



15. Management Tools to Support Circular Economy Practical Herd Applications

Title presentation

Impact simulation of feed levers on ruminant farms sustainability with CAP'2ER®

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Abstract

CAP'2ER® is multi-criteria modelling tool for environmental assessment and technical support in ruminant farms. Developed in France by the French Livestock Institute in collaboration with the French dairy board, CAP'2ER® respects life cycle assessment principles and complies with international standards (IPCC, FAO).

The collection of 150 activity data in dairy cattle farms allows the evaluation of GHG emissions, carbon storage and carbon footprint in kg CO₂ eq/l of milk. CAP'2ER® also assesses the positive contributions of livestock farming: biodiversity, food performance and carbon storage. Several types of action levers can be simulated in the tool: herd management, crop management, energy consumption, herd feeding and carbon storage. Following the diagnosis carried out in farm, the implementation of action levers leads to a reduction of the farm carbon footprint from 10 to 20%.

Concerning the feed lever, several actions may be implemented to reduce the carbon footprint of livestock farming and improve its sustainability:

- 1) Reducing feed wastage in fodder and concentrates
- 2) Ration balance: reduce overconsumption of concentrates,
- 3) Increasing milk yield in accordance with genetic potential
- 4) Reducing the use of imported soybean meal
- 5) Improving protein autonomy through fodder: fodder quality, protein crop mix
- 6) Making better use of grass: increasing the proportion of grass in the ration by grazing and harvesting, increasing grass yield

All the mitigation practices have been tested for evaluating the GHG reduction potential. As an example on a typical dairy farm in Western France, the substitution of soybean by rapeseed, 1.42kg DM of soybean meal vs 2.13kg DM of rapeseed meal, has been tested considering the respective emission factors (EF) 1.579kg CO₂/kg soybean meal (including deforestation) and 0.46kg CO₂/kg feed for rapeseed meal. In an optimised ration of 28 litre milk /day, CAP'2ER® highlights a significant decrease in CO₂/kg DM: 0.29 kg CO₂/kg DM for the soybean ration compared to 0.22 kg CO₂/kg DM for the rapeseed ration. Regarding the milk carbon footprint, the quantity of CO₂ emitted goes from



0.87kg per litre of milk for the soybean ration to 0.81 kg per litre of milk for the rapeseed ration (-6.4%).

This example well illustrates the potential improvement of ruminant farms sustainability thanks to the CAP'2ER[®] tool. For the other mitigation practices on feed improvement, the potential is in a range of 2% to 8%.