ClearFarm

PRACTICE ABSTRACT

What is Life Cycle Assessment and how does it fit ClearFarm project?

Life Cycle Assessment or LCA **is a standardized methodology** (ISO 14040) that **assesses the environmental impacts of a product, process, or service throughout its entire life cycle.**

When applied to livestock systems such as the pork and dairy value chains, **the LCA informs about the impact** of these production systems **on global warming, land use, eutrophication, acidification, water use, ecotoxicity, among other indicators.** It can also help identify hotspots (phases in the value chain that contribute most to the pollution or resource use) and to define strategies to reduce the environmental impact of animal-derived products.

The amount and the composition of feed, water, the energy consumption on- and off-farm, or manure management, for instance, are examples of relevant input data needed for an LCA.

The required primary data is collected directly from farmers and producers such as integrators or cooperatives. Countries included in ClearFarm LCA are Spain, Italy, Germany, Finland, and The Netherlands, representing different regions and production systems throughout Europe. Based on the completeness and quality of data, some assumptions and secondary data sources of information are required to fill data gaps.

The ClearFarm consortium has a good combination of diverse expertise, especially veterinary physicians, which helps to make such assumptions based on their knowledge of the system.

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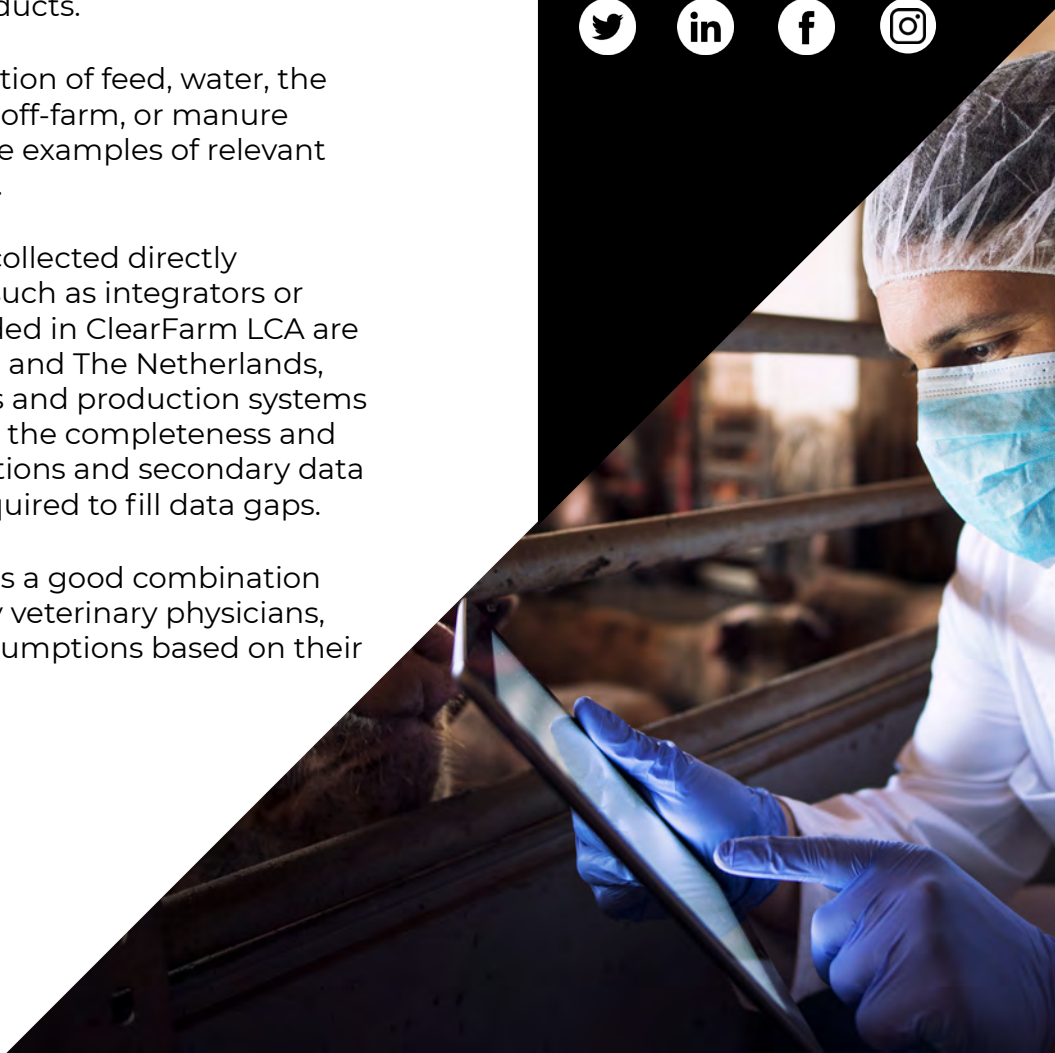

