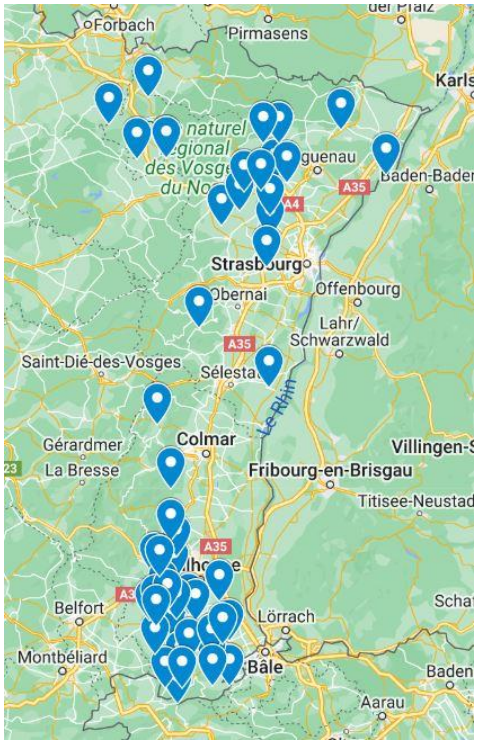
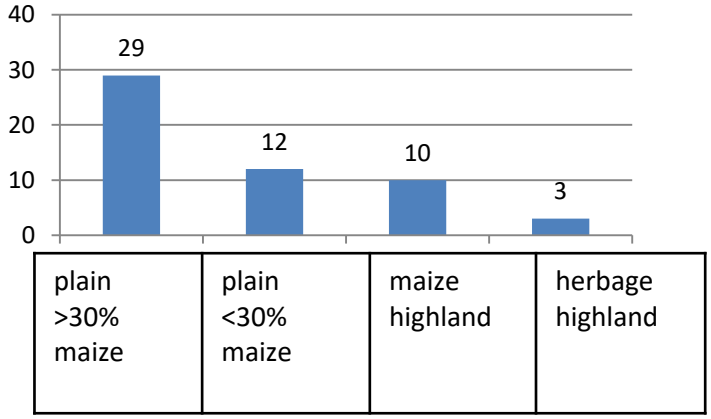
Results of the carbon diagnoses in Alsace - Dairy cattle

Introduction : In Alsace, between 2021 and 2023, 53 CO2 diagnoses were carried out on dairy farms with the Cap2ER diagnostic tool.
The main typology of dairy farms diagnosed was the Rhineland plain with more than 30% maize cultivation (54% of the farms investigated).

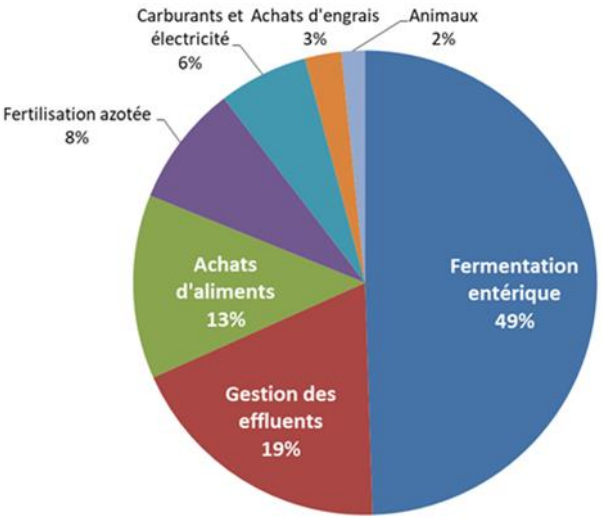


Distribution by typology (number)



Results

On dairy farms, more than 50% of the main emissions come from the enteric fermentation of the animals.



