Determining carbon footprint of sheep farms in Europe: first results of the LIFE Green Sheep project

S. Throude, M. Acciaro, A. Atzori, R. Ruiz, O. Del Hierro, C. Buckley, L. Bragina, T.W.J. Keady, C. Dragomir, M.A. Gras, J.B. Dollé

With the help of 2 French trainees M. Hiez and R. Pellerin





Key figures of the LIFE Green Sheep project

LIFE GREEN SHEEP IS:

5 years
European project, from October 2020 to September 2025

€ 4,6 M
budget

1 355
demonstrative farms involved

40 partners from
5 European countries

Reduce by **12 %** GHG emissions while maintaining farms' sustainability

282
innovative farms involved in the implementation of action levers





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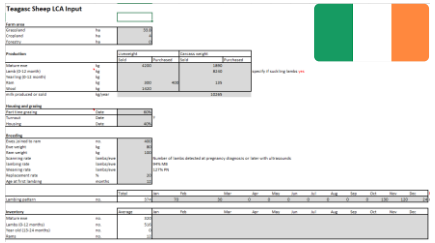
How determining carbon footprint of sheep farms in Europe ?

- Using tools :
  - CAP’2ER®

  - ArdiCarbon

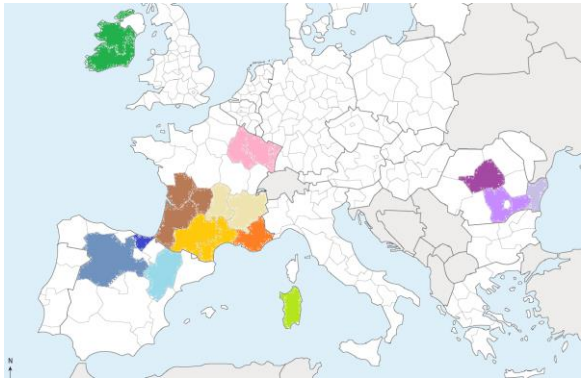
  - SheepLCA



- A sample of 1 355 sheep farms

	Meat sheep	Dairy sheep
France	700 - 584	185 - 186
Spain	30 - 41	60 - 41
Ireland	180 - 180	-
Italy	-	100 - 101
Romania	-	100 - 20

Nb of farms foreseen – Nb of farms already assessed & analyzed



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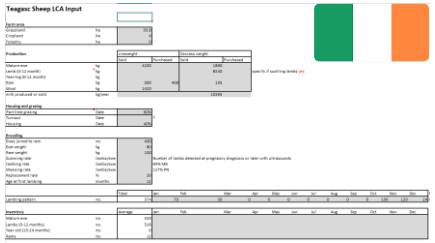

