Greenhouse Gas Emissions and Deer

Robin Pakeman

The Carbon Footprint of Scottish Wild Venison

- SAC Consulting report to the Scottish Venison Association.
- Cradle to gate assessment, birth to leaving the processor. Also known as Life Cycle Analysis.
- Not comparable with 2009 report “Life cycle assessment of Scottish wild venison” as different methodology.

Key points

- Includes methane production by deer
- Uses individual level emissions based on average age of deer herd (male 4 years, female 5 years)
- Does not include indirect damage from browsing damage or peatland erosion
- Emissions from the estate (vehicles, electricity etc)
- Transport to processor
- Processing to retail product

Results

		$kgCO_2e/t$ CW	Proportion of footprint (%)
Estate	Utilities	148	0.7%
	Vehicle fuel use	1,567	7.0%
	Waste	156	0.7%
	Methane emissions	19,771	88.6%
Processor	Utilities	238	1.1%
	Vehicle fuel use	383	1.7%
	Refrigerants	14	0.1%
	Waste	35	0.2%
Total		22,312	

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Two numbers to remember

- 22.3 kg CO_2 equivalents per kg of carcase weight
- 11.9 kg CO_2 equivalents per 100 g of protein

- Assumes protein content is 22.7 %

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Options - estates

- Utilities – energy efficiency, renewables
- Vehicle fuel use – fuel efficient vehicles, electric
- Waste – no suggestions
- Manage land for carbon sequestration
  - Known as “Insetting”
  - Trees in the right place
  - Peatland restoration

Options - processors

- Utilities – energy efficiency, waste heat recycling, renewables
- Vehicle fuel use – efficient collection, electric
- Refrigerants – these differ in global warming potential
- Waste – more efficient carcase use, packaging
- Whole chain – shared resources, e.g. larders

Comparisons

- SAC did not make any due to differences in methods between studies.
- So, any comparisons are mine not theirs.

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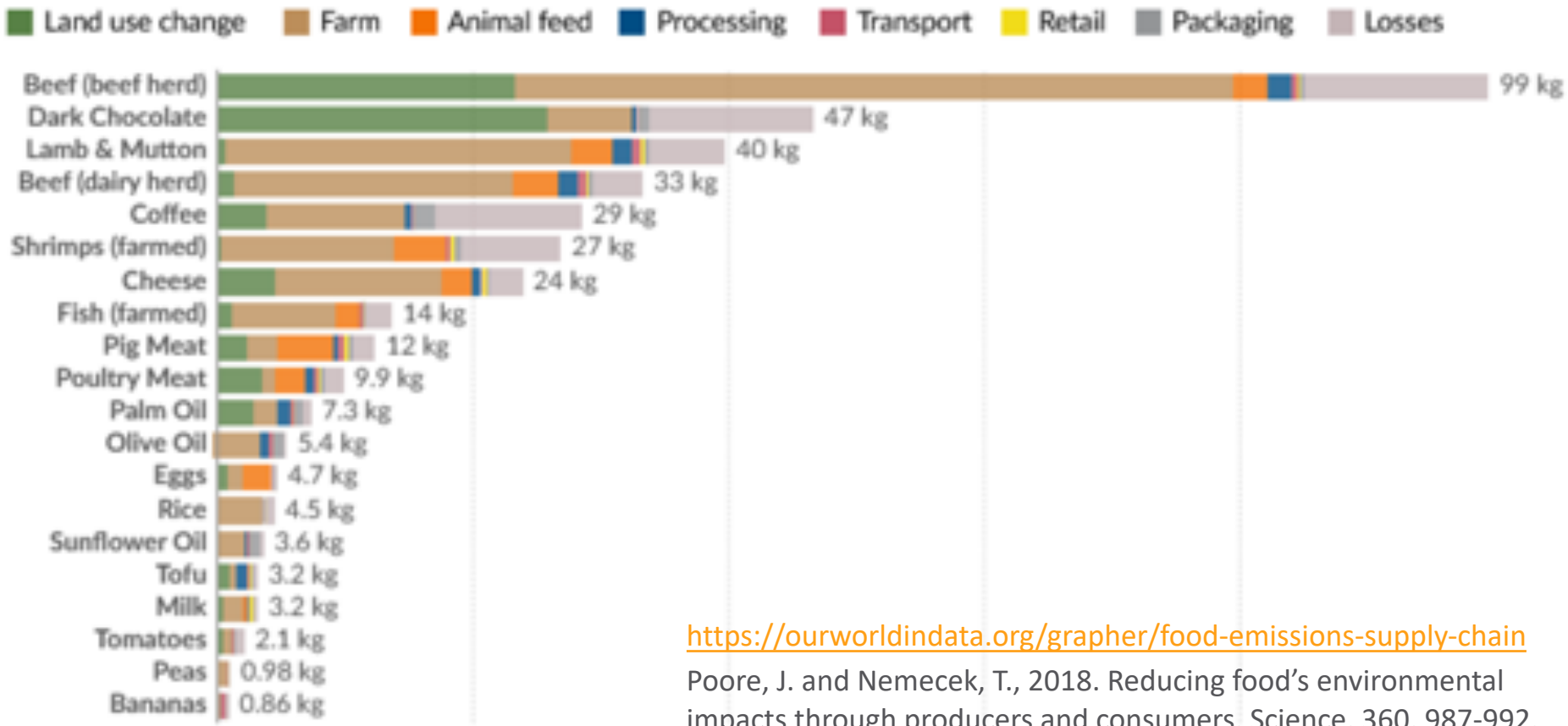
Greenhouse gas emissions across the supply chain kg CO_2/kg



