

Evaluating methods to account for the greenhouse gas emissions from Land Use Changes in agricultural LCA

Aim

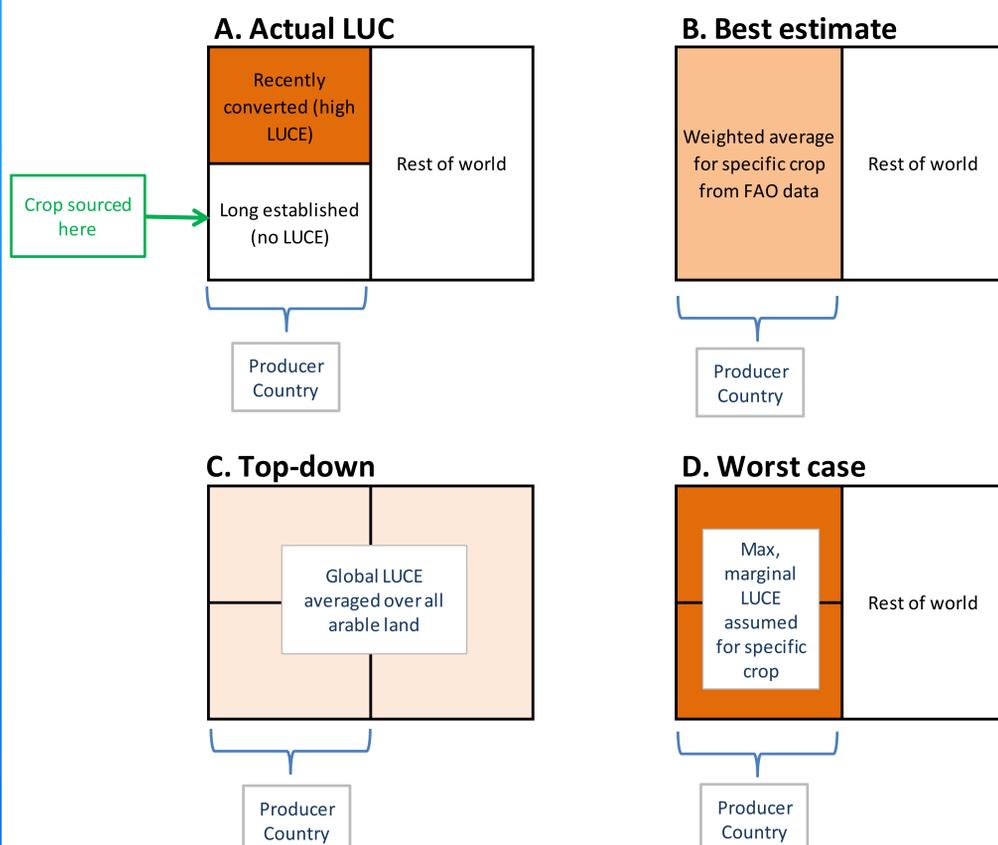
The aim was to compare approaches to account for land use change-related GHG emissions (LUCE), differing on the basis of the spatial allocation of the emissions, and to evaluate the justification of their application based on generally accepted criteria from ISO 14040, PAS 2050 and IPCC guidelines. The outcome of different approaches is demonstrated by comparing the global warming potential of production of two alternative poultry feeds.

Approaches to LUCE

- ❖ **A. "Actual LUC"**: LUCE from a specific location with well defined and distinguished LUC history for the crop in question
- ❖ **B. "Best estimate"**: Weighted average of LUCE for a certain crop from a specific country with high level data & no local disaggregation
- ❖ **C. "Top-down"**: Average of all global agricultural LUCE per unit of area (direct + indirect LUC), i.e. same factor per ha for all arable land
- ❖ **D. "Worst case"**: Highest possible LUCE factor for a specific crop from a certain country (marginal process): penalises lack of local data

Results

Demonstration of the spatial allocation of LUCE



Global warming potential per 1000 kg broiler feed (kg CO₂e) for either standard soy-based diet, or for the diet where up to 30% peas are used as protein source, using different methods to account for LUCE related to soya production.

	Actual LUC*	Best estimate	Top-down	Worst case
Soy diet	788	1085	1003	3026
30% pea diet	770	902	983	1771
Pea/soy	0.98	0.83	0.98	0.59

*Assumes certified sustainable source i.e. no LUCE

Conclusions

- ❖ Results and conclusions of studies quantifying GHG emissions depend strongly on the LUCE accounting method
- ❖ Approaches to LUCE of crops differ in spatial allocation of the emissions
 - most appear to fulfil the generally accepted requirements for attributional LCA and avoid double counting
 - the "Worst case" approach is the exception and double counts LUCE
- ❖ Combining different approaches in a single study can also lead to omission or double counting
- ❖ The selection between technically acceptable methods remains subjective
- ❖ All technically correct methods have their benefits and disadvantages
 - these relate to representativeness of the actual drivers of LUC and the practical matters, e.g. data availability
- ❖ A generally accepted, universal method is therefore required