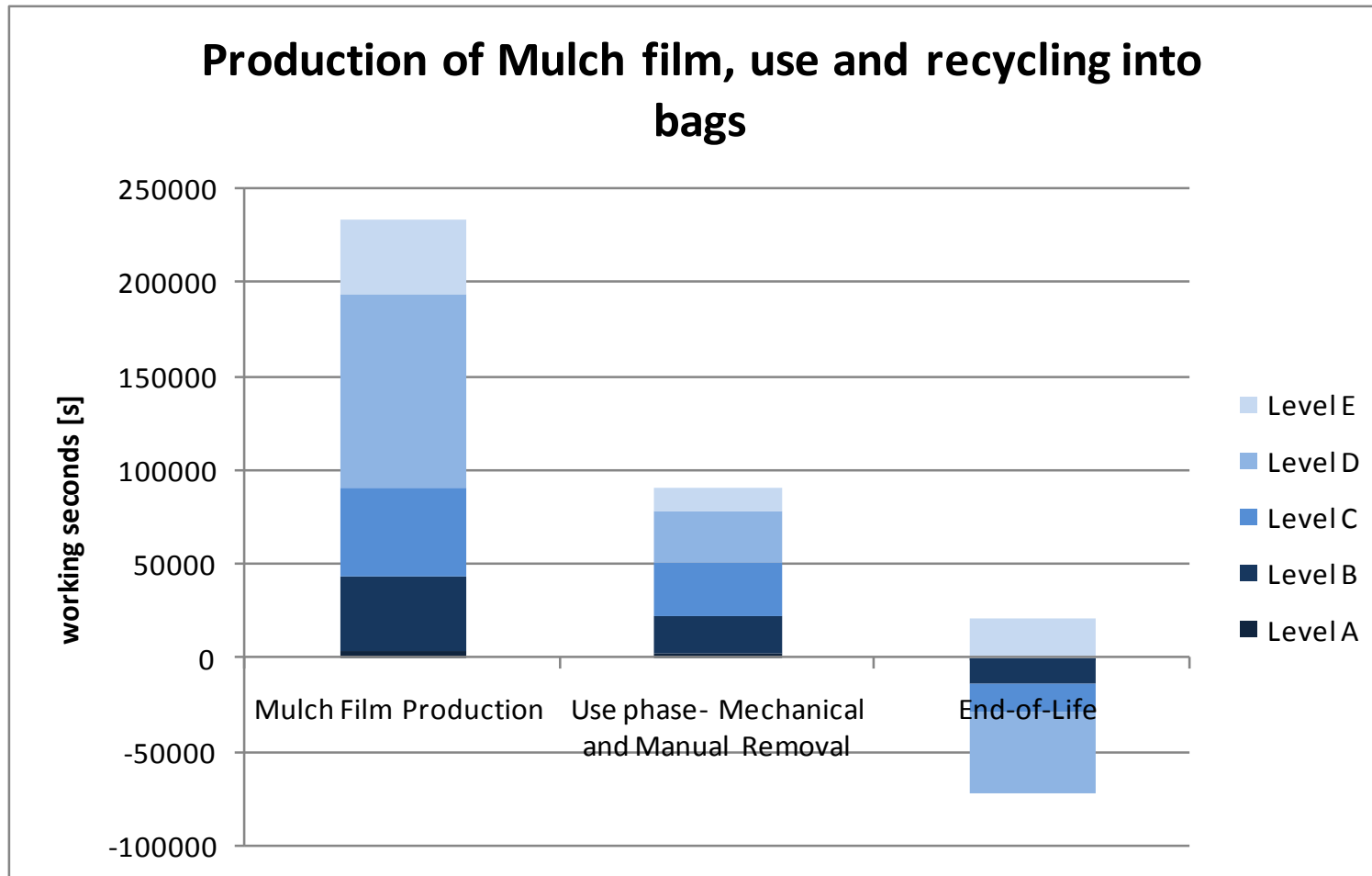
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# LCWE case study A results

Qualification profiles:

From A (high level) to E (low level)



Data:  
LABELAGRIWASTE



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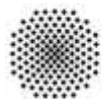
## LCWE Case study B

### **Sustainability of packaging systems for fruit and vegetable transport in Europe on basis of life-cycle-analysis**

Stiftung Initiative Mehrweg (SIM), 05/2005 – 03/2007 (updated in 2008 and 2009)

Goal of the study is an analysis of the environmental impacts of the production, utilisation and “end of life” of three packaging systems (wooden boxes, cardboard boxes and plastic crates). This includes the individual distribution systems like one-way or multi-way for the transport of fruit and vegetables in Europe.

In addition to the environmental impacts, which are the core of this life-cycle assessment, the study also integrates cost factors over the entire life cycle and considers social characteristics of the examined products and process chains.



