

## Sphera® Managed LCA Content (MLC)

Land Use Change LCI Modelling & Assessment 2024



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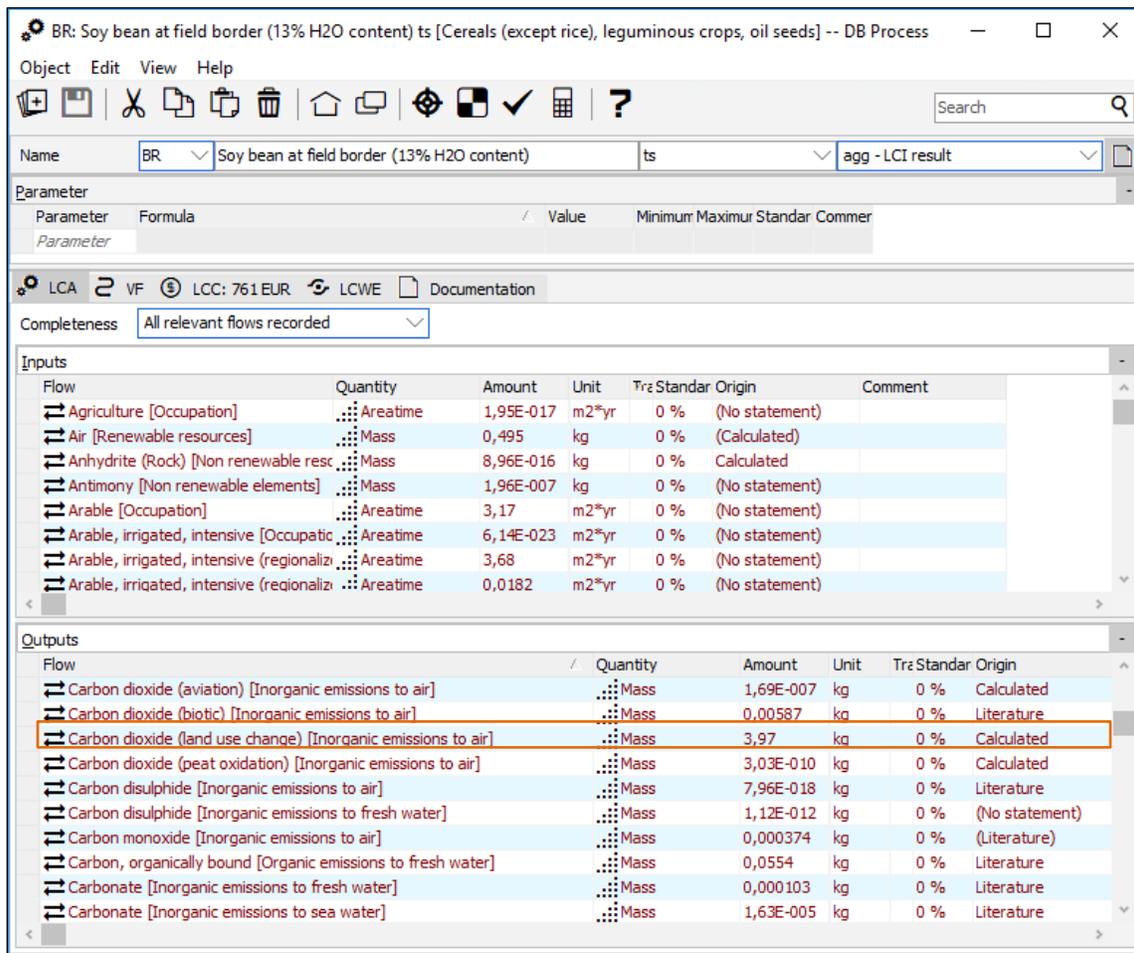
## Introduction

Emissions from land use change (LUC) in LCA have become an important issue. Therefore, we decided some years ago to introduce this feature in our managed LCA content datasets. We give you the opportunity to introduce or to omit emissions from LUC in your calculations – this is supported by respective variants of the LCIA methods delivered with all our databases.

# How to model LUC and related emissions in LCA for Experts Software with MLC Databases

CO<sub>2</sub> emissions related to LUC are managed in a transparent way at each step of your LCA model, from process/plan to LCIA. In order to illustrate how LCA for Experts manages LUC and associated CO<sub>2</sub> emissions in this document, one example is shown in the next paragraphs.

The chosen example is the process: “Soybean at field border (13% H<sub>2</sub>O content)” from the managed LCA content Extension database XII: Renewable materials, as depicted in [Figure 1](#). In the process, CO<sub>2</sub> emissions related to LUC will appear in the output table of your process as “Carbon dioxide (land use change) [Inorganic emissions to air]”.