Emissions in kg CO_2-eq/L milk

Typologie	Ebene >30%	Ebene <30%	Mais Gebirge	Gras Gebirge
Enterische Fermentation	48%	51%	47%	63%
Umgang mit Dung	19%	21%	18%	18%
Düngung mit Stickstoff	9%	8%	9%	7%
Kraftstoffe und Elektrizität	6%	6%	7%	8%
Einkauf von Futtermitteln	15%	10%	13%	3%
Einkauf von Düngemitteln	3%	2%	2%	0%
Einkauf von Tieren	1%	1%	4%	0%

Comparison of emissions by typology (kg CO2-eq./L milk)

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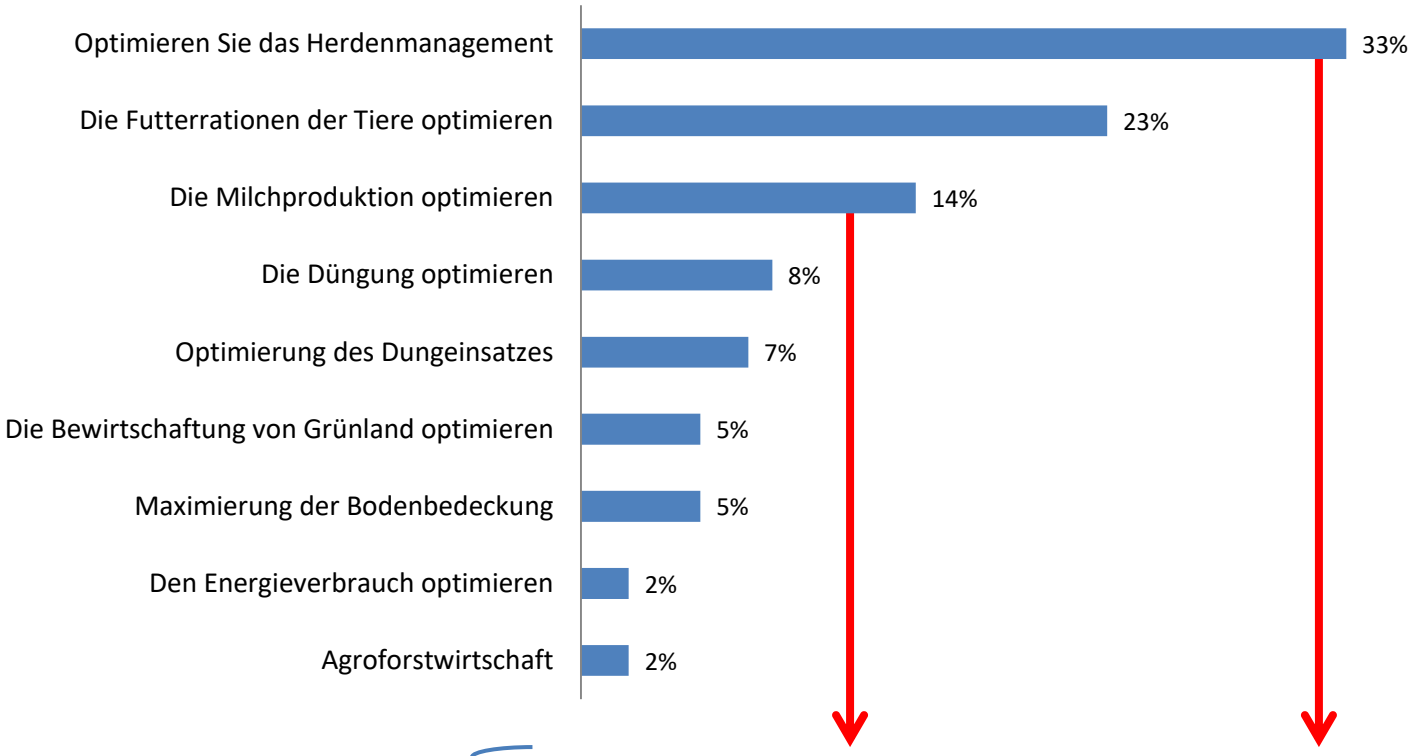
Main levers for reducing emissions

After carrying out a CO2 diagnosis, an action plan is drawn up to identify necessary but also feasible adjusting screws that correspond to the characteristics of the farm in question, with the aim of optimising economic performance and reducing the CO2 footprint.

The following graphic illustrates the classification of the most important measures that are used.



The 3 most important levers used

3. Increase milk production per dairy cow

1. Reduce age at first calving

2. Lower replacement rate

Carbon gains (tonnes of CO2 in 5 years)

Once the measures are defined, a simulation is carried out that takes into account the changes caused by the implementation.
The CO2 gains are then calculated by comparing the net footprint between the original diagnosis and the simulation.