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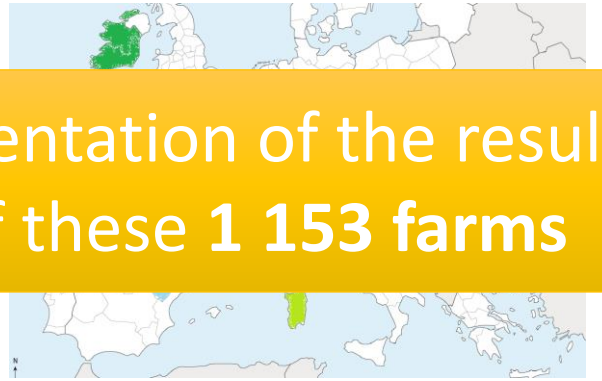
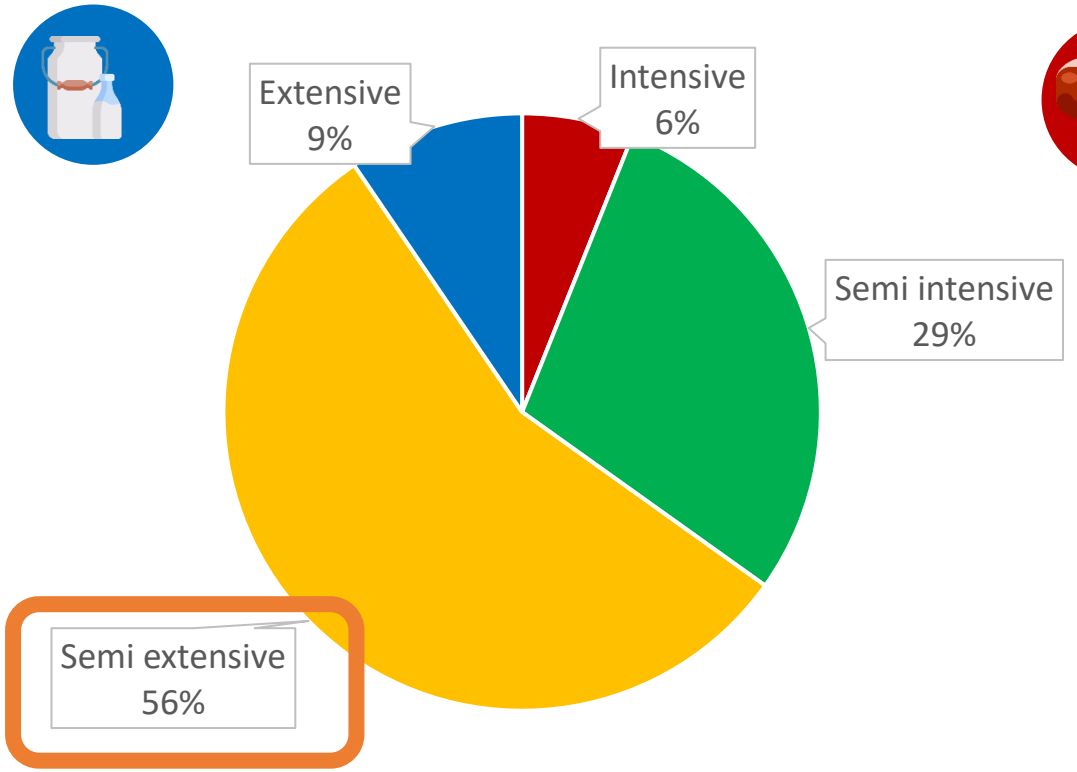
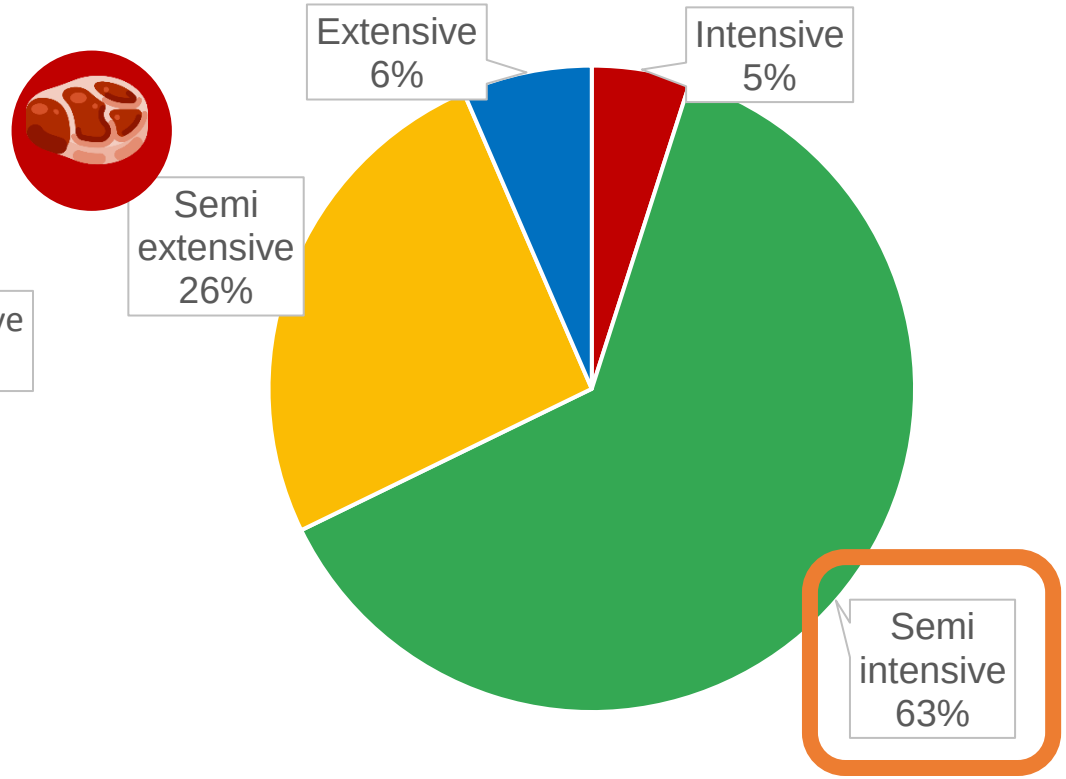