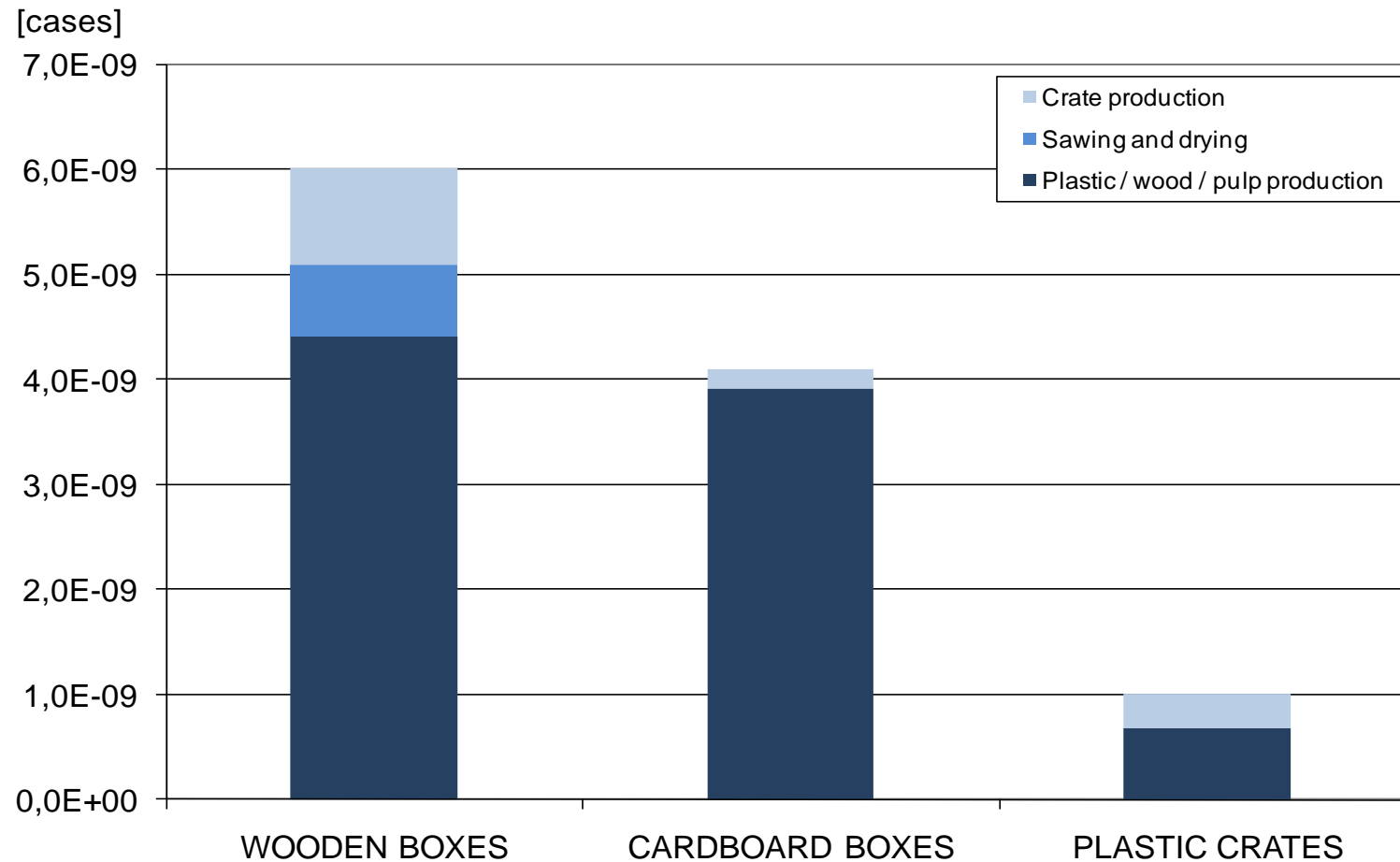
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# LCWE Case study B results

## Lethal accidents in box production



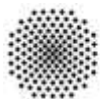
Data: „Sustainability of packaging systems for fruit and vegetable transport in Europe on basis of life-cycle-analysis“



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# Conclusions

- ▶ Social aspects have to be integrated into sustainability assessment of products.
- ▶ LCWE method allows quantitative tracking of social aspects along a product's life cycle on the basis of seconds of labour per value added.
- ▶ Primary data integration possible; data gaps can be filled from statistical sources.
- ▶ Background data on qualification levels as well as lethal and non-lethal accidents for every unit process in upcoming GaBi 4.4 → database could be used to identify hotspot processes
- ▶ LCWE method is open for the integration of new indicators as long as they refer to working time.



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# Contact

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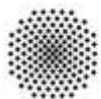
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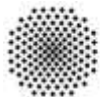
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# Supplementary material



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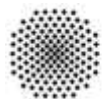


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# Indicator development

## Requirements

- **Relevance and consensus**
- **Completeness and attributability**
- **Pertinence of indicator sum**
- **Comparability of targets and indicators**
- **Average validity**
- **Cutt-off criteria**
- **Temporal stability and time series**
- **Impartiality**
- **Quantitativeness**
- **No overlap**
- **Product/process-relatedness**
- **System boundaries**
- **Reference system**
- **Data availability/effort**



# Indicator development

1. Defining the problem fields/indicators
2. Collect different dimensions
3. Identify interrelations and overlaps
1. Merging of dimensions
2. Identifying loss of information
3. Build separate Indicators
4. Aggregation along the chain