Min. carbon gains : 8

Average carbon gains: 441

Max. carbon gains : 2284

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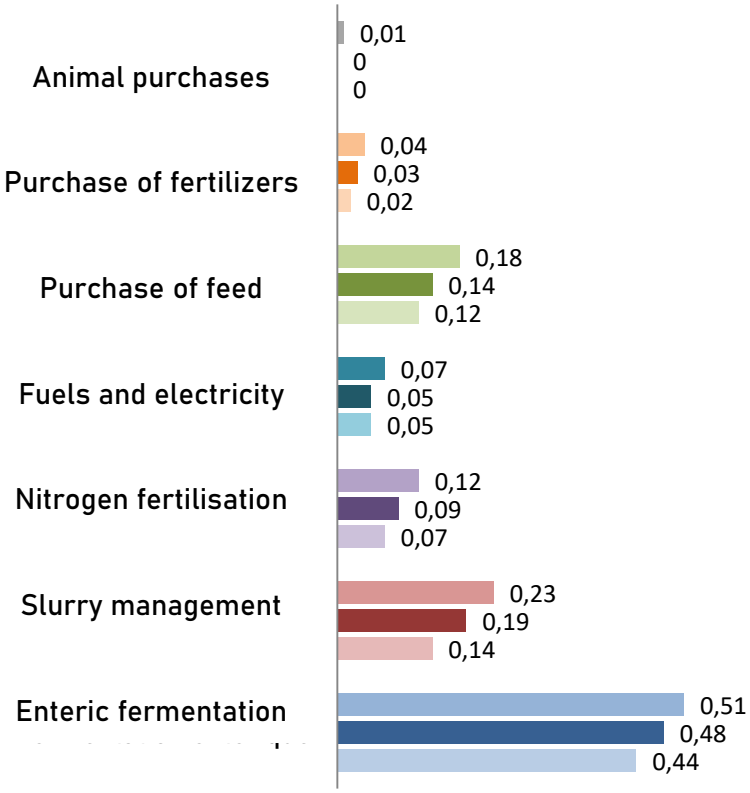
Results of the carbon diagnoses in Alsace - Dairy cattle

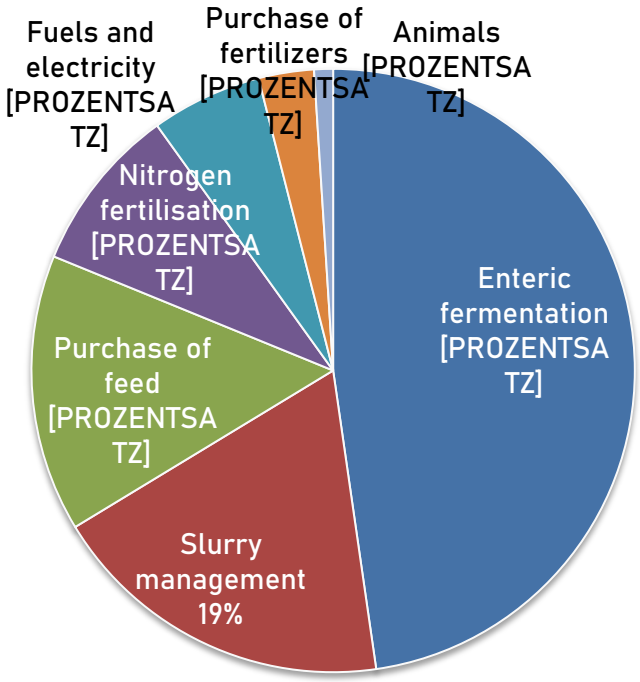
Maize system in the plain >30%

Introduction: In Alsace, 29 CO2 diagnoses were carried out on dairy farms in the plain with a maize proportion of more than 30%.