Presentation of the results of these **1 153 farms**

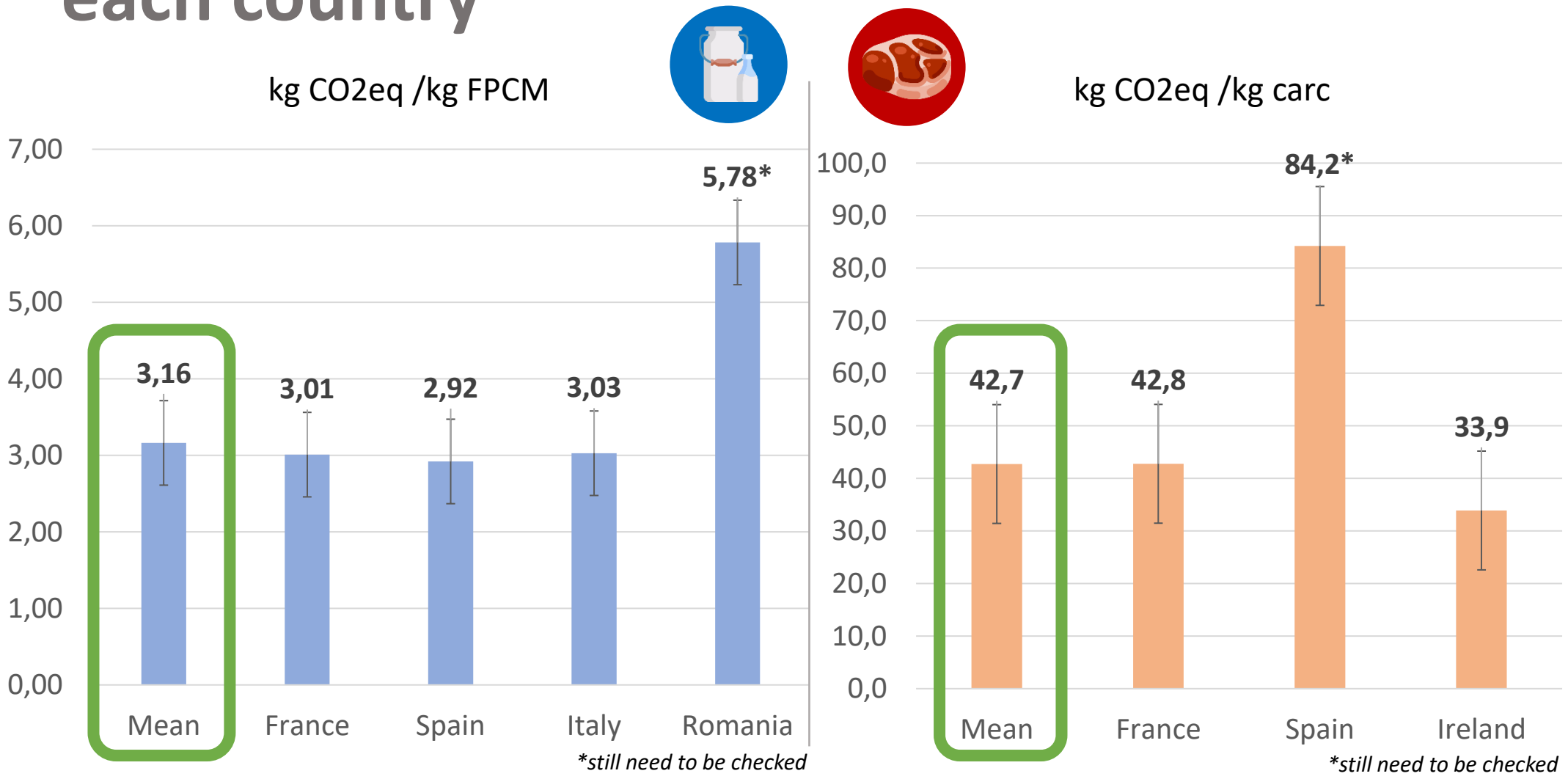
A EU-scale sample with a diversity of rearing sheep systems

