

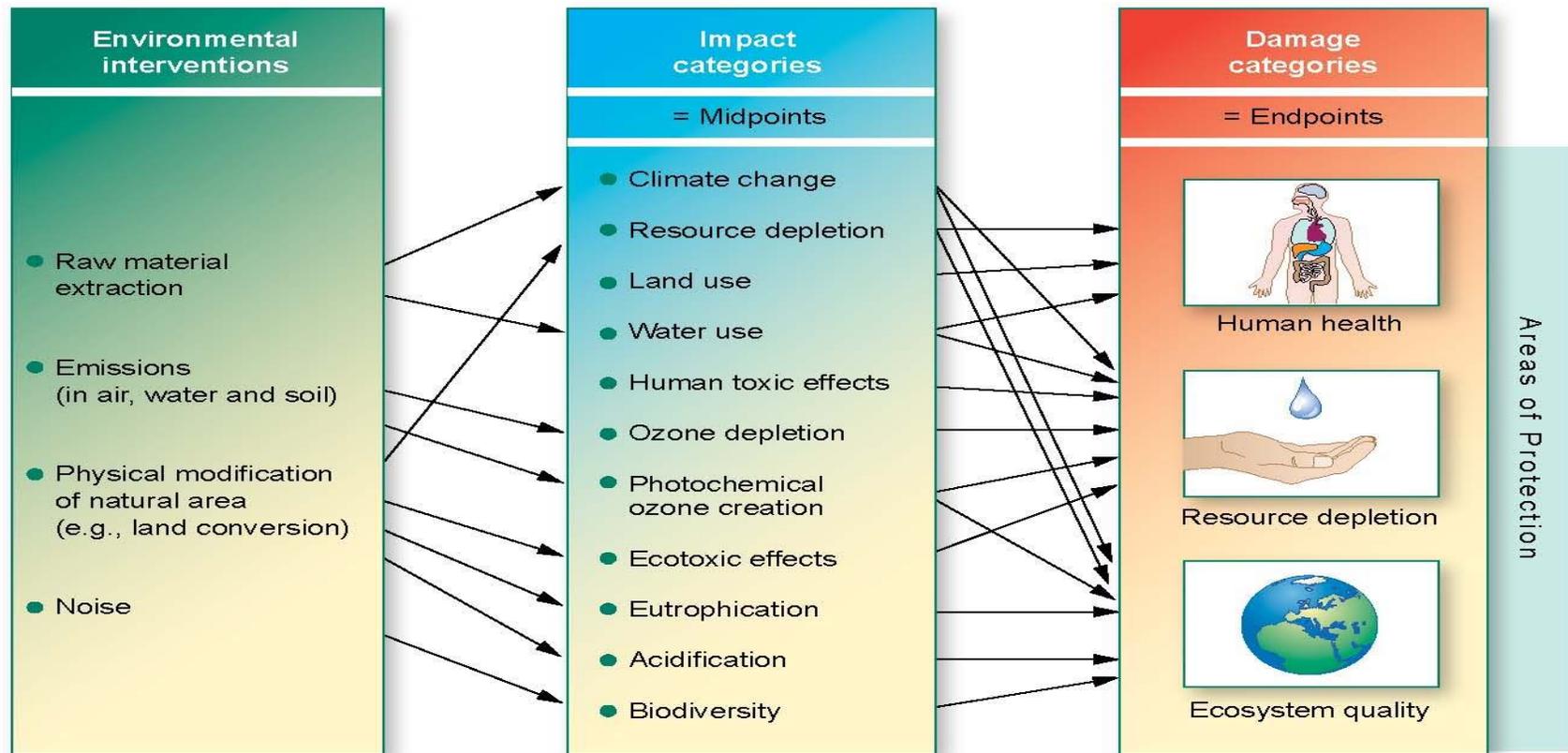
# Life Cycle Thinking



Raw Material Extraction  
Material Processing  
Production  
Use and Maintenance  
Disposal

## Life Cycle Stages

# Life Cycle Impact Assessment



**Figure 2. Overall UNEP/SETAC scheme of the environmental LCIA framework, linking LCI results via the midpoint categories to damage categories (adapted from Joliet et al., 2003a).**

4 See the definition in the Glossary.

5 Reference is chosen by the practitioner. A common reference is the impact caused by a citizen in one year.  
6 This can be done by dividing indicator values by a reference quantity.



# LC Tools

- Life Cycle Inventory/Database
- Life Cycle Impact Analysis
- Life Cycle Assessment Methods
- Water Footprinting
- Carbon Footprinting

# Life Cycle Inventory -LCI

- EIO-LCA
- NREL US LCI
- BEES
- GaBi
- SimaPro
- Athena
- E3 Database
- WRATE
- WaRM
- AWAST
- Greet
- GHGenius 3.15
- IWM
- Orware
- IWM-2
- WASTED
- EASEWASTE
- WISARD
- MSW-DST
- Ecoinvent

- Others?



# Life Cycle Impact Assessment LCIA

- TRACI
- GaBi
- Athena
- E<sub>3</sub> Database
- EASEWASTE
- WISARD
- BEES
- SimaPro
- APEEP
- ORWARE
- WRATE
- Others?



# Key Descriptors -Life Cycle Tools -

- LCA Stage
- LCA Focus
- Free/Fee
- Life-cycle Phases
- Processes
- Indicators Evaluated
- Geography
- Relevant Analysis Time Period

*Are these valued?      Others?*



# Water Tools

- The Water Footprint
- Water Footprinting: How to Address Water Use in LCA
- Corporate Water Accounting
- Sustainability Tools for the Water Treatment Industry
- The water footprint assessment manual: Setting the global standard
- GEMI
- CERES
- Aqueduct

*Other tools? Descriptors of value?*



# Other Life Cycle Tools/Methods

## Carbon tools/methods

- EPA WAR model
- PAS 2050
- ....

Data sources

Other?

Descriptors?



# Life Cycle Methods

- **European Environment Agency**  
*Life-Cycle Assessment: A Guide to Approaches, Experiences, and Information Sources*
- **European Commission**
  - International Reference Life Cycle Data System (ILCD) Handbook: General Guide for Life Cycle Assessment*
  - Environmental Impacts of Products (EIPRO): Analysis of the life cycle environmental impacts related to the final consumption of the EU-25.*
- **US Environmental Protection Agency**  
*Life Cycle Assessment: Principles and Practice*

# Life Cycle Methods

- **European Union – Calcas: Coordination Action for Innovation in Life-Cycle Analysis for Sustainability**  
*D20 Blue Paper on Life Cycle Sustainability Analysis*
- **United Nations Environment Programme (UNEP)**
  - Life Cycle Approaches: The Road from Analysis to Practice*
  - Evaluation of Environmental Impacts in Life Cycle Assessment*
  - Life Cycle Assessment: What it is and how to do it*
- **World Business Council for Sustainable Development and the World Resources Institute.**  
*Product Life Cycle Accounting and Reporting Standard (Draft)*

*Others? Narrative 'focus' description adequate?  
Descriptors?*



Additional thoughts or Questions?