Distribution of greenhouse gas sources

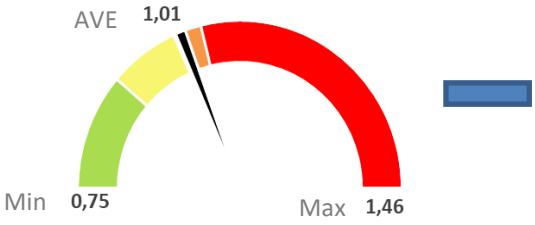
Emissions in kg CO2-eq/L milk



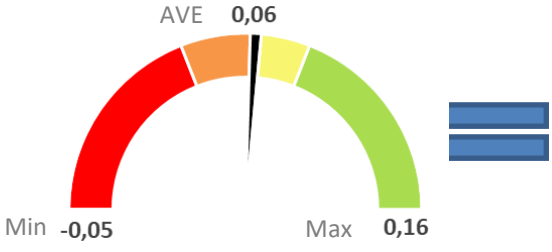


Net carbon footprint (kg CO_2-eq./L milk)

Gross emissions



Carbon storage



Net footprint

AVE : 0,96 kg CO2-eq./L milk

Min : 0,80

Max : 1,30

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Environmental footprint

Nitrogen budget

Input − Output = Balance surplus: 137 kg/ha AA

Input ÷ Output = Nitrogen efficiency: 46%

I feed **39** people/ ha AA

I consume **4** MJ/L ECM

Positioning in comparison to regional and national averages

		Alsace Maize in the plain (maize >30%)	Grand Est Maize in the plain (maize<30%)	France Maize in the plain
	Greenhouse gas emissions	1,01 kg CO_2-eq./L ECM	1,03 kg CO_2-eq./L ECM	0,99 kg CO_2-eq./L ECM
Herd	Milk yield	8 749 L/cow/year	8 562 L/cow/year	8 047 L/cow/year
Herd	Age at first calving	29 months	29 months	28 months
Herd	Replacement rate	34 %	41 %	40 %
Feeding	Concentrated feed / cow	259 g/L milk	258 g/L milk	182 g/L milk
Feeding	Protein autonomy	54 %	56 %	61 %
Areas and effluents	Grazing time	35 days	69 days	134 days
Areas and effluents	Nitrogen load	115 kg N/ha AA	102 kg N/ha AA	131 kg N/ha AA

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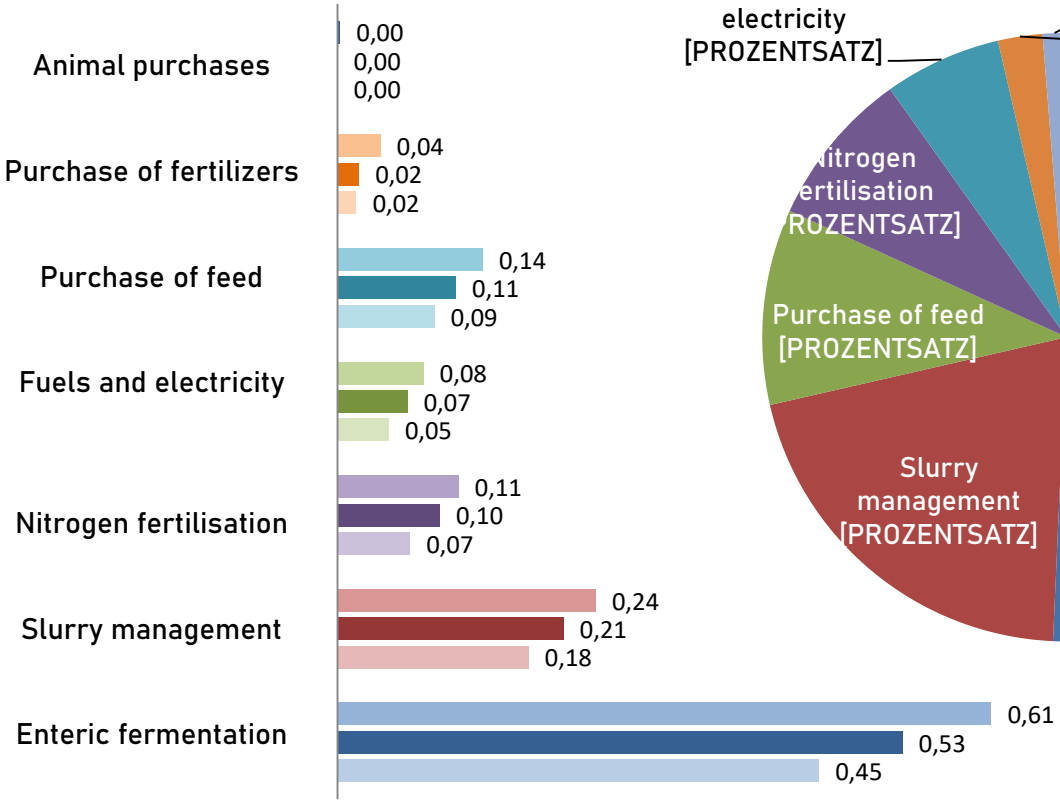
Results of the carbon diagnoses in Alsace - Dairy cattle