- A majority of semi-extensive and semi-intensive systems





Average EU sheep milk and sheep meat carbon footprint with high variability within each country

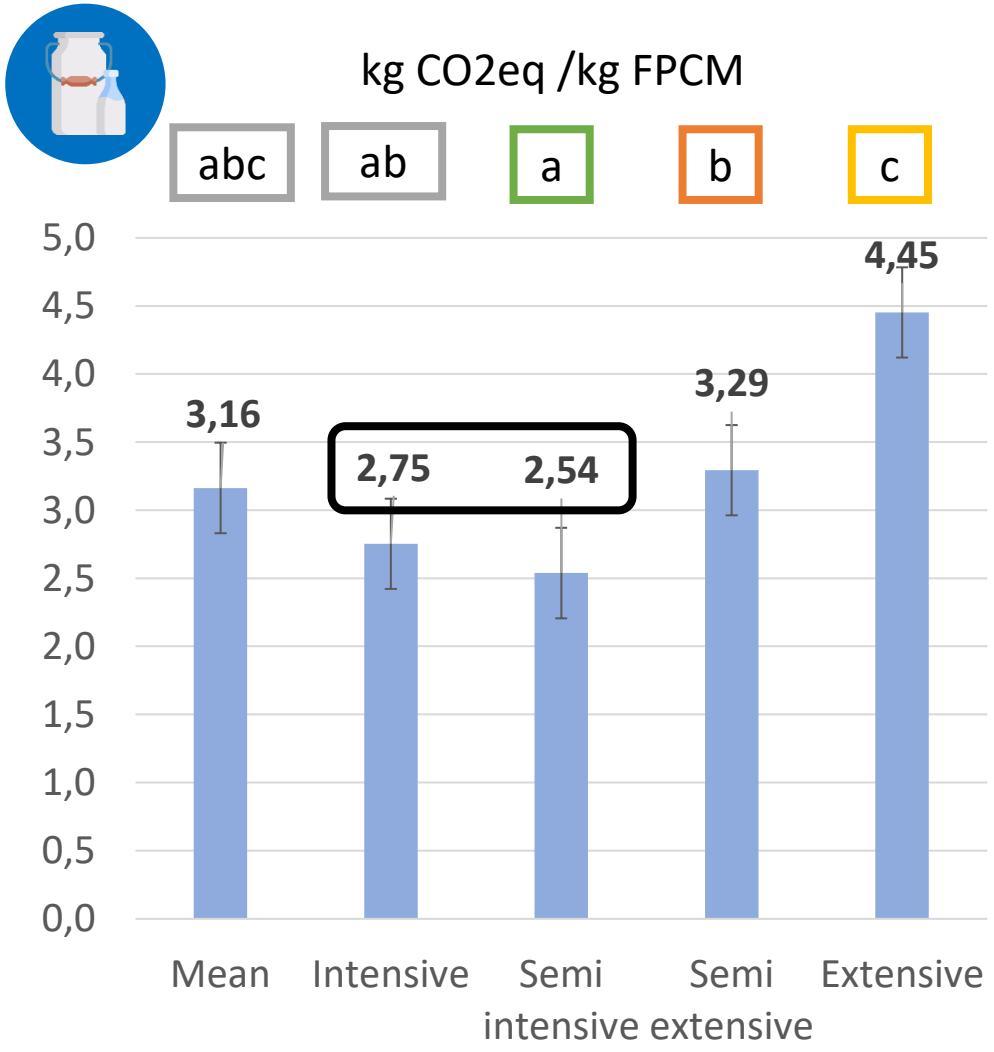


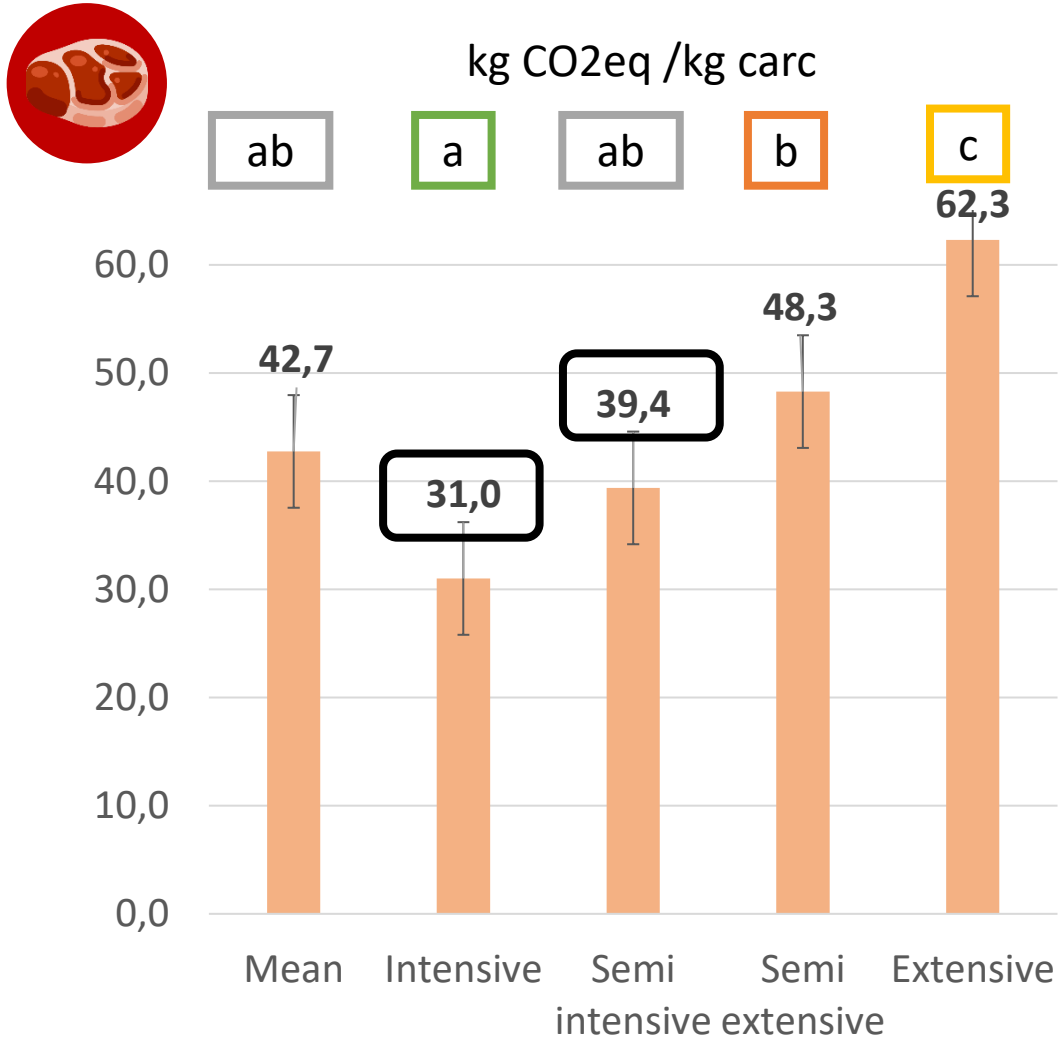
Why do we have differences between countries ? Example of dairy sector

