

# LCA4Regions

Interreg Europe



European Union  
European Regional  
Development Fund

## LCA methodologies for Regions

- from LCA to LCM

**Fritz Balkau, Project expert**

Sustainable Solutions

[fbalkau@gmail.com](mailto:fbalkau@gmail.com)

15 June, 2020



# Content of presentation

Recall of key points in LC thinking

Applications at regional level

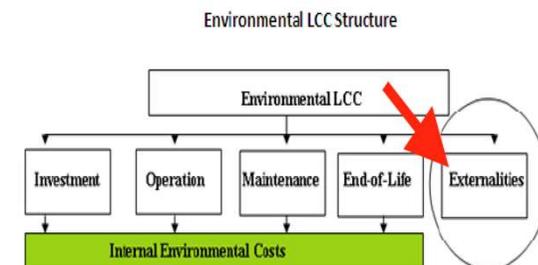
# Recall key points

- Life cycle thinking process - impacts along the life-chain
- Sustainability objectives and SDGs
- Assessment leads to policy and management action
- LCM involves all the stakeholders
- Life cycle toolbox

# An illustration of life cycle thinking

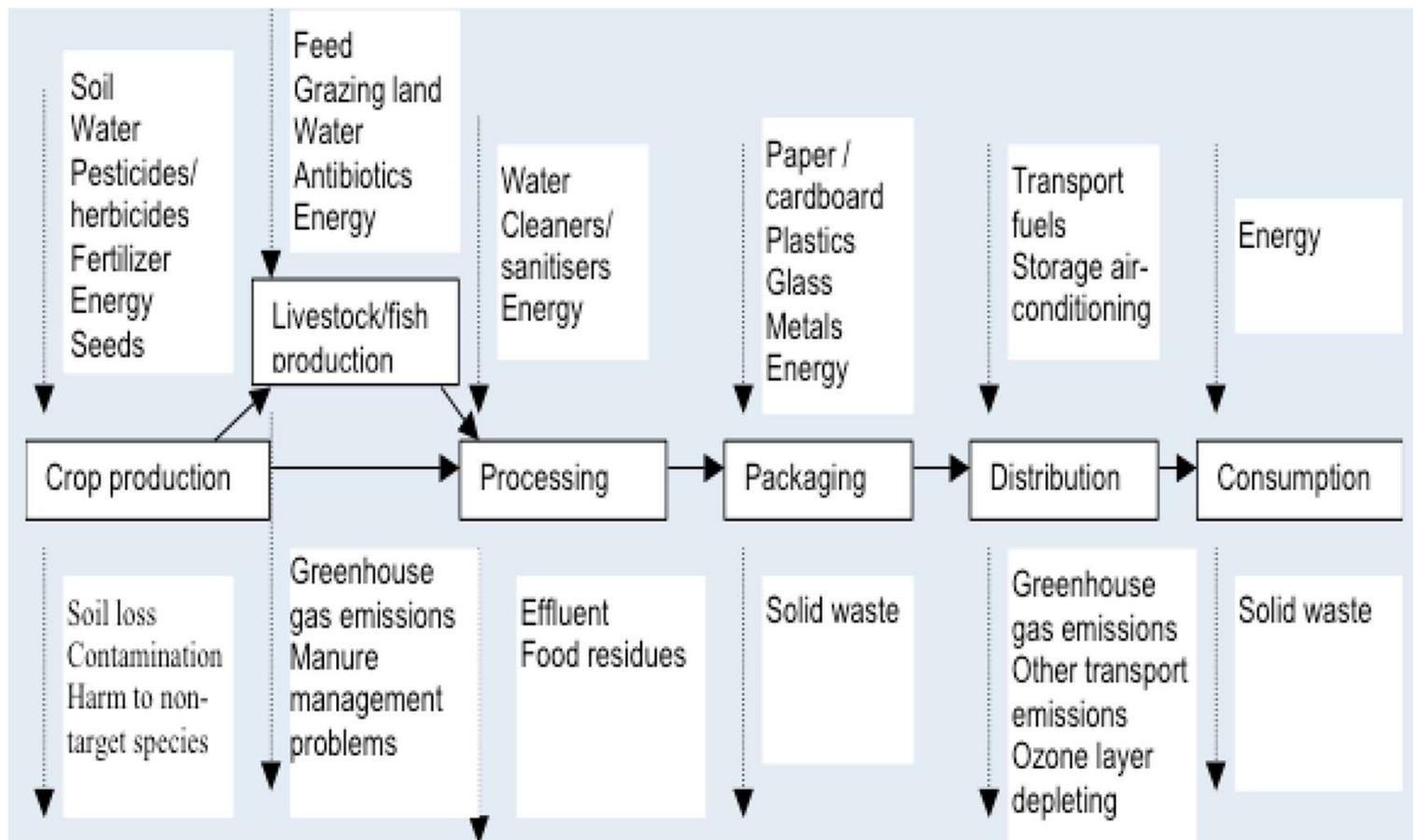
Example of **life cycle costing** (LCC) -