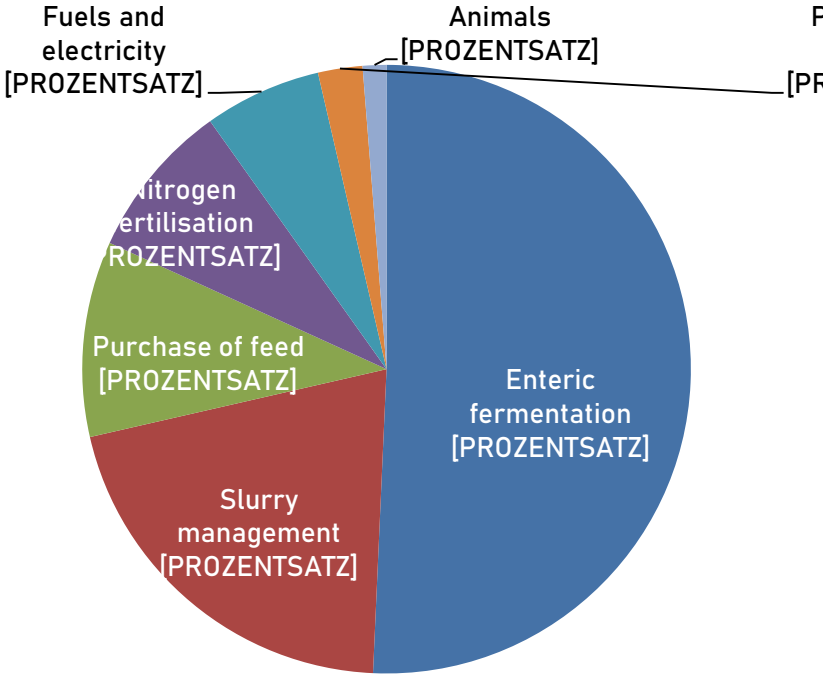
Maize system in the plain <30%

Introduction: In Alsace, 12 CO2 diagnoses were carried out on dairy farms in lowland areas with a maize content of less than 30%.

Distribution of greenhouse gas sources

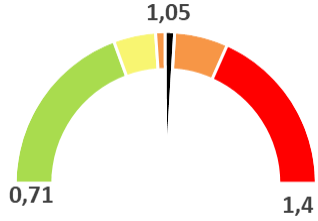
Emissions in kg CO2-eq./L milk



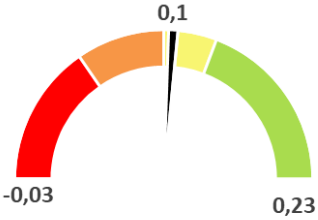


Results (kg CO2-eq./L milk)

Gross emissions



Carbon storage



Net footprint

AVE : 0,94 kg eq CO_2/L milk

Min : 0,74
Max : 1,17

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Environmental footprint

Nitrogen budget

Input − Output = Balance surplus: 107 kg/ha AA

Input ÷ Output = Nitrogen efficiency: 43%

I feed 31 people/ ha AA

I consume 3 MJ/L ECM

Positioning in comparison to regional and national averages

		Alsace Maize in the plain (maize >30%)	Grand Est Maize in the plain (maize <30%)	France Maize in the plain
	Greenhouse gas emissions	1,05 kg CO2-eq./L ECM	1,02 kg CO2-eq./L ECM	0,99 kg CO2-eq./L ECM
Herd	Milk yield	7 758 L/cow/year	7 921 L/cow/year	8 047 L/cow/year
Herd	Age at first calving	30 months	31 months	28 months
Herd	Replacement rate	29 %	41 %	40 %
Feeding	Concentrated feed / cow	194 g/L milk	240 g/L milk	182 g/L milk
Feeding	Protein autonomy	65 %	64 %	61 %
Areas and effluents	Grazing time	79 days	69 days	134 days
Areas and effluents	Nitrogen load	108 kg N/ha AA	91 kg N/ha AA	131 kg N/ha AA