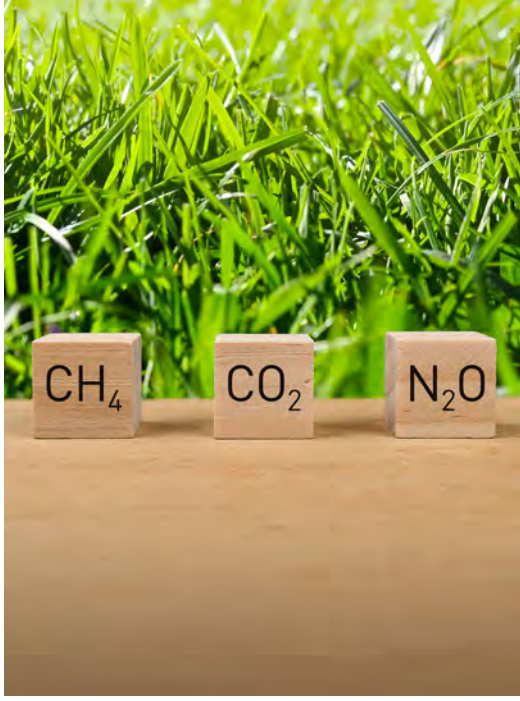

An important aspect when performing an LCA **is the definition of the system boundaries** (i.e. what processes to include). **Another important aspect** in animal-derived products **is the assessment of animal-derived systems considering co-products as butter, cheese, and meat from the dairy farms.** The environmental impact has then to be allocated to different products leaving the farm. Since there are different allocation methods, the outcome may also be different.

Once all data are gathered and the system boundaries are defined, the potential environmental impacts of the pork and milk production can be calculated. The calculation is based on existing data repositories such as *Ecoinvent, GaBi*, as well as databases with local inventories as the LCADB® developed by ICTA-UAB. To make such calculations, a series of characterization factors have been defined and agreed. For example, one of the most used impact categories in LCIA is the global warming potential (GWP). The reference substance to account for the GWP is carbon dioxide (CO_2). All substances contributing to GWP –e.g., methane (CH_4) and nitrous oxide (N_2O), gases commonly emitted in livestock production through enteric fermentation or manure management–, are accounted for in kg or g of CO_2 equivalent.

In ClearFarm, performing an LCA of the pork and dairy value chain from over five different countries helps comparing differences due to day-to-day practices and the implementation of diverse farm technologies across countries, and how they affect the environment.

One of the most important challenges in ClearFarm is understanding the potential contribution of LCA results to the assessment of animal welfare in the various farms assessed. There is still limited literature linking how a change in the farm management can benefit or constraint animal welfare. Identifying potential benefits and trade-offs between animal welfare and environmental performance would be a major outcome of the project. To achieve such goal, the ClearFarm team develop a unique platform and concentrate a high level of expertise to develop scores that reflect both the environmental and the animal welfare domains.

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