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Importance of linkage between LCA methodology developments and their applications in practice

Laurent, Alexis; Olsen, Stig Irving; Hauschild, Michael Zwicky

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Importance of linkage between LCA methodology developments and their applications in practice

Alexis Laurent, Stig Irving Olsen, Michael Z. Hauschild

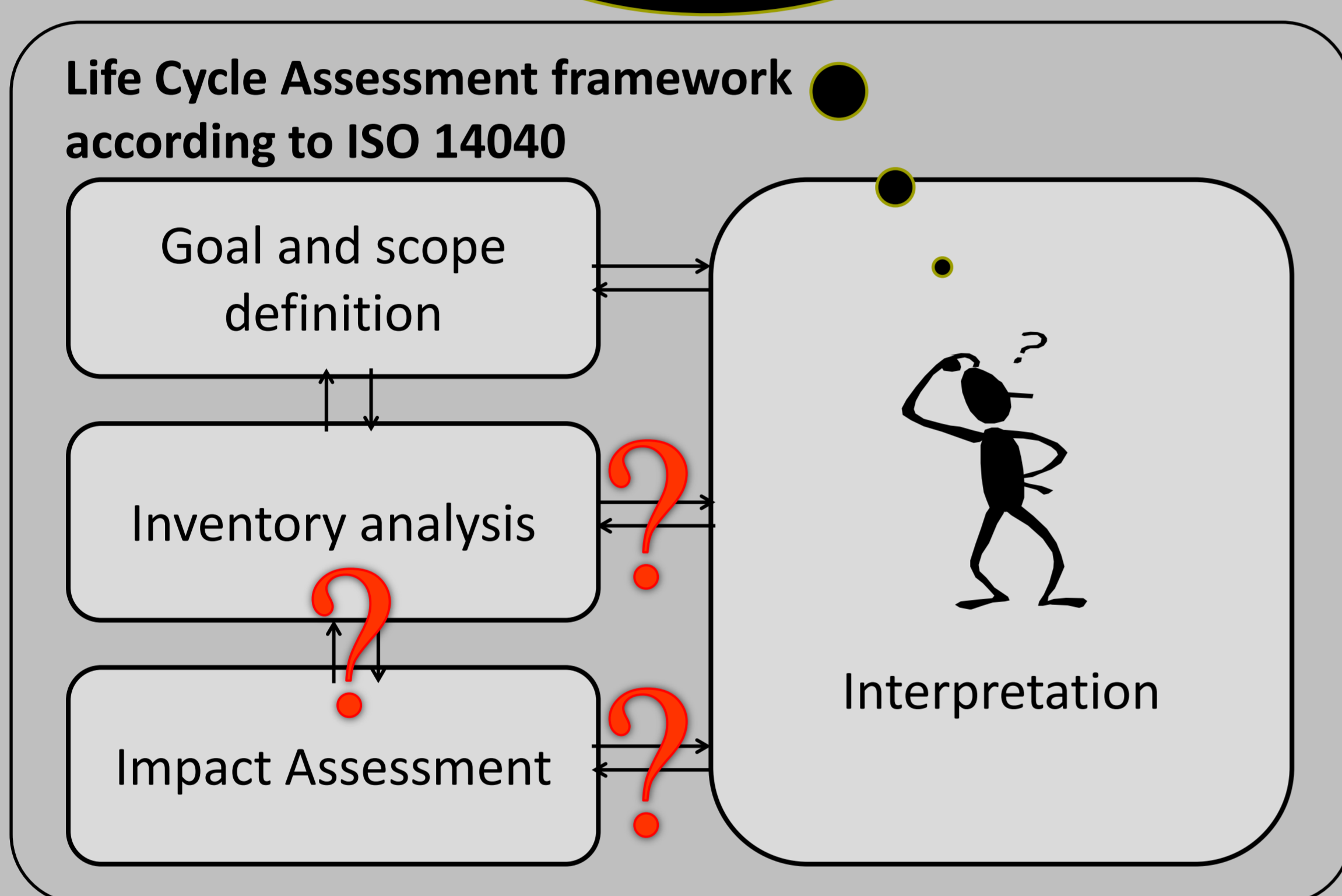
Department of Management Engineering, Technical University of Denmark (DTU), Lyngby, Denmark

Does it make sense to do an LCA with our current practice?

LCA practice today...