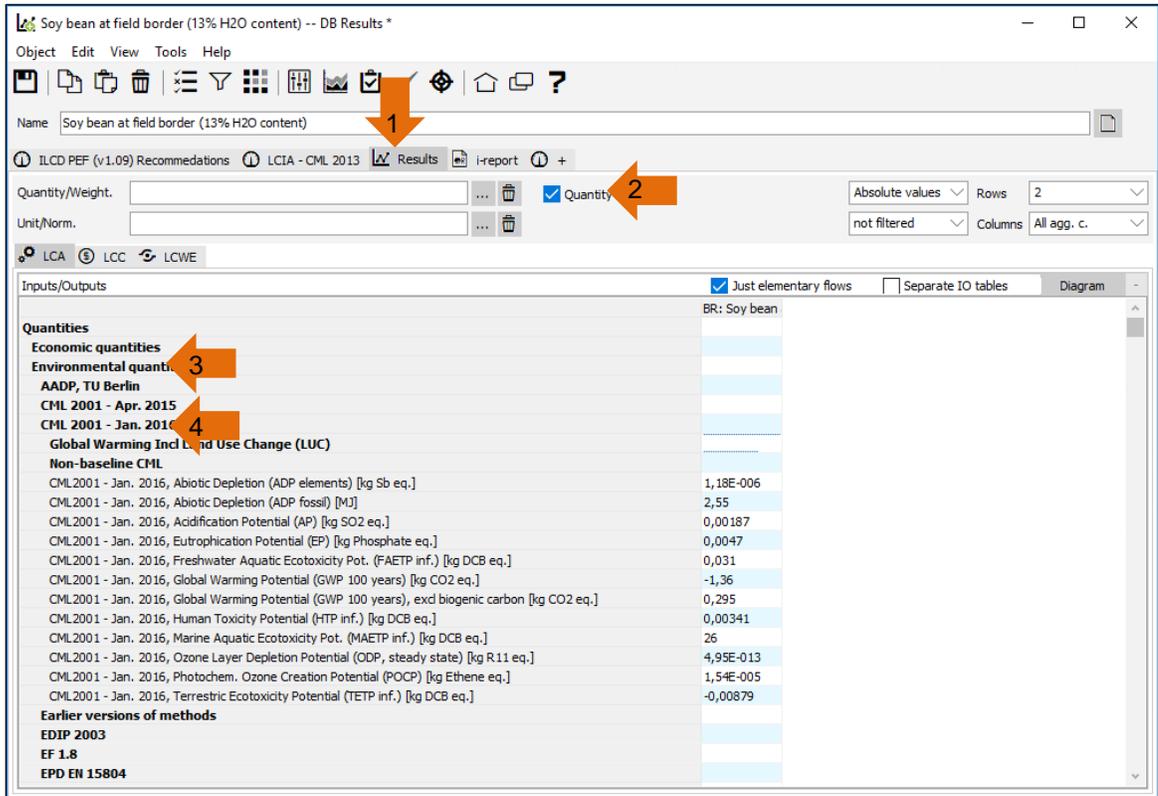


**Figure 1:** Input-Output table of Soybean at field border (13% H<sub>2</sub>O content) in Brazil. The flow carbon dioxide (land use change) is highlighted.

In case you calculate the results of your process/plan (in this example only the process “BR: Soybean at field border (13% H<sub>2</sub>O content)” is considered), you can obtain the results as presented in Figure 2. To obtain the results you have to calculate them via right click on the process or the results calculation button in a plan.

1. Select the **Results** tab.
2. Click the checkbox to activate the **Quantity** view.
3. Double-click **Environmental quantities** to open the LCIA methodologies.
4. Select an impact assessment method. For example: Double-click CML 2001 – Jan. 2016.

**Note:** The approach is the same for any other GWP impact assessment method.



**Figure 2:** Results (quantity view) of Soybean at field border (13% H2O content) in Brazil

5. To obtain the focus on GWP, including emission from LUC, double-click **Global Warming Incl Land Use Change (LUC)**.

A table like the one shown in Figure 3 is presented with the details about several GWP emissions. CML 2001 – Jan. 2016 considers:

- Global Warming Potential (GWP 100), excl biog. C, incl LUC, no norm/weight [kg CO2-Equiv.];
- Global Warming Potential (GWP 100), incl biog. C, incl LUC, no norm/weight [kg CO2-Equiv.];
- Global Warming Potential (GWP 100), Land Use Change only, no norm/weight [kg CO2-Equiv.].

