AtSource

AtSource Footprint (DFC) Methodology Update history

DFC v2.2

Released on 29th July 2024

Improvement

1. **KM Crop Residue Management:** correction of Global Warming Potentials **(GWPs)** to the newest IPCC Sixth Assessment Report **(AR6)**. Now all GWPs in DFC are the newest version.
2. **KM Seedling:** correction of the conversion of the imperial unit.
3. **KM Fertilizer production:** correction of calculation of **nitric acid** and **customized fertilizers**.
4. **KM Fertilizer use (only applicable for RICE):** correction of N_2O emission factor for fertilizer used for rice. In the previous version, we accounted twice for this activity: one with a standard emission factor for normal fertilizer use, and one for fertilizer use if it was rice cultivation. In this version, we only use one emission factor of fertilizer use for rice, following IPCC 2019 guidance.
5. **KM Irrigation for Water Use:** correction of the calculation to include direct water use.
6. **KM Processing - Biomass:** improve the Ecoinvent emission factors of biomass used in processing **(coffee grounds, coffee husks, rice husks, cashew shell and bagasse)** for better proxies.
7. **KM Processing – Series:** correction of Hazelnut series processing, where only emissions of the second facility were accounted for.

DFC v2.1

Released on 10 April 2024

Improvement

1. Updated background data to the newest **Ecoinvent 3.10**.
2. Updated Global Warming Potentials **(GWPs)** to the newest IPCC Sixth Assessment Report (**AR6**). *It was found out later that this was done except for KM Crop Residue Management to do a system bug; it has been corrected in DFC v2.2.*
3. **KM Fertilizer Use now fully based on IPCC 2019.** We do not account for soil emissions due to nitrogen content of soil according to WFLDB v3.5. *This improvement introduces the new input datapoint **"Climate condition" under the Entity section.***
4. **KM Rice Cultivation is now fully aligned with IPCC 2019.** Emissions variation due to different geography is also included.
5. Added new reporting area **"Data Quality Rating"**.

These improvements led to slight changes in all KMs as these background numbers are applied on the overall calculation.

New features

1. Added accounting function for **"fertilizer inhibitors"** including nitrification inhibitor and urease inhibitor. Fertilizers used with inhibitors lead to lower emissions in KM Fertilizer Use. *This feature introduces the new input datapoint **"Inhibitor" under the Chemical Fertilisers section.***

2. Added accounting function for **"origin of fertilizer production"** and **"different nitrogen forms"**. *This feature introduces the new input datapoint **"Production Origin"; "% ammonium N"; "%nitrate N"; "%urea N" in the Chemical Fertilisers section.***
3. Added accounting function for **"dolomite"** as a soil amendment. *This feature introduces the new input datapoint **"Dolomite" in Soil Amendment section**.*
4. **KM Wastewater: added accounting for N_2O emissions**, following IPCC 2019. *This feature introduces the new input datapoint **"Total N content of wastewater" in Wastewater Treatment section**.*
5. **KM Wastewater: added the function to calculate COD** of coffee wastewater based on the coffee production volume.

DFC v1.0

This refers to DFC tool from its first release in 2018 until 10 April 2024. There has been continuous improvement and bug fixings, however, the overall methodology of DFC was kept constant as following:

- Global Warming Potential GWP AR4.
- Emission factors of upstream processes such as the production of electricity and fertilizers came from Ecoinvent v3.6 and World Food LCA Database (WFLDB) v3.3.
- KM Fertilizer Use was based on the guidance of IPCC Guidelines for National Greenhouse Gas Inventories 2006 in combination of WFLDB Guidelines v3.3 and v3.5.
- KM Rice Cultivation was based on IPCC 2006 and updated to IPCC 2019, however it did not take into account the regional variation of emissions.
- KM Wastewater was introduced in 2022, based on IPCC 2019, and it only accounted for CH4 emissions.

For detailed changes, please contact DFC team. All current DFC footprints will be re-calculated with DFC v2.1 and the methodology version later in 2024.

Key glossary

- **AR – (IPCC) Assessment Report** refers to the scientific reference where we take the Global Warming Potential values.
- **Data Quality Rating (DQR)** evaluates, reports, and tracks the reliability, completeness, technological, temporal and geographical representativeness of data, reflected by a numerical score indicating the integrity and usability of the data for a particular purpose.
- **Ecoinvent** is the third-party database that we use for emission factors of the upstream production such as fertilizer and seeds, and the emissions during the use phase that the DFC does not model such as diesel combustion and agricultural machines.
- **GWP – Global Warming Potentials** is the conversion factor that is used to convert other GHGs CH4 and N2O to CO2 equivalent.
- **IPCC – Intergovernmental Panel on Climate Change**. With IPCC we refer to its Guidelines for National Greenhouse Gas Inventories which are the key scientific methodology behind DFC.
- **KM – key metrics** that are used to calculate the Carbon and Water Footprint.
- **WFLDB – World Food LCA Database** is another third-party database which we used to use with the same purpose and in combination with Ecoinvent. WFLDB also provides a modelling guideline that we partly followed in DFC v1.0