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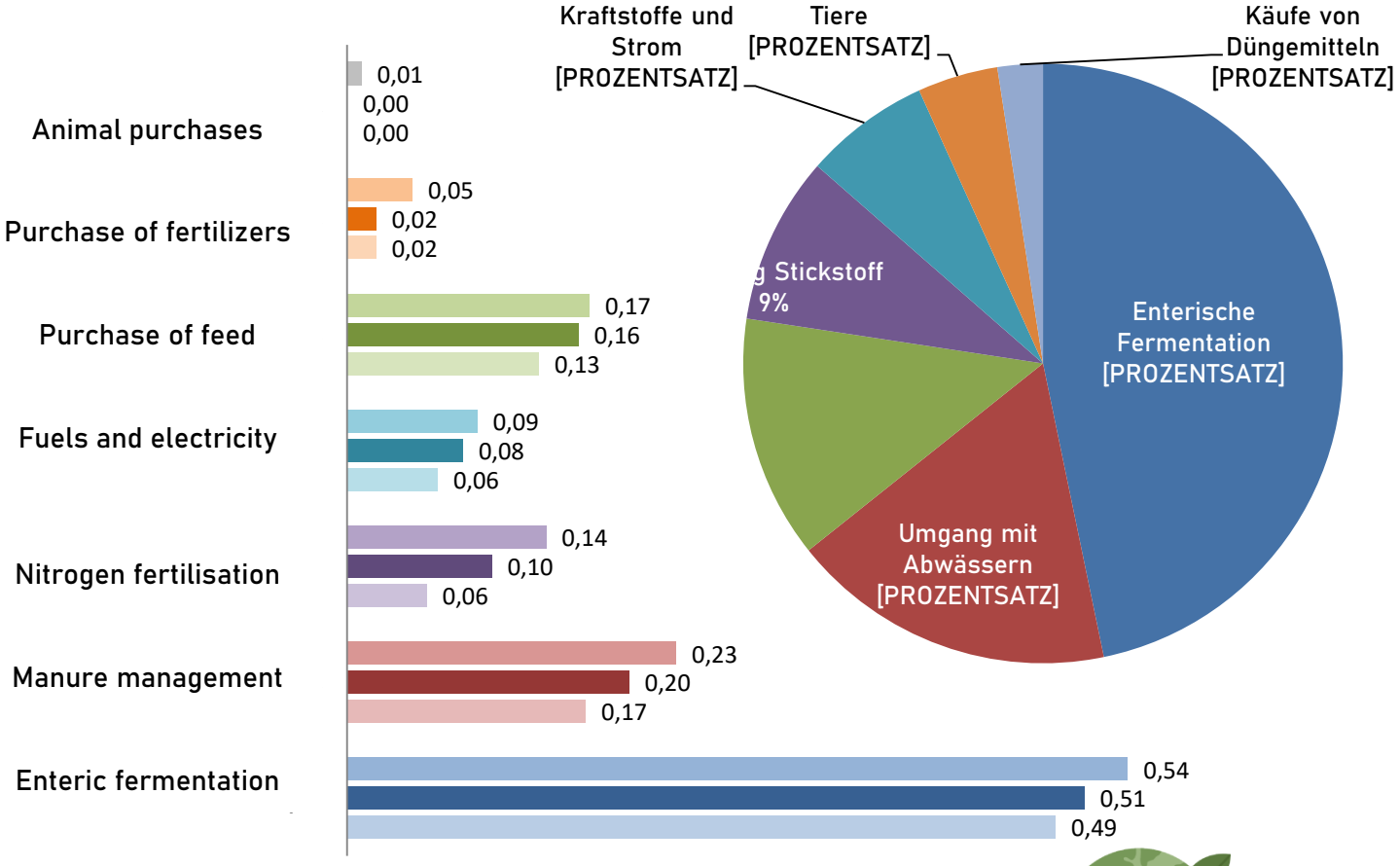
Results of the carbon diagnoses in Alsace - Dairy cattle

Highland maize system

Introduction: In Alsace, 10 carbon diagnoses were carried out on dairy farms with maize cultivation in mountainous areas.

