Attributional and consequential LCI modelling

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The type of LCA affects modelling

- Early proponents:
  Heintz & Baisnée (1992)
  Weidema (1993)

- Well established:
  SETAC-Europe WG
  on Inventory Enhancement

Types of LCA in this presentation (Curran et al. 2001)

- Attributional LCA, which aims at describing the environmental properties of a life cycle and its subsystems.

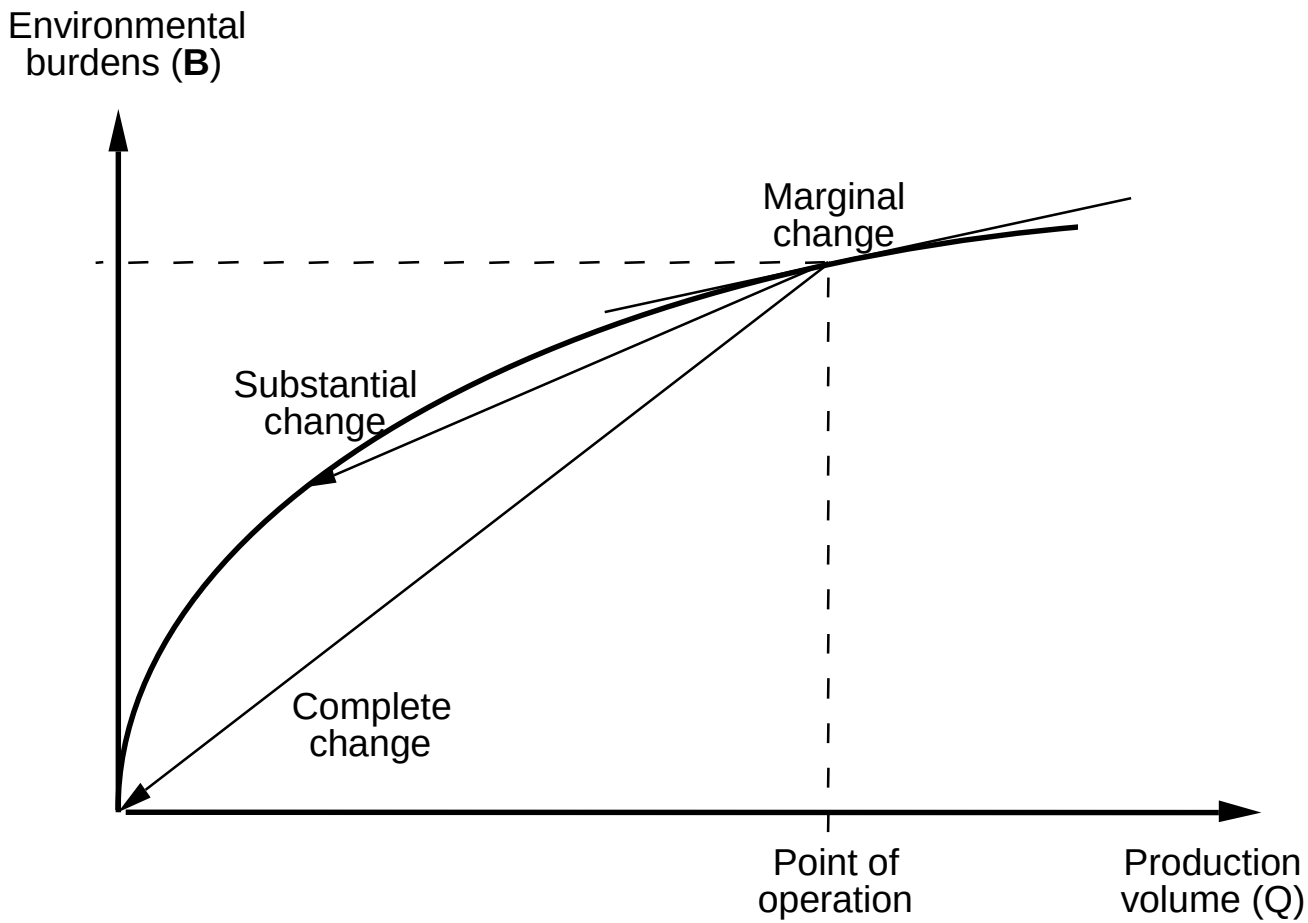
- Consequential LCA, which aims at describing the effects of changes within the life cycle.