- Traditional costing – consider only initial purchase price
- Internal life cycle costing – account for internal cost flows
- Full life cycle costing – address internal + external public costs



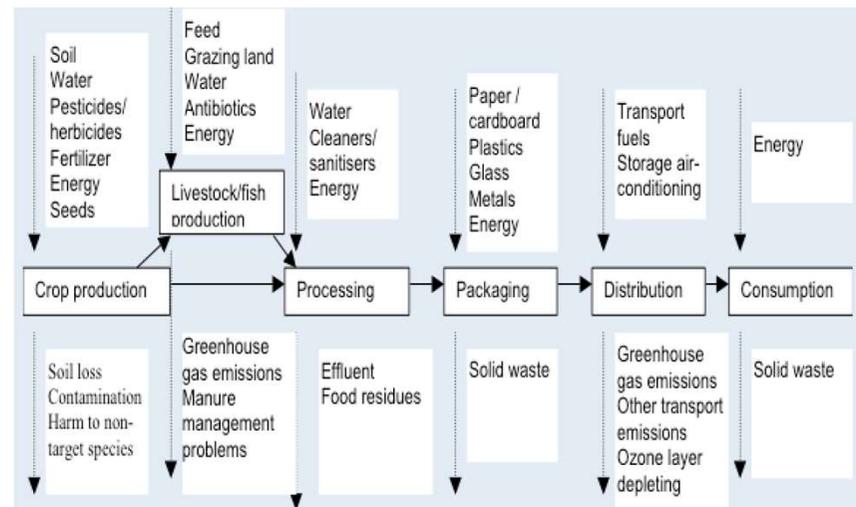
# Life chains have many impact points

*example of the food sector life chain*



# Unwanted spill-over effects

*Improving sustainability in one area may create unexpected impacts elsewhere*



# Multiple objectives

*sustainability is a diverse agenda*



**Selected Life Cycle Tools, Procedures and Concepts  
useful for efficient and effective implementation of SDGs**

**Life cycle systems and concepts**

Circular economy  
Industrial ecology  
Product-service system  
Cradle to grave/cradle to cradle  
Environmental/sustainability footprints

**Life cycle assessment tools and methods**

Life cycle assessment LCA\* (materials, energy)  
Materials flow assessment (MFA)  
Input-Output tables  
Social LCA (SLCA)  
Sustainability LCA  
Organisational LCA (O-LCA)  
Life cycle Costing (LCC)  
Chemicals assessment\*  
Risk assessment  
Evolving assessment tools for biodiversity, LULUC, landscape etc.