https://ourworldindata.org/grapher/food-emissions-supply-chain

Poore, J. and Nemecek, T., 2018. Reducing food's environmental impacts through producers and consumers. Science, 360, 987-992.

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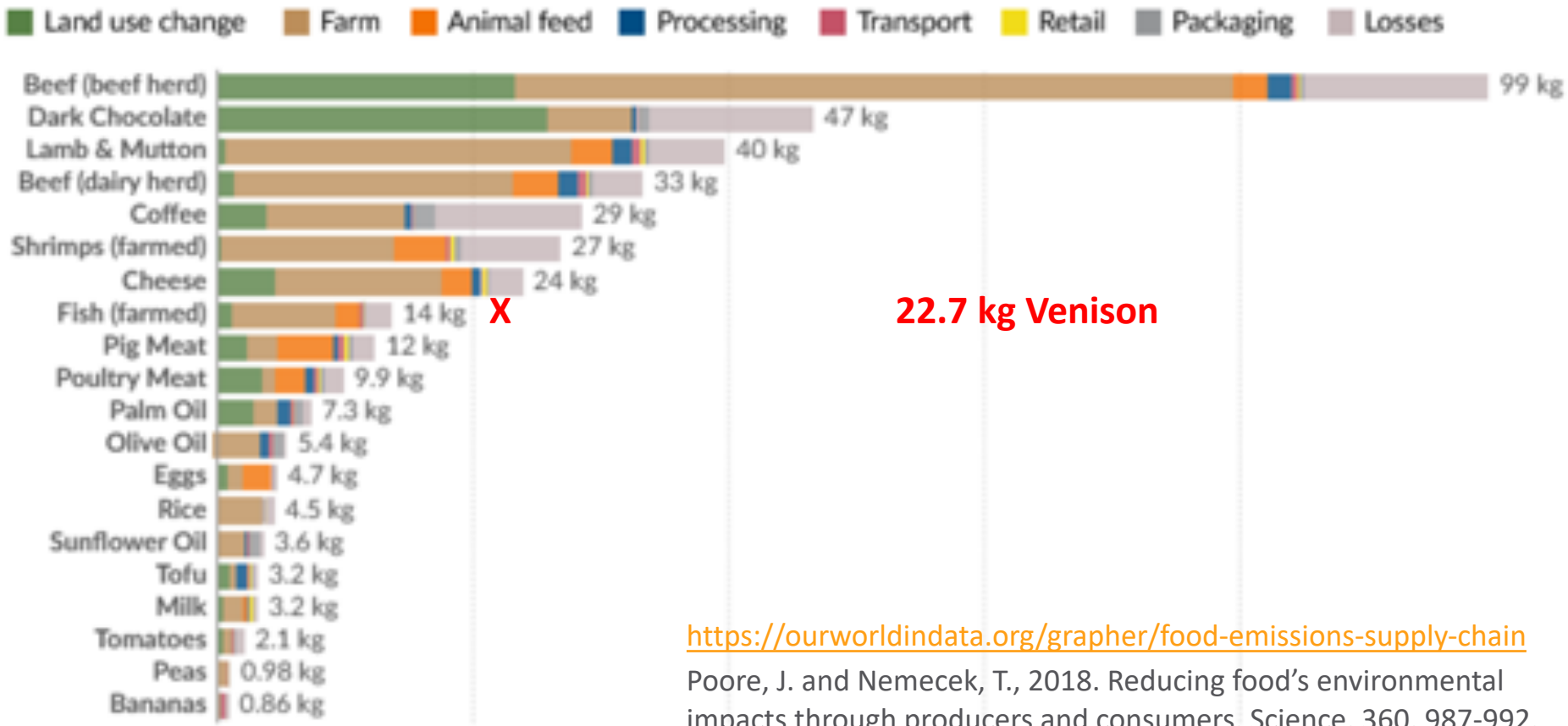