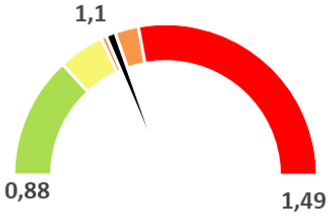
Distribution of greenhouse gas sources

Emissions in kg CO2-eq/L milk

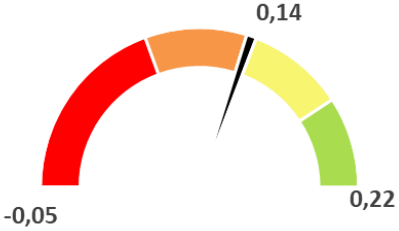


Results (kg CO2-eq./L milk)

Gross emissions



Carbon storage



Net footprint

MOY : 1 kg eq CO_2/L milk

Min : 0,93

Max : 1,27

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Environmental footprint

Nitrogen budget

Input − Output = Balance surplus: 122 kg/ha AA

Input ÷ Output = Nitrogen efficiency: 27%

I feed	I consume
28 people/ ha AA	3,7 MJ/L ECM

Positioning in comparison to national averages

		Alsace Highland Maize	France Highland Maize
	Greenhouse gas emissions	1,11 kg CO2-eq./L ECM	1,07 kg CO2-eq./L ECM
Herd	Milk yield	8 170 L/cow/year	7 841 L/cow/year
Herd	Age at first calving	31 months	30 months
Herd	Replacement rate	29 %	35 %
Feeding	Concentrated feed / cow	241 g/L milk	251 g/L milk
Feeding	Protein autonomy	44 %	63 %
Areas and effluents	Grazing time	68 days	114 days
Areas and effluents	Nitrogen load	121 kg N/ha AA	119 kg N/ha AA

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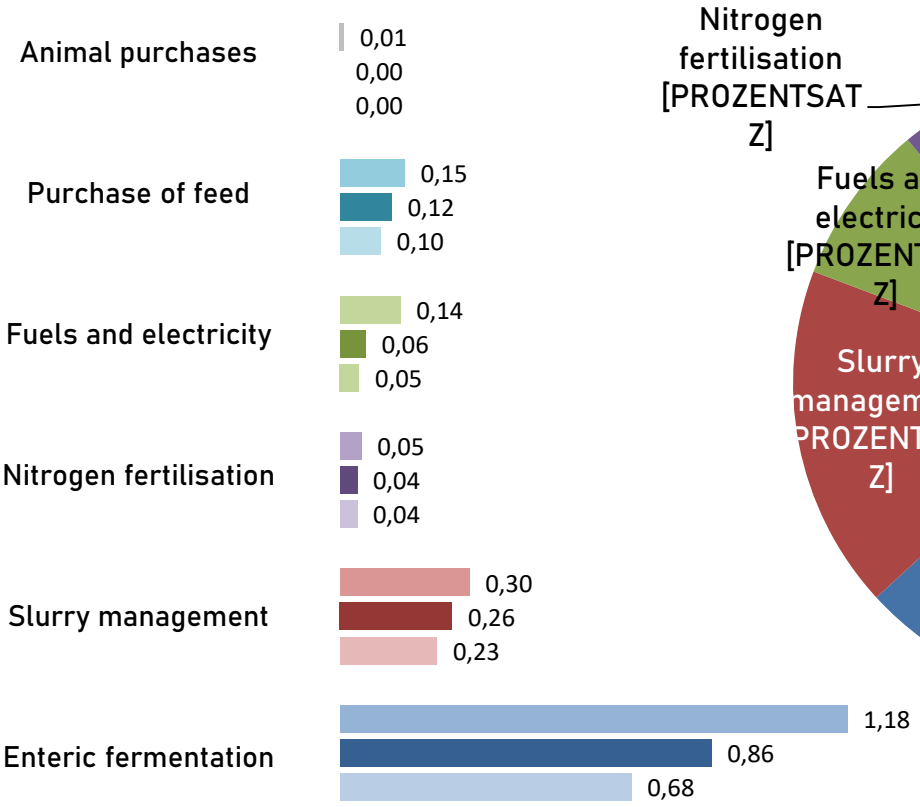
Results of the carbon diagnoses in Alsace - Dairy cattle