**Action tools based on LCA**

Eco-labels\*  
Environmental Product Declarations (EPD)\*  
Product environmental footprint (PEF)\*  
Eco-design

**Life cycle Management Tools**

Sustainable supply-chain management (SSCM)  
Circular materials management  
Sustainable and/or circular public procurement (SSP, CPP)  
Green purchasing (GP)  
Extended Producer Responsibility (EPR)  
Environmental Management Systems\* (EMS, EMAS)  
Sustainability reporting\* (e.g. GRI)

*1. Some of the above have been standardized procedures under international agreements or practices\**

*2. Other concepts such as sustainable production, resource efficiency, etc. also provide useful frameworks for implementing selected SDGs*

Two main interest areas -

\* Assessment and analysis (**LCA**)

\* Management action (**LCM**)



## LC toolbox:

## LC Assessment tools



Navarra

**Calculation of Carbon emissions** in services of the Commonwealth of the Region of Pamplona: analysis of services and facilities to calculate greenhouse gas emissions (water cycle, urban waste, urban transport). Registry of carbon offset and CO2 absorption projects. 15 organizations in Navarra have registered their carbon footprint.

### Carbon footprint

- Navarra asparagus and the cured sheep cheese Latxa de Lezaun
- Oil production - oleohealth 2013- calculation of GHG emissions

**MFA** (Materials Flow Analysis) - Inventory of GHG emissions in Navarra: evaluation of GHG emissions taking into account both the **sectors** that originate them and the **type** of GHG

**LCA** for organic extra virgin olive oil 2008-2010: LCA, SLCA, and LCC to assess environmental, economic and social impacts.

### Footprint calculation models

UMBERTO; SIMAPRO; SIMUR; EURENERS; ENECO

**Indicators:** See section 4.5 on the regional analysis



## LC Management tools

### Eco-design ISO 14006

- LCA for designing healthy and sustainable food menus in municipal schools

**Eco-label:** Register of Navarra Products with European Ecological label:

- tissue paper napkins of SCA Hygiene Spain S. Com. P.A
- quilt and mattress protector from Textiles Inducam SL
- Hotel Rural Aribe
- lubricating greases from Verkol, S.A.U

**EPD** (Environmental Product Declarations) - use of LCA to support certification

- EGGNOVO, has 3 EPD for different products derived from eggshells
- COMPOSITES GUREA had in its day 1 registered EPDN (removed) (**Clarify this**)
- ACCIONA and SIEMENS GAMESA have 6 and 9 registered EPDs each for installed wind farms.

**Ecological Footprint – regional environmental footprint** considering material resources and waste generated for the maintenance of the production and consumption model of the community.

### Carbon footprint reductions

- Carbon offset scheme for municipal energy consumption
- Purchase of green energy by municipality
- Energy efficient public transport (buses)

**Management Systems ISO 14001** (427 certified organizations) and **ISO 50001** (9)

### Circular and sustainable materials management:

- Reusing drinking glasses at parties and events for public services
- “Nights without plastics” in Informal Room of Tafalla to reduce footprint of events
- Olite, ecological municipality to eliminate plastic material, and decrease footprint
- ECOCIRPLAS Project - life cycle analysis approach to waste management in the Foral Community, promoting waste reduction and its reuse and recycling as key management principles.
- Lourdes Renove (**need description**)