LCI modelling – Guide in summary

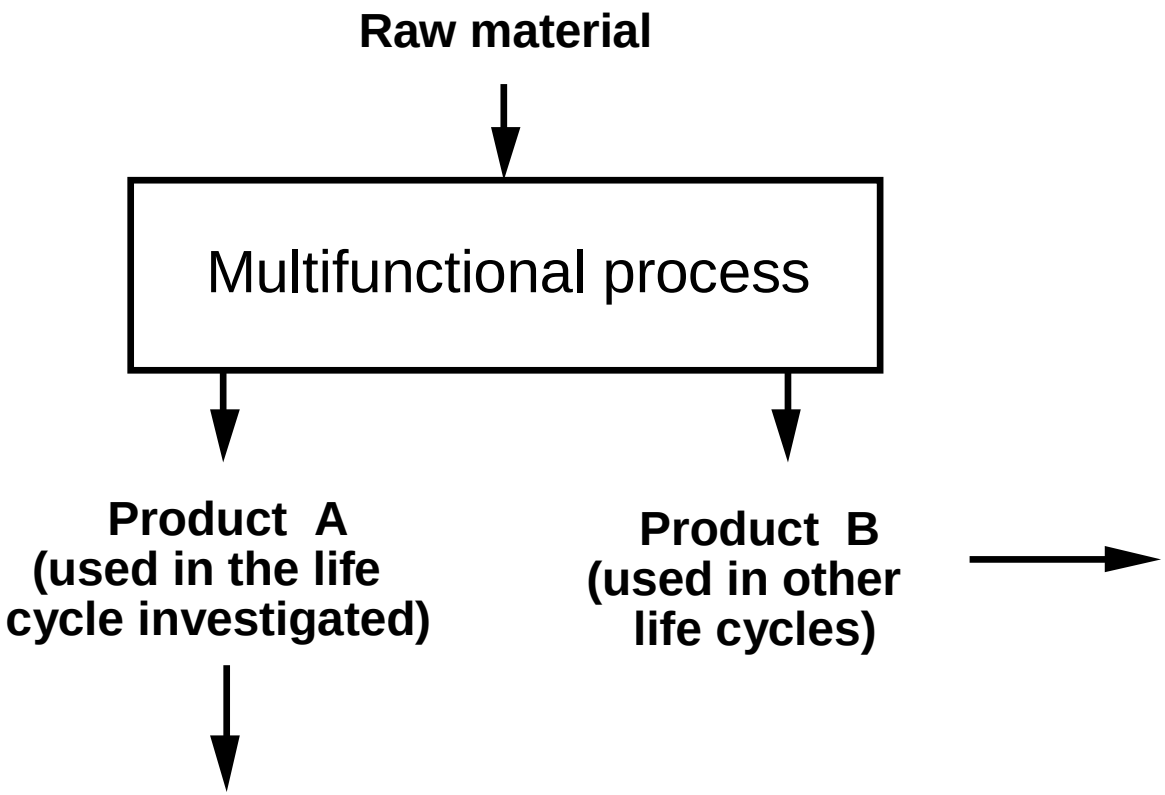
- Attributional LCA:
  Include full life cycle
  Use average data
  Allocate in proportion to, e.g., economic value

- Consequential LCA:
  Include processes that are affected
  Use data that reflect expected effects of changes
  Avoid allocation through system expansion

