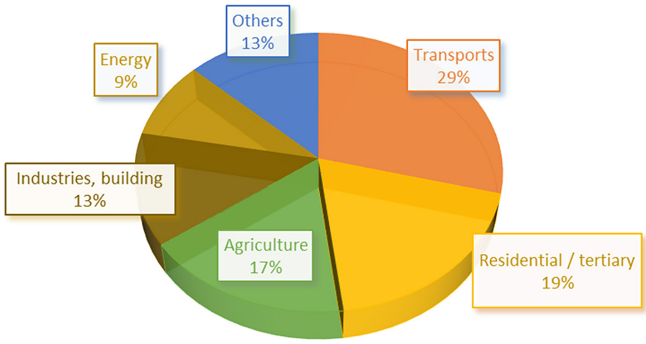
MILK CARBON FOOTPRINT
The French case

Agriculture contributes to global greenhouse gas (GHG) emissions, particularly through methane and nitrous oxide emissions. In France, these emissions amount to 17% of the overall national GHG emissions (CITEPA, 2017), with 8% attributable to ruminants. In line with global commitments to reduce GHG emissions, the French government aims to reduce GHG emissions by 75% by 2050 (reference year: 1990). For agriculture, an intermediate target is to cut GHG emissions by 12% by 2028 (reference year: 2013).

Consumers also demand more information on the environmental impact, including GHG emissions, of food products. The 3 main sources of GHG emissions in dairy farming are enteric fermentation of animals (50%), fertilizer (mineral and manure management (30%) and input purchases (20%).

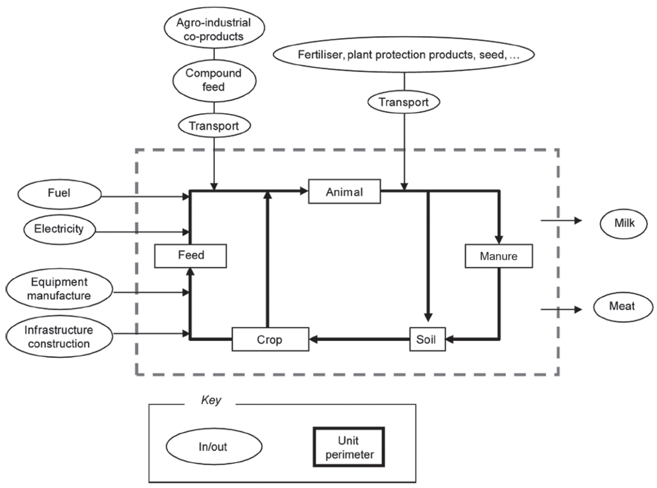


Contributions of the French business sectors to national GHG emissions

Reducing emissions at dairy farm level

The French Livestock Institute (Institut de l'Elevage), in association with three partners[1], has launched the LIFE CARBON DAIRY project. It's main goal is to promote an approach to reduce the milk carbon footprint at farm level by 20% over 10 years.

To reach this goal, CAP'2ER® was developed, a Life Cycle Assessment (LCA) tool, to measure the milk carbon footprint in French dairy farms. Following LCA standards, the system boundaries covered by CAP'2ER® represent 'cradle-to-farm gate' of the dairy farm. This covers both on-farm impacts plus impacts from inputs used on the farm. The methodology developed to assess the carbon footprint is based on international methodologies[2].



System boundaries
(adapted from LEAP large ruminants - FAO 2016)

The emission sources related to these boundaries are listed under five main headings:

- Enteric fermentation: methane (CH_4) emissions from diet digestion;
- Manure management:CH_4 and nitrous oxide (N_2O) emissions from manure management (grazing, buildings, storage);
- Nitrogen consumption: N_2O emissions related to nitrification and denitrification of direct nitrogen application through organic (including crop residue) and mineral fertilization, and indirect emissions resulting from nitrogen enrichment through nitrate leaching and ammonia volatilization;
- Direct energy: Carbon dioxide (CO_2) emissions from on-farm fossil energy consumption (electricity and fuel oil);
- Inputs: impact resulting from the manufacture and transport of inputs (fertilizer, animal feed, seeds), given in CO_2 equivalents.

1 The three partners are key players in the French dairy sector i.e. dairy advisory enterprises such as ECEL, Chambers of agriculture and the French dairy board (CNIEL). This project is funded with the contribution of the LIFE financial instrument of the European Community and the French Ministry of Agriculture special funding CASDAR.

2 IPCC-2006 Tiers 3, FAO-2016 and IDF-2010 guidelines

MILK CARBON FOOTPRINT
The French case

The 'carbon dairy farm'

	National Average<?>	Top 10
Agricultural area (ha)	96	86
Forage area (ha)	67	54
Maize silage / Forage area (%)	37	36
Number of dairy cows	61	57
Livestock Units/ha forage area	1.53	1.57
Milk sold, l FPCM<?>/cow/year	432,000	440,000
Milk production standard, l FPCM/cow/year	7,491	8,221
Gross Carbon Footprint, Kg CO_2e/ l FPCM	1.04	0.87
Carbon sequestration, Kg CO_2e/ l FPCM	0.11	0.09
Net Carbon Footprint, Kg CO_2e/ l FPCM	0.93	0.78

A more complete view of a farm's overall sustainability is obtained by supplementing these 5 elements with a diverse set of indicators to enable an integrated assessment of its economic, social and environmental performance. These additional indicators describe the farm's economic situation and working conditions, but also a range of indicators of daily farming practices used by farmers and advisors, since they are essential to describe livestock performance. Finally, the tool aims also to integrate the more positive contributions of dairy farming, by incorporating indicators for biodiversity, carbon storage and feed efficiency. This full view makes it possible to build action plans on the medium and long term consistent with the sustainability of dairy farms.

This way, CAP'2ER® highlights the practices that must evolve to improve both the technical and environmental performance of a farm, and as such, offers concrete recommendations to be used in advisory and training services for farmers.

FARMER CASE
Excelling in resource efficiency: Neil and Jane Dyson, dairy farmers In Buckinghamshire

Holly Green Farm in Buckinghamshire is a EuroDairy pilot farm excelling in resource efficiency, lying in the top 10% of Arla farms for carbon footprint performance. Neil and Jane Dyson's high attention to detail drives high performance from their 500 Holstein cows, averaging 9,000 litres/year. Low mortality rates, calving at 24 months, good nutrition and avoidance of soyabean meal in the diet mean reduced greenhouse gas emissions from the herd. In addition, investment in solar panels and in a biomass boiler burning wood-chips, has made the farm 50% self-sufficient in energy consumption.

CONTACT
Sylvain Foray
sylvain.foray@idele.fr
idele.fr/services/outils/cap2er.html

EURODAIRY.EU