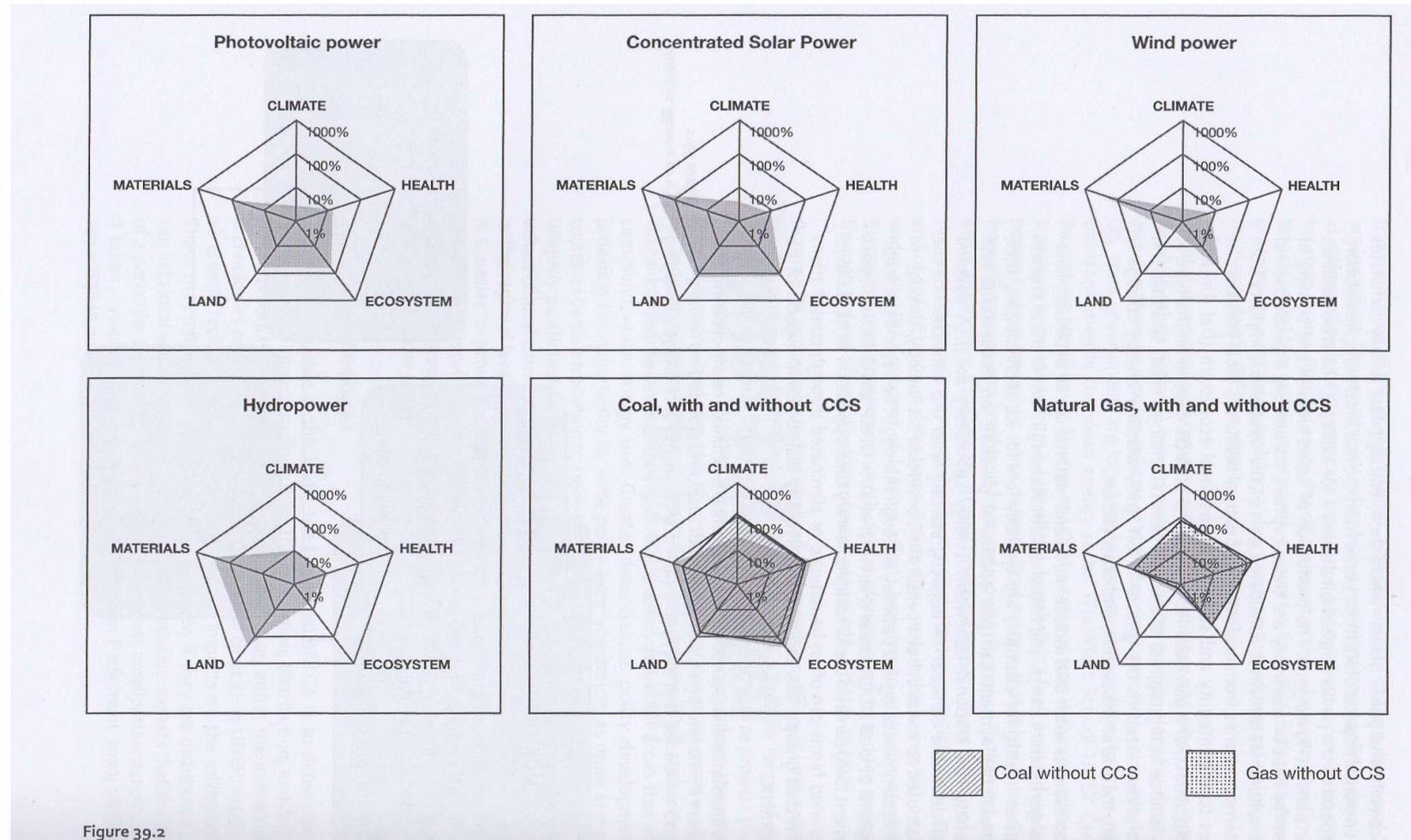
### Green Procurement:

- LCA and calculation of Carbon Footprint for road cleaning tenders of Pamplona

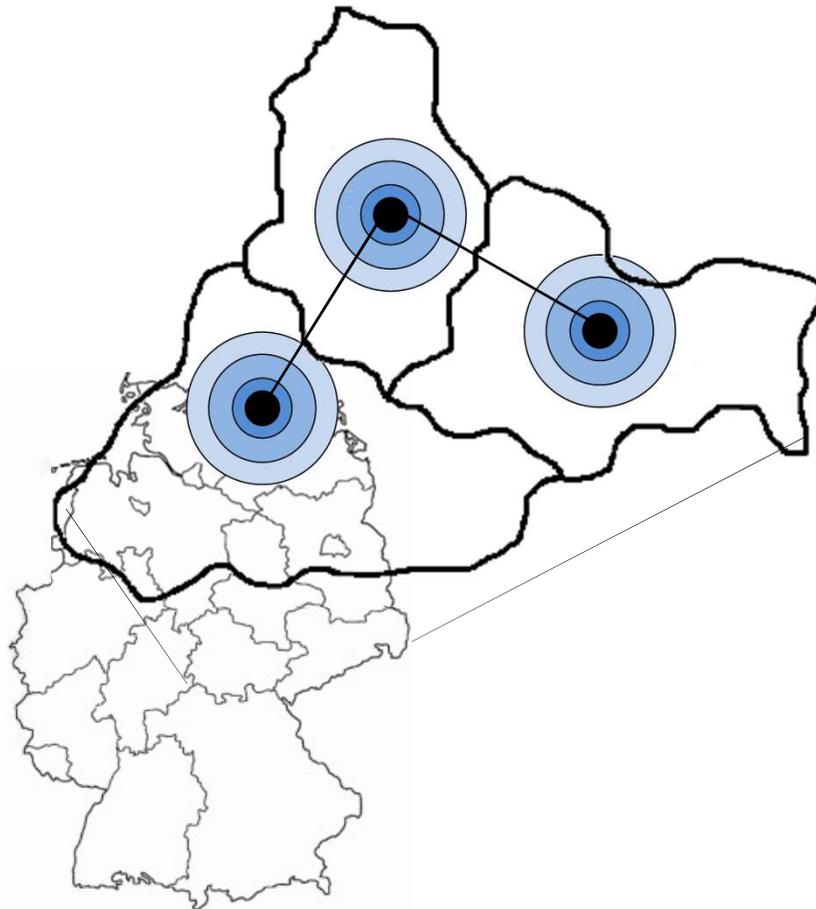
# LCA - Comparative impact assessment

*LCA results for generalised energy options*

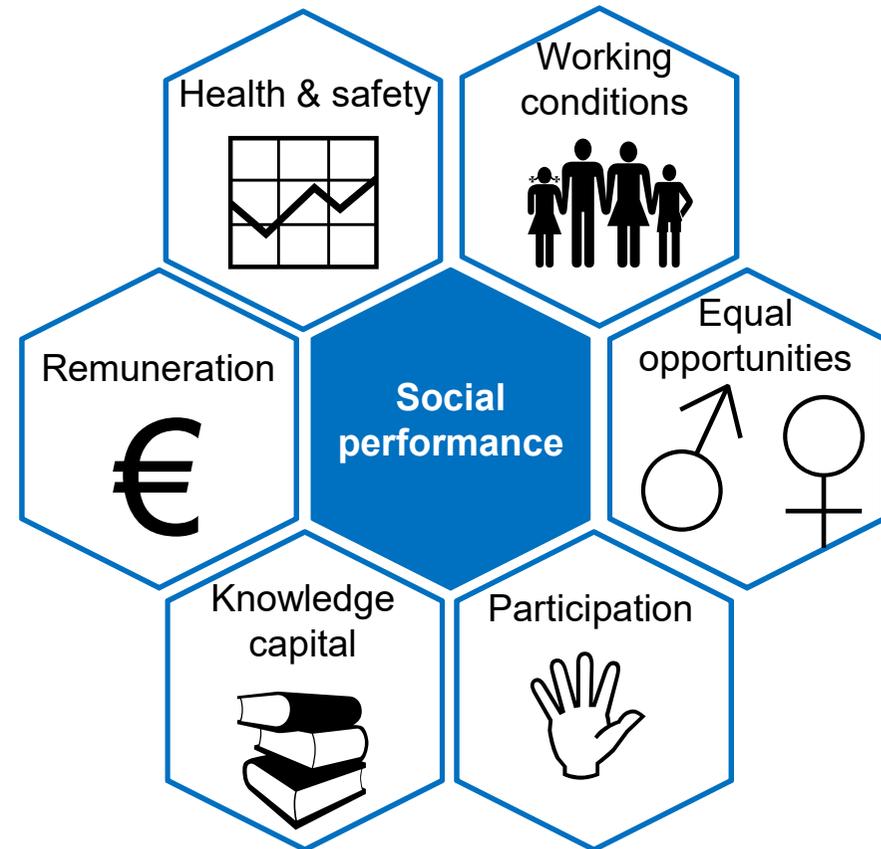
*Performance on 5 sustainability criteria is compared*