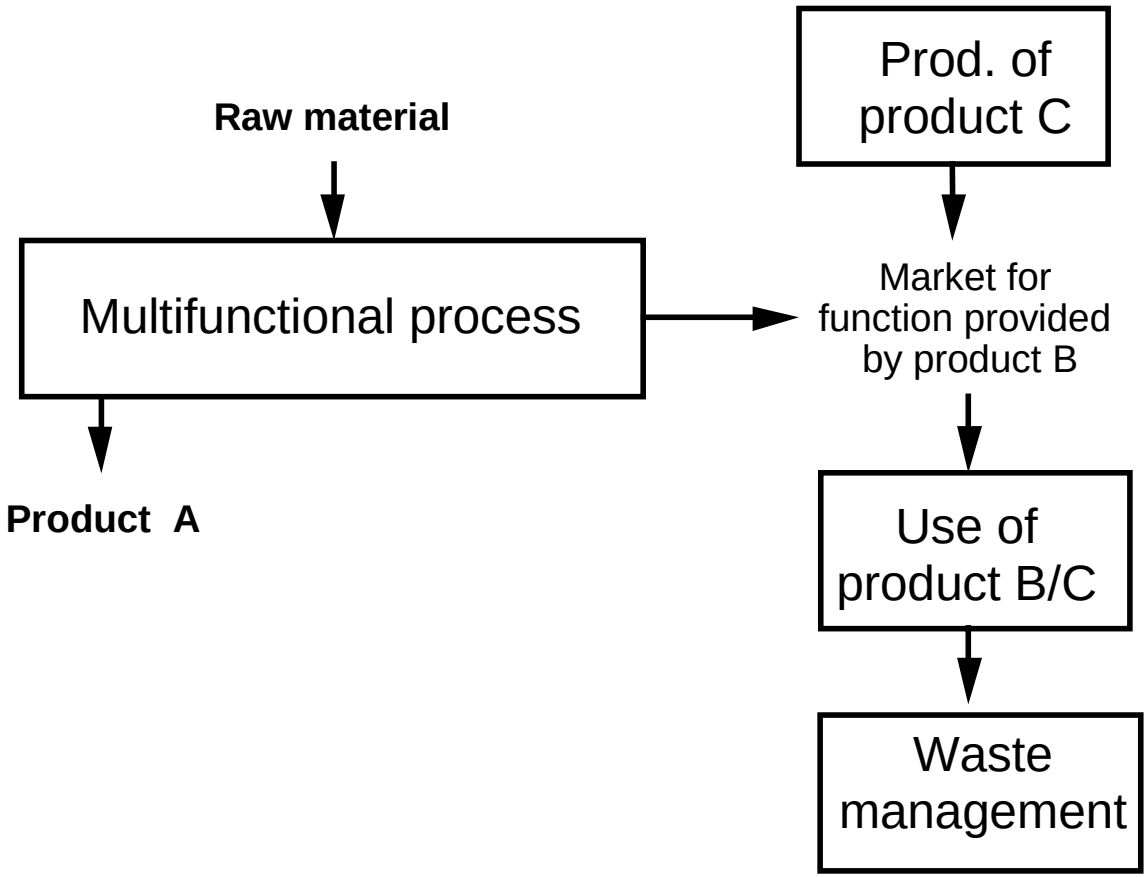
Data that reflect changes (Azapagic & Clift 1999)