- Effect of the functionnal unit and rearing sheep systems

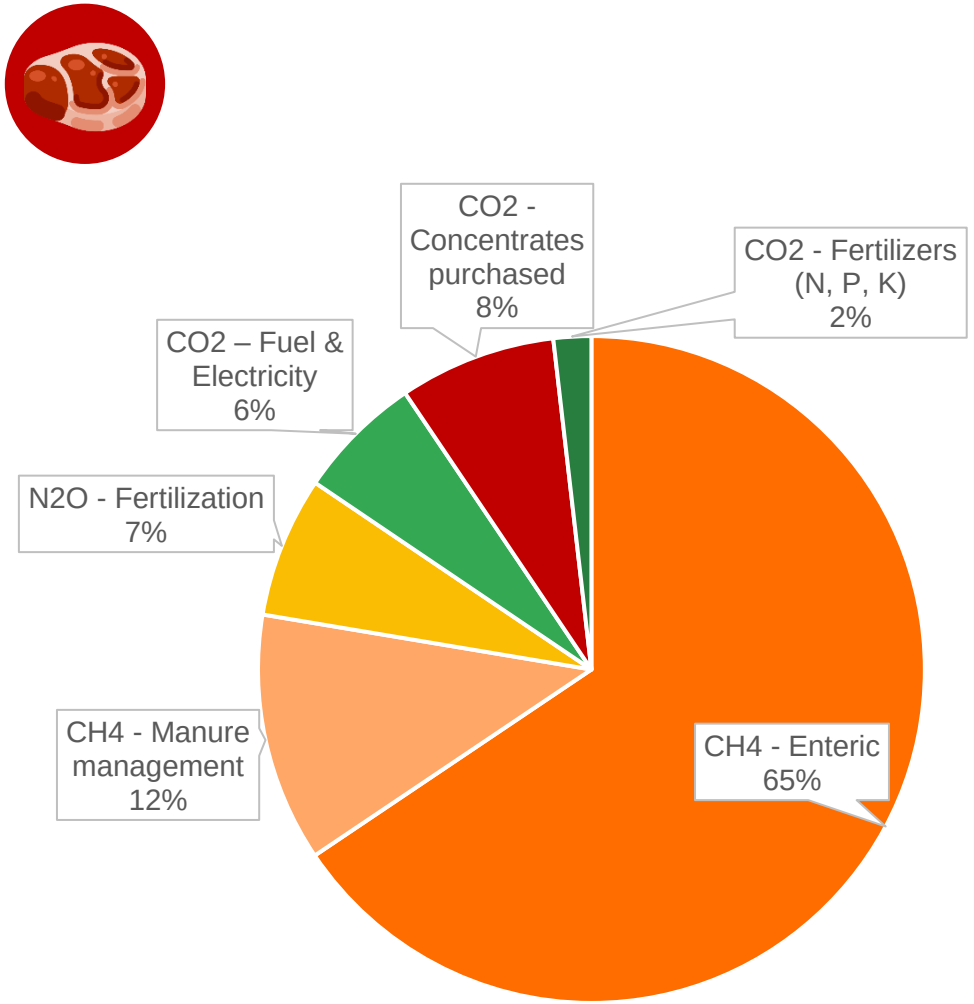
	France	Spain	Italy	Romania
CF/ kg FPCM	3,01 (a)	2,92 (a)	3,03 (a)	5,78 (b)
CF /ha	6 345 (a)	27 837 (b)	3 285 (a)	2 070 (a)
Milk production litres/ewe	254 **(bc)**	313 (c)	183 (b)	53 (a)
UAA (ha)	80 (b)	58 (a)	106 (c)	119 (c)