Assessment of wood-based products from German bio-economy regions and social performance



Bio-economy region in Germany



Aspects of social performance

# Materials Flow Analysis (MFA)

*example of biomass flows – 70% of biomass goes to animal feed !*

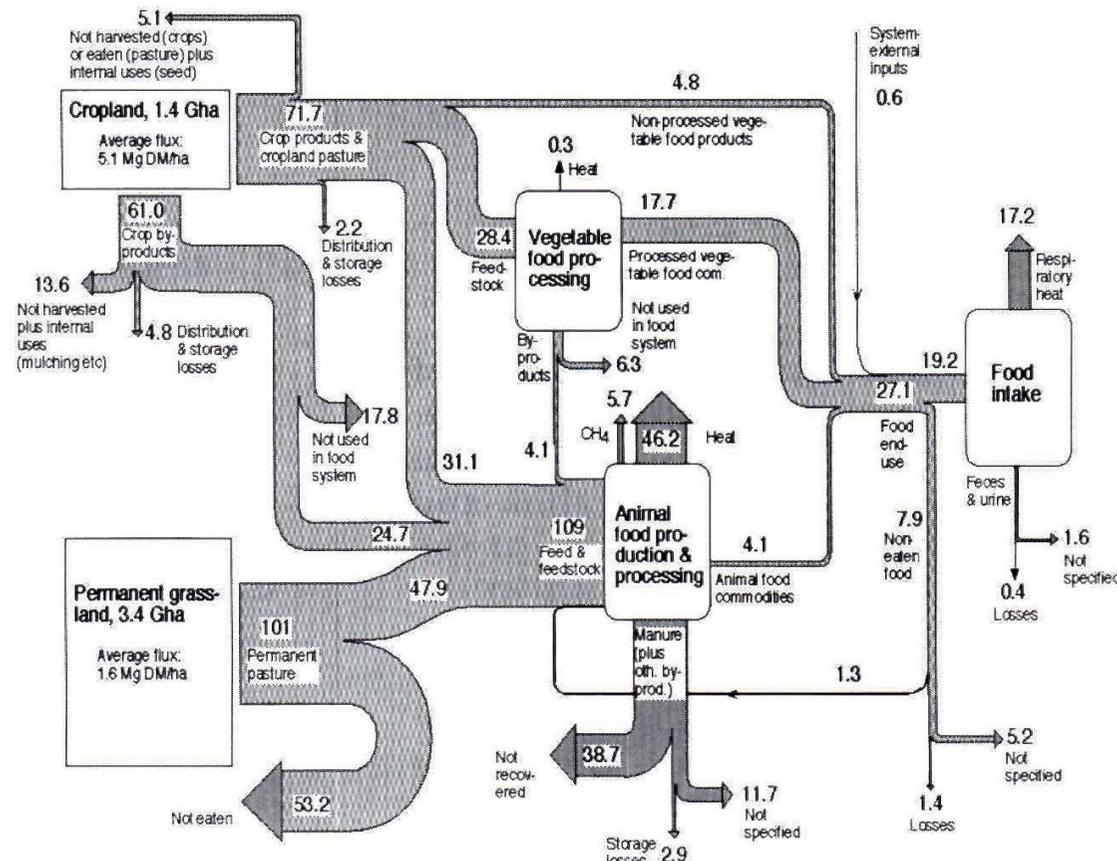
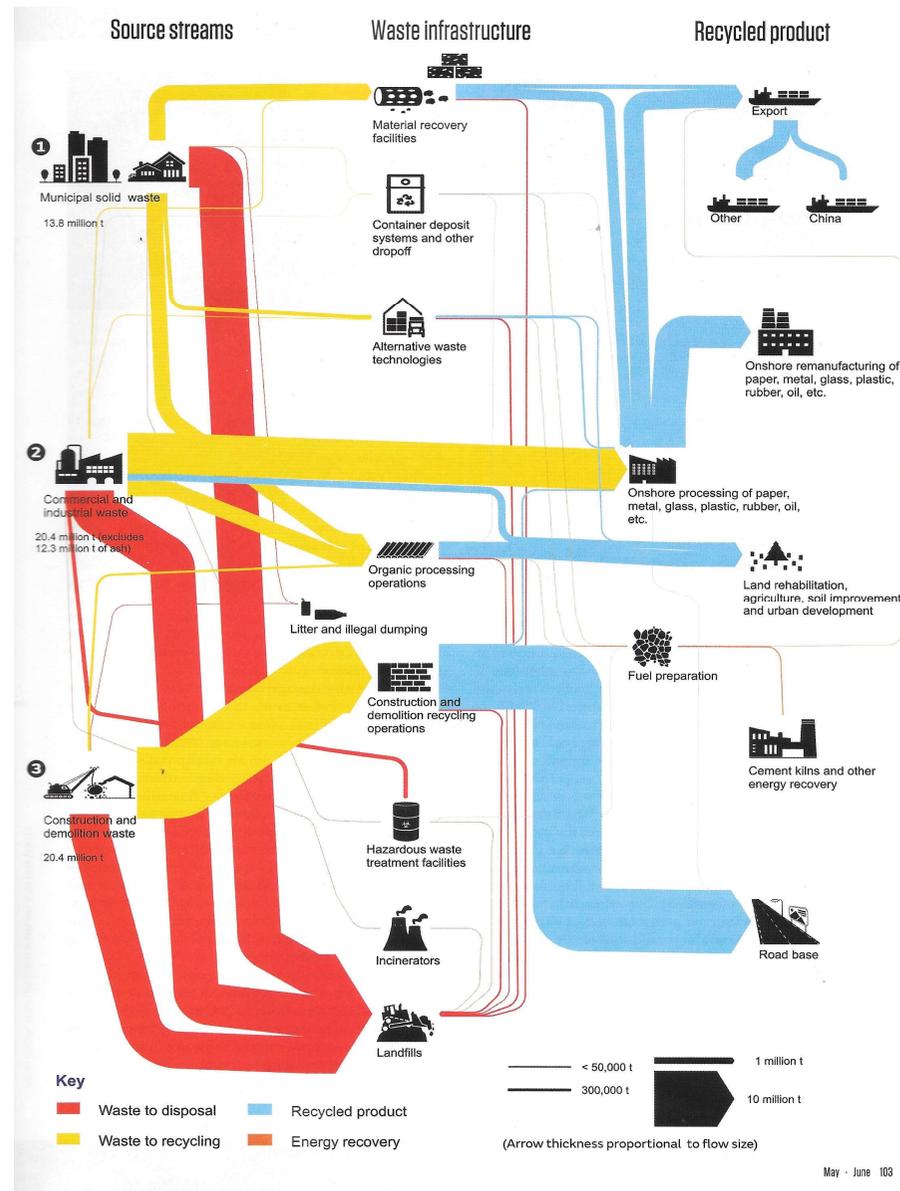