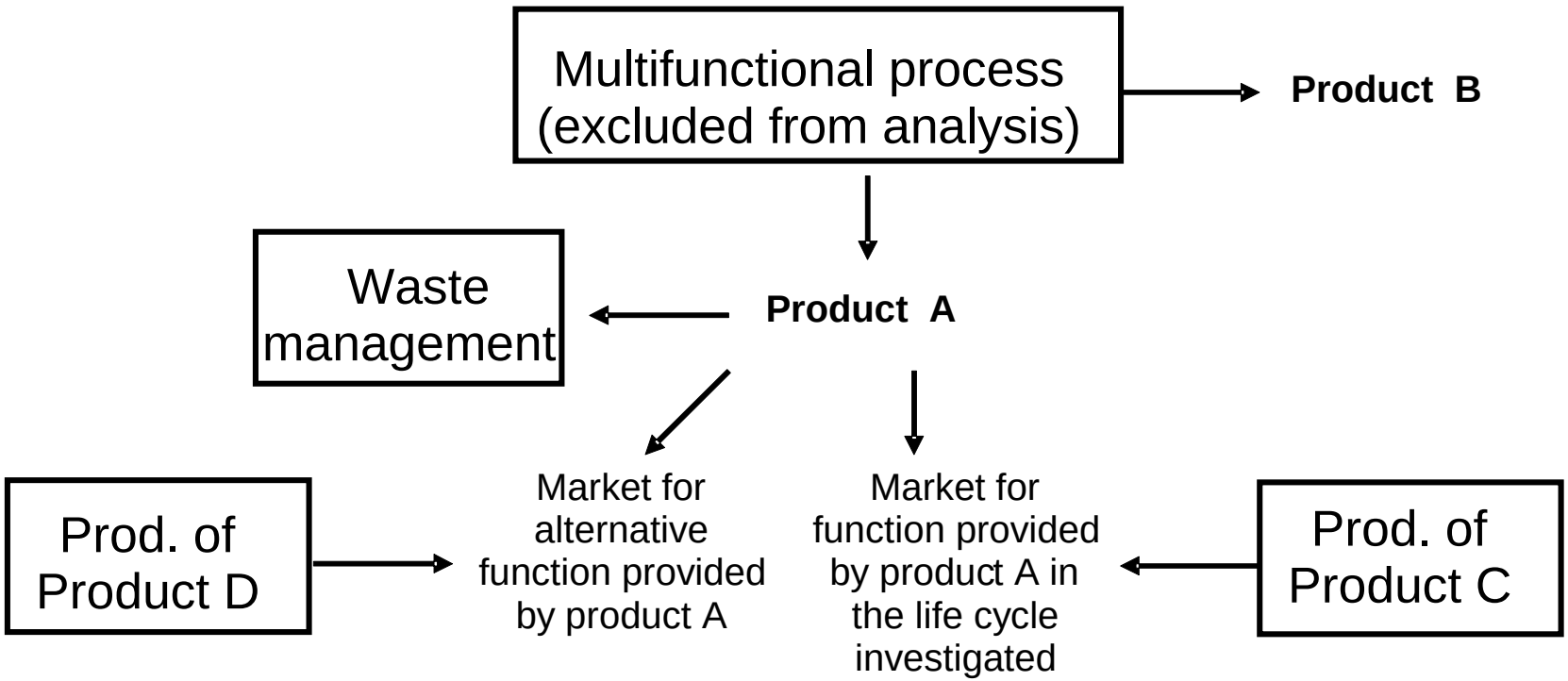
Allocation problem at multifunctional processes (Ekvall & Weidema 2003)