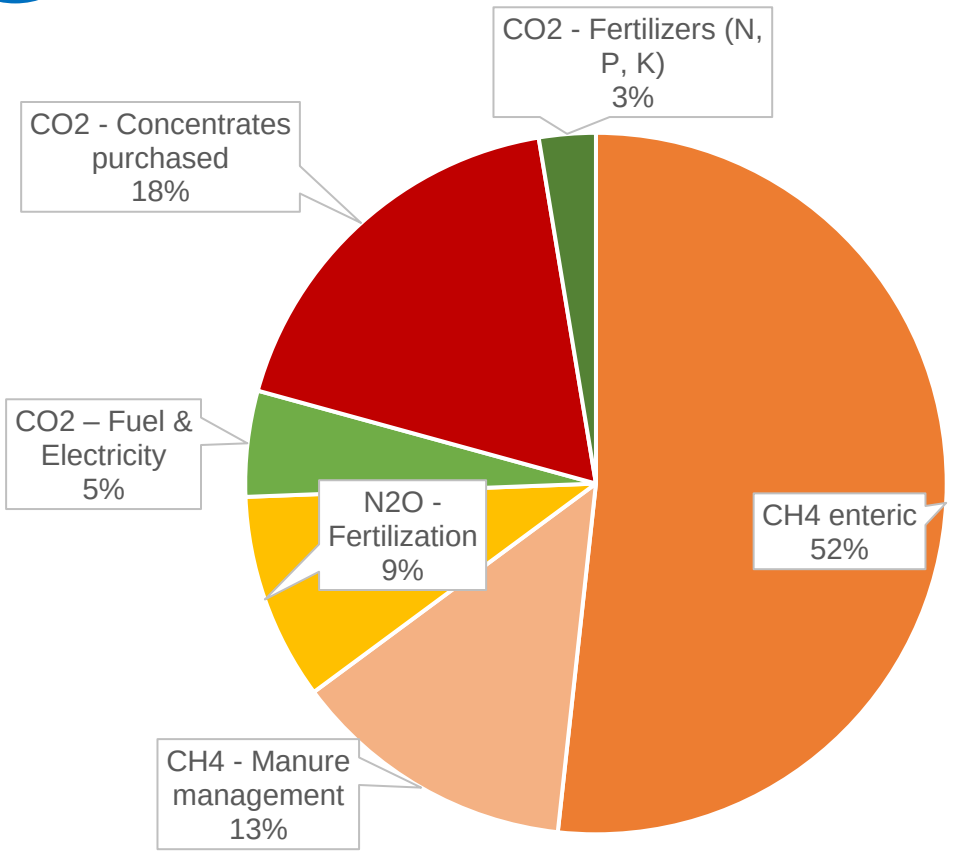
Average carbon footprint according to the rearing sheep system





Enteric fermentation and manure management are the main sources of GHG





What are the technical results for the 10% of farms with the lowest emissions?

		10 % lowest (77 farms)	Average (770 farms)	10 % highest (77 farms)
Environmental results	GHG emissions (kg CO2eq/kg carcass)	20	41	89
	GHG emissions (kg CO2eq/ha)	6 205	5 043	3 700
Surfaces	UAA (ha)	37	113	125
Flock management and production	Number of ewes	298	398	327
	Prolificity rate	1,71	1,45	1,18
	Carcass weight of lambs (kg carc/lamb)	38	22	22
	Meat production (kg carc/year)	8 427	7 956	3 180
	Weight productivity (kg carc/ewe)	46	24	12
Flock feeding	Part of purchased concentrates (%)	93	66	63
	Grazing time for ewes (days/year)	282	245	248
Energy	Fuel consumption (litres/ha)	94	97	129
	Electricity consumption (kwh/ha)	166	116	122

What are the main factors explaining GHG emissions results ?

- When GHG emissions are expressed per ha :

For meat sheep farms :

- According to the system, around 5 **factors explain at least 60% of the GHG emissions**
  - Stocking rate
  - Mineral & organic nitrogen
  - N balance
  - Weight productivity
  - Prolificacy rate

For dairy sheep farms :

- According to systems, **5 factors explain at least 60% of the GHG emissions**
  - Stocking rate
  - N balance
  - Mineral & organic nitrogen
  - Energy consumption (fuel & elec)
  - Prolificacy rate (only for semi-extensive systems)

Statistical test used : Boruta

Conclusion

- First results give us a good overview of the average EU sheep milk and sheep meat carbon footprint based on an important sample of farms
  - 3,16 kg CO2eq/kg FPCM for dairy farms
  - 42.7 kg CO2eq/kg carcass for meat farms
  - →Different results according to the countries and farming systems
- Importance of the funtionnal unit
  - Need to analyse the results expressed per unit of product AND per ha
- A high variability of CF results whithin each system
  - Explained by different practices
- This work is still in progress and these are preliminary results
  - The classification of sheep systems need to be consolidated
  - The analysis of intra-system results needs to be more in-depth
  - Final results with sustainability aspects by the end of this year, considering also carbon storage & sustainability performances

Thank you for your attention and thanks to all partners for these preliminary results

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