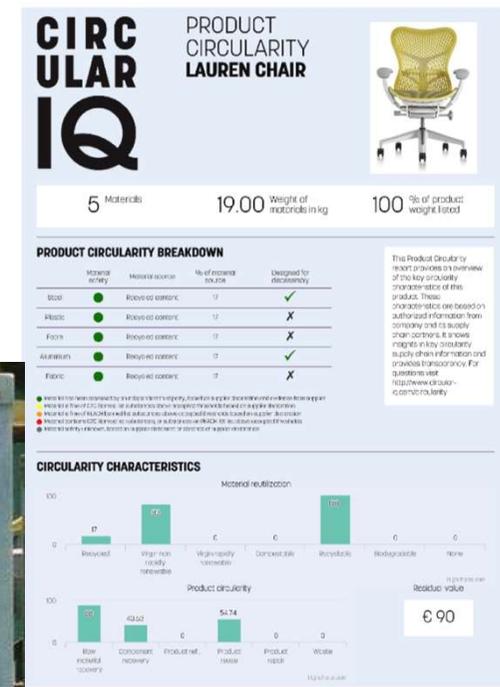
Fig. 1. Overview of the biomass flows in the global food system in 1992-94 (EJ gross energy per year). Animal food systems account for nearly 70% of biomass appropriation of the food system, whereas their contribution to the human diet is about 13%.

# Materials Flow Analysis (MFA)

*example of regional waste flows*



# LCM example - eco-labels, EPD, PEF



# LCM example – Resource efficient buildings

- Understanding the building life cycle
- Identify main SDGs
- Documenting impacts and consequences
- Identify main building materials
- LCA of key building components
- Identify key stakeholders along the life cycle
- Consultation on objectives and means
- Agreeing on metrics
- Action plan
- Monitoring



## LCM example – Impact offsetting

Often impacts cannot be entirely avoided. This can be confronted by, among other things, an offsetting scheme whereby benefits are created in other places to offset the unavoidable impacts. The most popular of these is carbon offsetting, increasingly offered by airlines for example.

See <https://www.easyjet.com/en/sustainability> or <https://www.airfrance.fr/en>

**Planting trees is the most popular offsetting scheme, but it is of doubtful value (see reference below).**

Intuitively simple, offsetting nevertheless needs attention to several key issues for it to be successful

- Eliminate impacts first, as far as possible
- Rely on standards, not on intuition
- Activate the “additionality” principle
- Be wary of forestry offsetting, often it’s not as effective as claimed
- Choose renewable (energy) or impact prevention projects
- Ensure positive social and economic outcomes
- Beware of the “rebound effect”

From <https://www.thinkstep.com/blog/7-keys-offsetting-your-carbon-emissions>

# Summary

Life cycle thinking considers the sustainability situation along the entire value chain of products and services. It also evaluates the life chain consequences of what we might do at a single point.

The sustainability agenda is broad (17 UN SDGs) To simplify regional policies it is common to address only a few issues (*'cherry-picking'*), leaving the others aside. This often just moves the impact somewhere else (*the 'spill-over effect'*) rather than solving the overall problem. (EVs are a good example of this)

Regions engage in many activities, and with so many SDGs to take into account, there is a search to simplify solutions. Simplicity comes at a price.

A life-cycle framework for decision-making is a better approach. There is a life cycle toolbox from which regions can choose the most appropriate approach.

Various life cycle assessment tools (LCA) can assist regions in evaluating their sustainability impact (*footprint*), and also that of possible sustainability responses (*the 'solutions'*), in a more effective manner. Many assessment tools are sufficiently mature for use by regions. Some tools still need to evolve further.

Life cycle management frameworks are sector- or materials-specific, and can be adapted to selected actions (e.g. construction), or embrace a more general approach across all areas (e.g. procurement).



# LCA4Regions

Interreg Europe



European Union  
European Regional  
Development Fund

## Thank you!

Questions welcome

[www.interregeurope.eu/LCA4Regions](http://www.interregeurope.eu/LCA4Regions)

---