System expansion when B depends on A



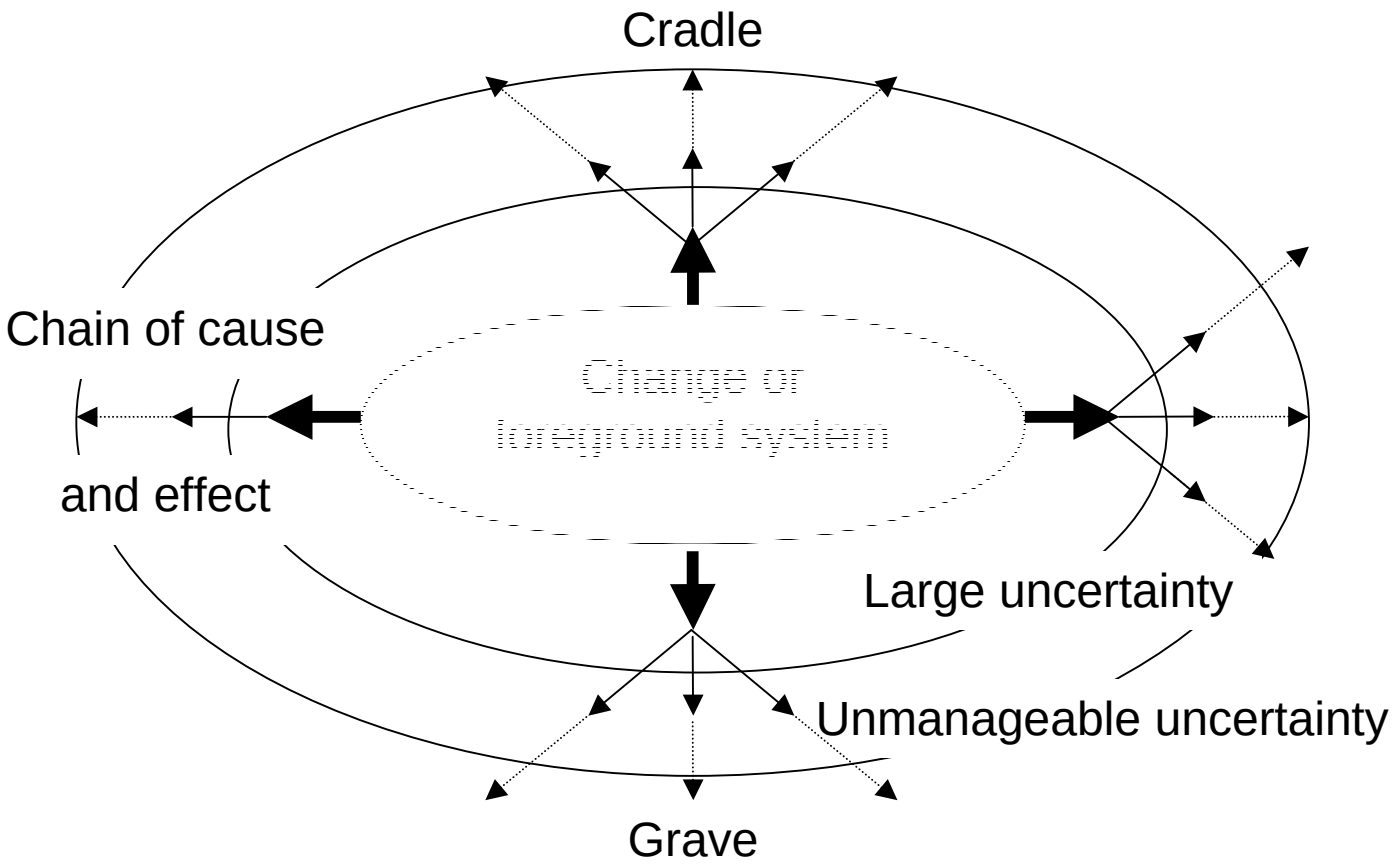
System expansion when A depends on B



Additional consequences (Ekvall 2003)

Consequences on…	Example: Electricity efficiency	Modelling tool
…demand by other consumers	Increased through price reduction	Partial equilibrium models
…economic activity	Increased through money savings	General equilibrium models
…knowledge and values	Reduced through good example	Marketing models?

Including affected processes



Limitations

- Attributional LCA:
  Describes systems only
  Systems are subjective (allocation, geographical boundaries etc.)

- Consequential LCA:
  Describes consequences only
  Entails great uncertainty and instability

Suggested criteria for assessing methodology

- Generate relevant information
- Allow efficient communication of this information
- Contribute to inspire actions
- No significant adverse effects

Conclusions and discussion

- Consequential modelling goes far beyond marginal data and avoiding allocation
- Pure consequential LCAs are rare
- Terminology is confused
- Ranking methodology is not straightforward
- Choice of methodology should be deliberate

References

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