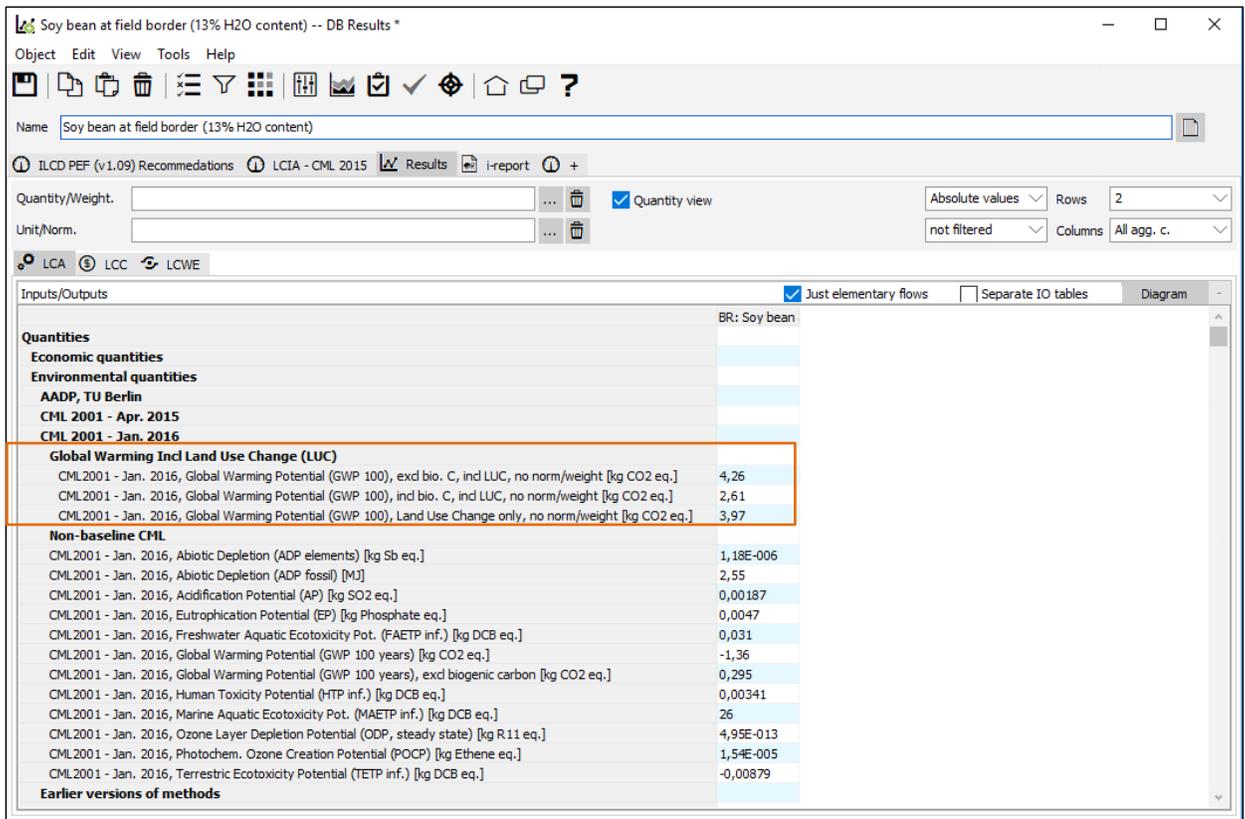
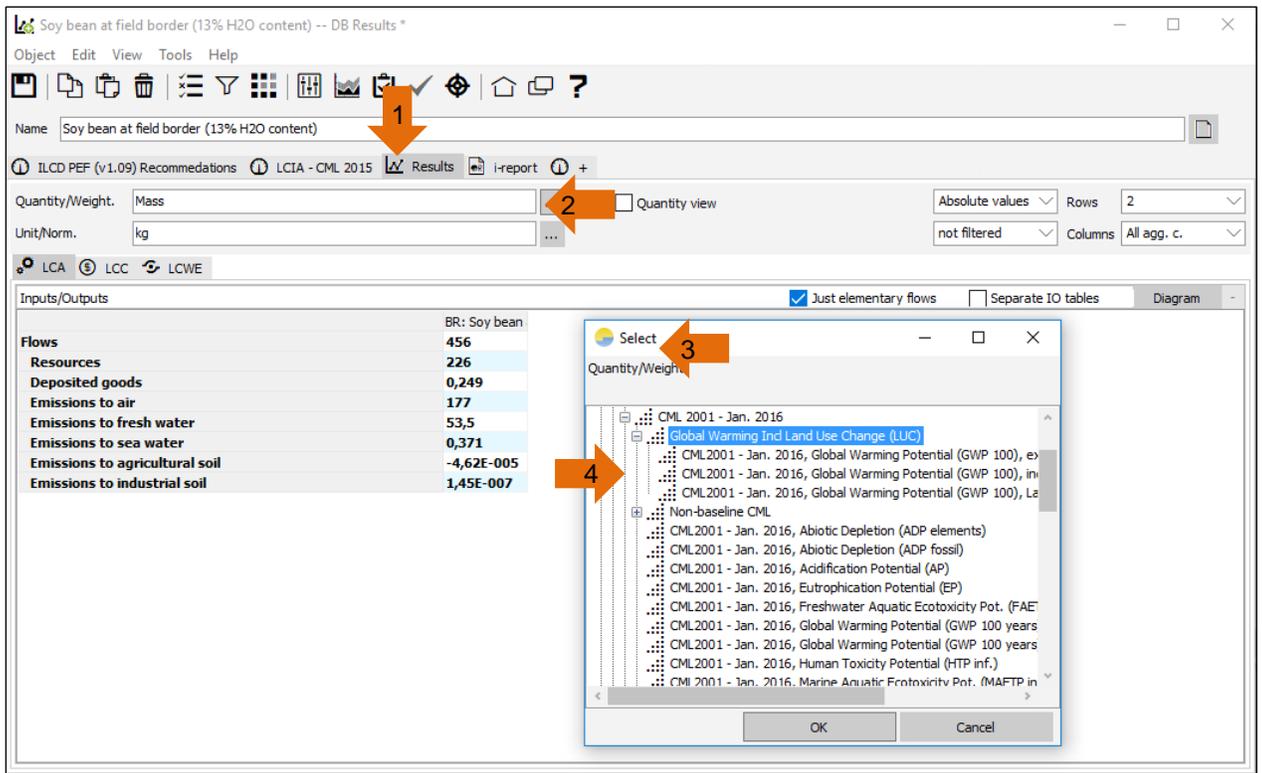