- Lack of interactions between research advances in LCI and LCIA phases
- Lack of follow-up between methodology developments and applied LCA

How wrong can my results be when I do an LCA ?

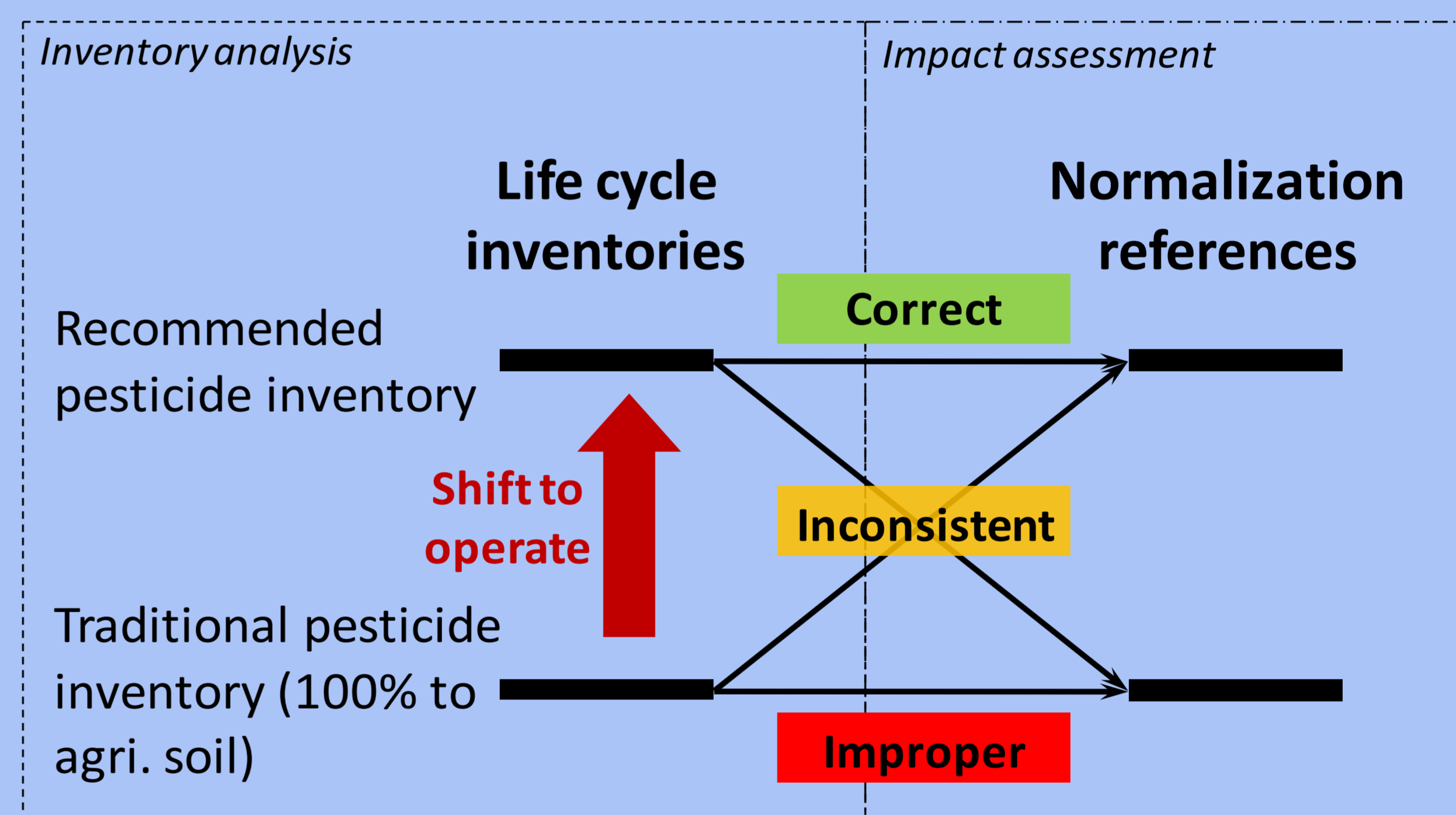


... does not always make sense...