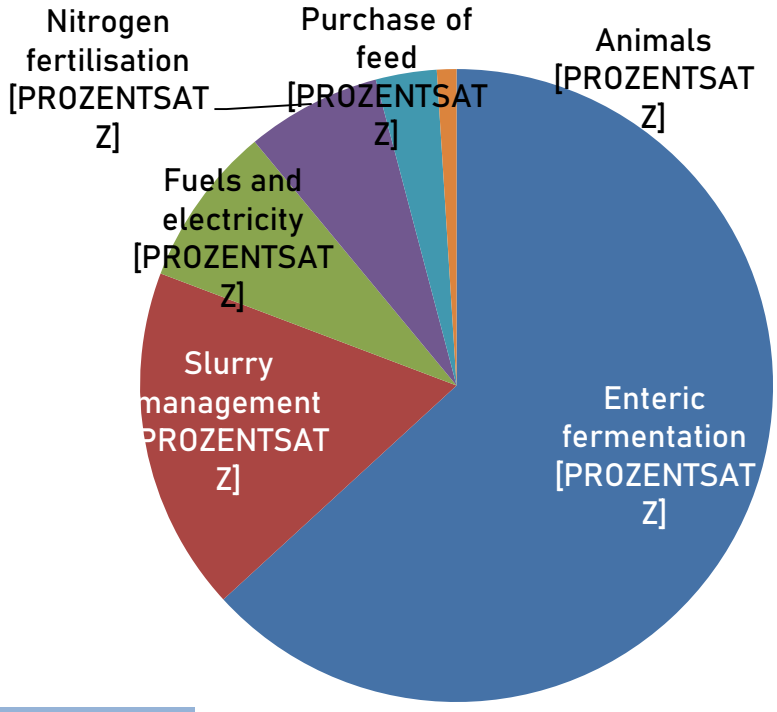
Highland herbage system

Introduction: In Alsace, 3 carbon diagnoses were carried out on dairy farms in mountainous areas with grass cultivation.

Distribution of greenhouse gas sources

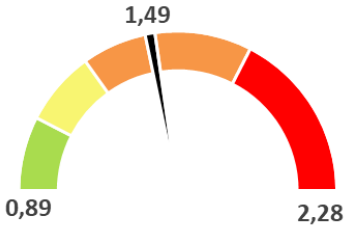
Emissions in kg CO2-eq. /L milk



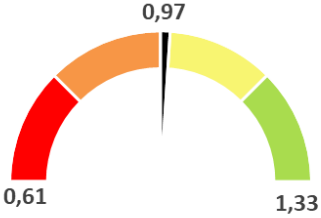


Results (kg CO2-eq./L milk)

Gross emissions



Carbon storage



Net footprint

AVE : 0,79 kg eq CO_2/L milk

Min : 0,72
Max : 0,95

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Environmental footprint

Nitrogen budget

Input − Output = Balance surplus : 48 kg/ha AA

Input ÷ Output = Nitrogen efficiency: 39 %

I feed
12
people/ ha AA

I consume
5,4
MJ/L ECM

Positioning in comparison to national averages

		Alsace Highland herbage	France Highland herbage
	Greenhouse gas emissions	1,49 kg CO2-eq./L ECM	1,09 kg CO2-eq./L ECM
Herd	Milk yield	5 182 L/cow/year	6 254 L/cow/year
Herd	Age at first calving	39 months	32 months
Herd	Replacement rate	35 %	33 %
Feeding	Concentrated feed / cow	286 g/L milk	254 g/L milk
Feeding	Protein autonomy	74 %	71 %
Areas and effluents	Grazing time	161 days	172 days
Areas and effluents	Nitrogen load	76 kg N/ha AA	86 kg N/ha AA

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