Figure 3: Results (quantity view) of Soybean at field border (13% H2O content) in Brazil, the impact assessment with LUC is highlighted.

### Another Option to Assess GWP Including Land Use Change

As a user, you can choose to create your own table and present GWP emissions linked to LUC as well as other impact assessment categories, or specific flows. In your results window, the following procedure must be completed (see Figure 4 for one selected example):

1. Select the **Results** tab.
2. Click **...** (**More**) after the Quantity/Weight field.  
The Select Window is displayed.
3. In the Select window, scroll and choose the impact category you want to display.



**Figure 4:** Results of Soybean at field border (13% H<sub>2</sub>O content) in Brazil, the impact assessment with LUC is highlighted.

After following the procedure described in Figure 4, a table like the one presented in Figure 5 is displayed, which presents three GWP quantities, e.g. the *Global Warming Potential (GWP 100)*, *excl biog. C, incl LUC, no norm/weight*.

The screenshot shows the 'Results' window in the LCA software. The title bar reads 'Soy bean at field border (13% H2O content) -- DB Results \*'. The interface includes a menu bar (Object, Edit, View, Tools, Help), a toolbar, and a name field containing 'Soy bean at field border (13% H2O content)'. Below the toolbar, there are tabs for 'ILCD PEF (v1.09) Recommendations', 'LCIA - CML 2015', 'Results', and 'i-report'. The 'Results' tab is active, showing a table of emissions and their impact on GWP 100. The table has columns for 'Quantity/Weight', 'Unit/Norm.', and 'Quantity view'. The 'Quantity/Weight' is set to 'CML2001 - Jan. 2016, Global Warming Potential (GWP 100)', and the 'Unit/Norm.' is 'kg CO2 eq.'. The 'Quantity view' is set to 'Absolute values'. The table shows a total impact of 4,26 kg CO2 eq. for 'Global Warming Potential (GWP 100)'. The 'Carbon dioxide (land use change)' row is highlighted with an orange box, showing a value of 3,97 kg CO2 eq.

Category	Quantity/Weight	Unit/Norm.	Quantity view
Global Warming Potential (GWP 100)	4,26	kg CO2 eq.	Absolute values
Resources			
Deposited goods			
Emissions to air	4,26		
Heavy metals to air			
Inorganic emissions to air	4,25		
Aluminium			
Ammonia			
Ammonium			
Ammonium nitrate			
Argon			
Barium			
Beryllium			
Boron			
Boron compounds (unspecified)			
Bromine			
Carbon dioxide	0,156		
Carbon dioxide (aviation)	1,69E-007		
Carbon dioxide (biotic)			
Carbon dioxide (land use change)	3,97		
Carbon dioxide (peat oxidation)	3,03E-010		
Carbon disulphide			
Carbon monoxide			

**Figure 5:** Results of Soybean at field border (13% H<sub>2</sub>O content) in Brazil, the impact of emissions from LUC is highlighted.

Emissions from LUC and respective impact assessment can be displayed with other options as well, e.g., via the dashboard.