- Large bias among impact results threatening interpretation step (up to 2 orders of magnitude)
- Primarily affecting toxic impacts (most uncertain)

... hence the need to ensure proper transfer of the new knowledge into the application field

- Regular updates required
- Shift to better practice, e.g. pesticide modelling



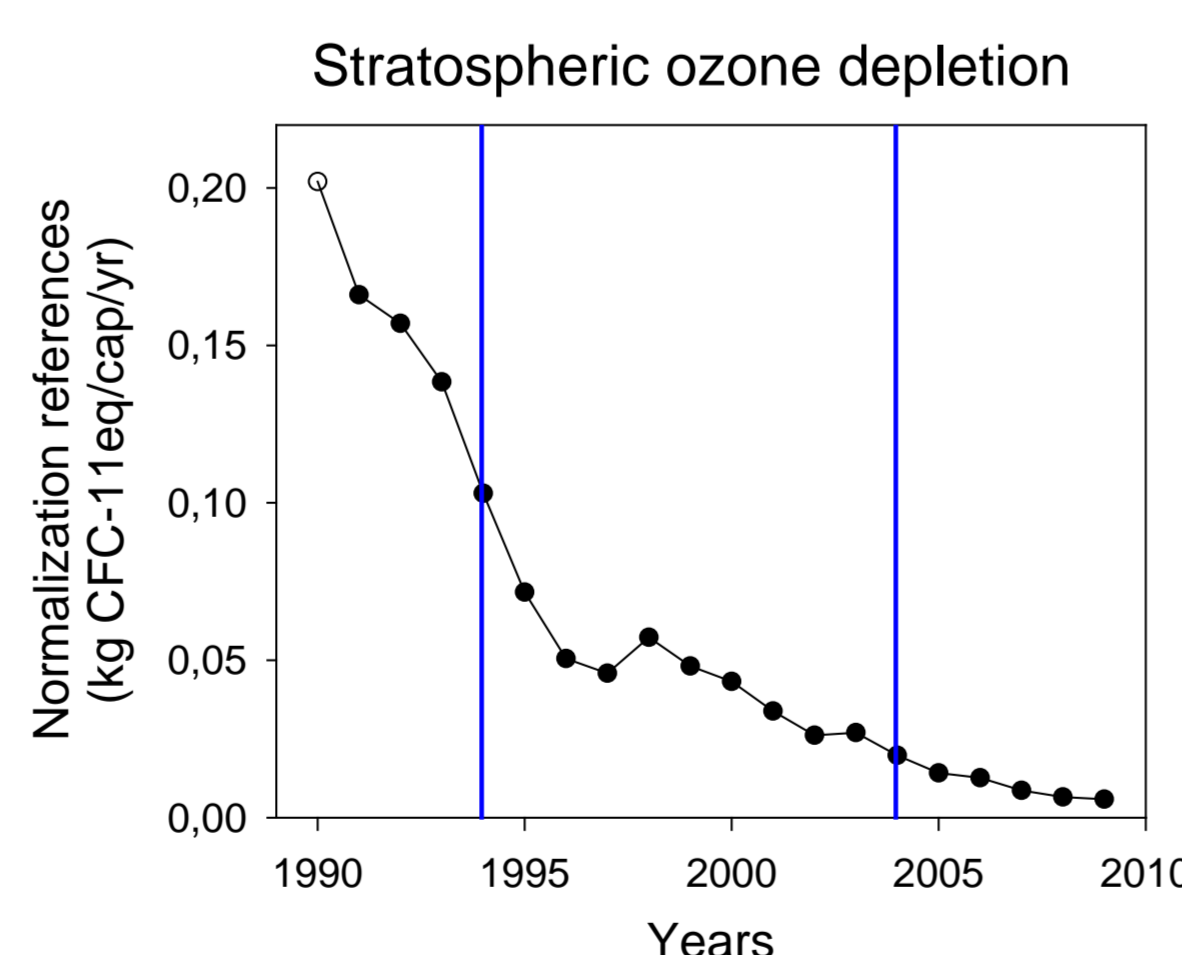
Methods & Results

Example of outdated normalization references

Impact assessment ↔ Interpretation

- NR for non-toxic impacts: decrease (factors of 0.2 – 0.9)

Example of stratospheric ozone depletion (factor 0.03 between 1990 and 2009)



- NR for toxic impacts: overall increase (factors of 0.2 – 63)

Consequences of misuse: bias in normalized results

- Underestimation of non-toxic impacts
- Overestimation of toxic impacts

References:

- ^a Laurent, A., Olsen, S. I., Hauschild, M. Z. 2011. Normalization in EDIP97 and EDIP2003: updated European inventory for 2004 and guidance towards a consistent use in practice. *Int.J.LCA* 16(5): xxx-xxx.
- ^b Stranddorf, H. K., Hoffmann, L., Schmidt A. 2005. *Update on Impact Categories, Normalisation and Weighting in LCA – Selected EDIP97 data*. Environmental Project Nr. 995 2005: Danish EPA.
- ^c Birkved, M. and M. Z. Hauschild. 2006. PestLCI-A model for estimating field emissions of pesticides in agricultural LCA. *Ecological Modelling* 198(3-4): 433-451.

Example of pesticide modelling

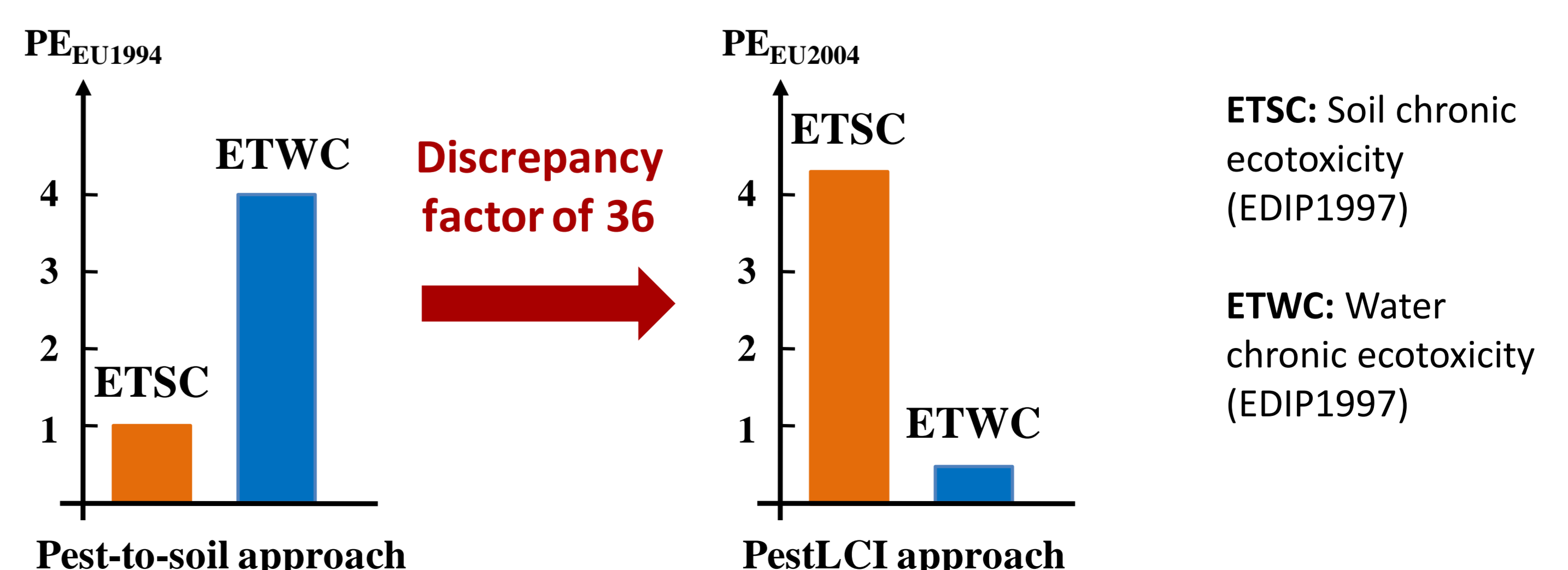
Inventory ↔ Impact assessment

Comparison of 2 sets of normalization references (NR): emission year 1994 (still in use) versus 2004 (new update) ^a

- Updated European inventory ^a

Pest-to-soil approach – 1994 ^b	PestLCI approach – 2004 ^a
Applied pesticides modeled as 100% emissions to agricultural soil	Pesticides modeled as 0,1% emissions to freshwater and 5% emissions to air ^c
Pesticides split in 3 classes (F, H, I)	Pesticides specified into 482 compounds

- Normalization of *same characterized results* for ecotoxicity using both approaches (EDIP-methodology)



Important consequences in interpretation step