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22.7 kg Venison

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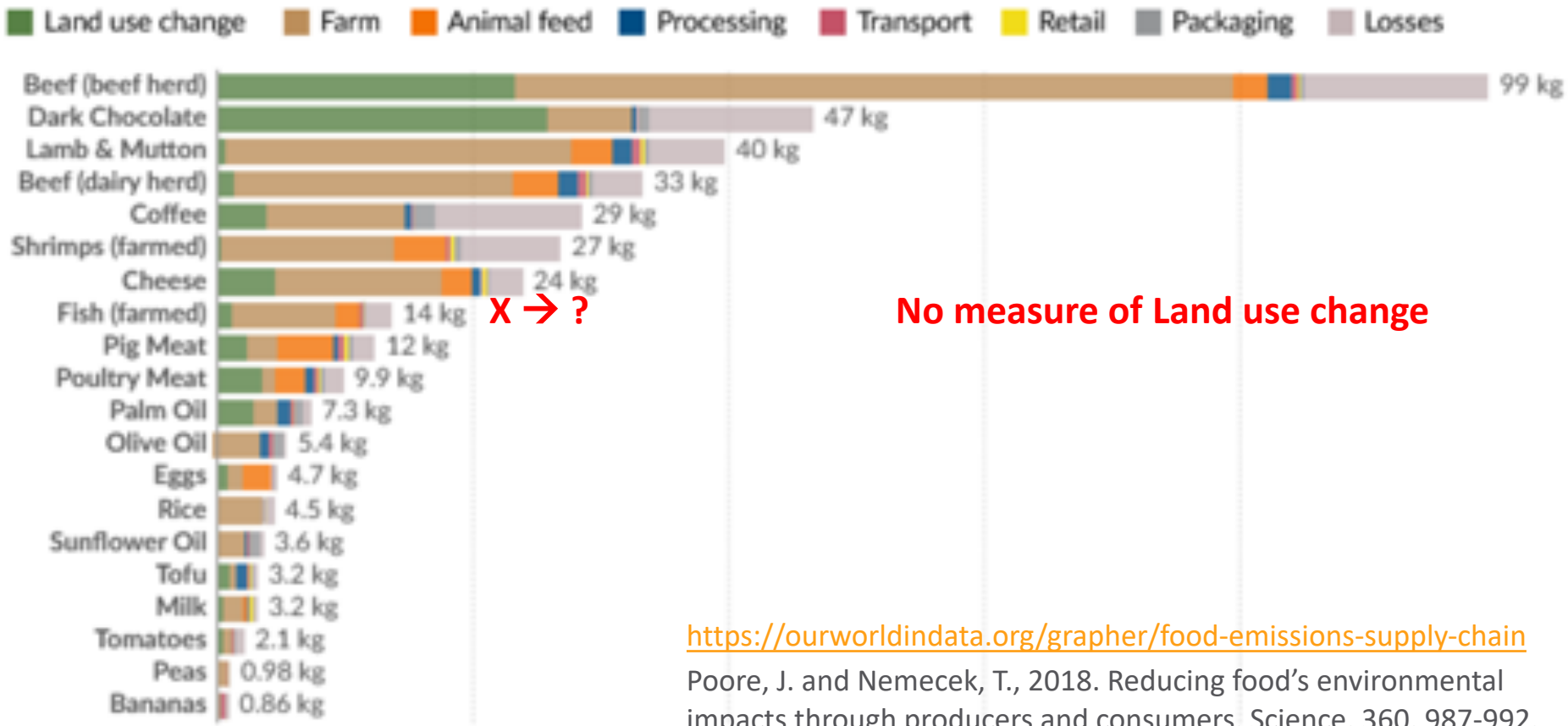

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No measure of Land use change

https://ourworldindata.org/grapher/food-emissions-supply-chain

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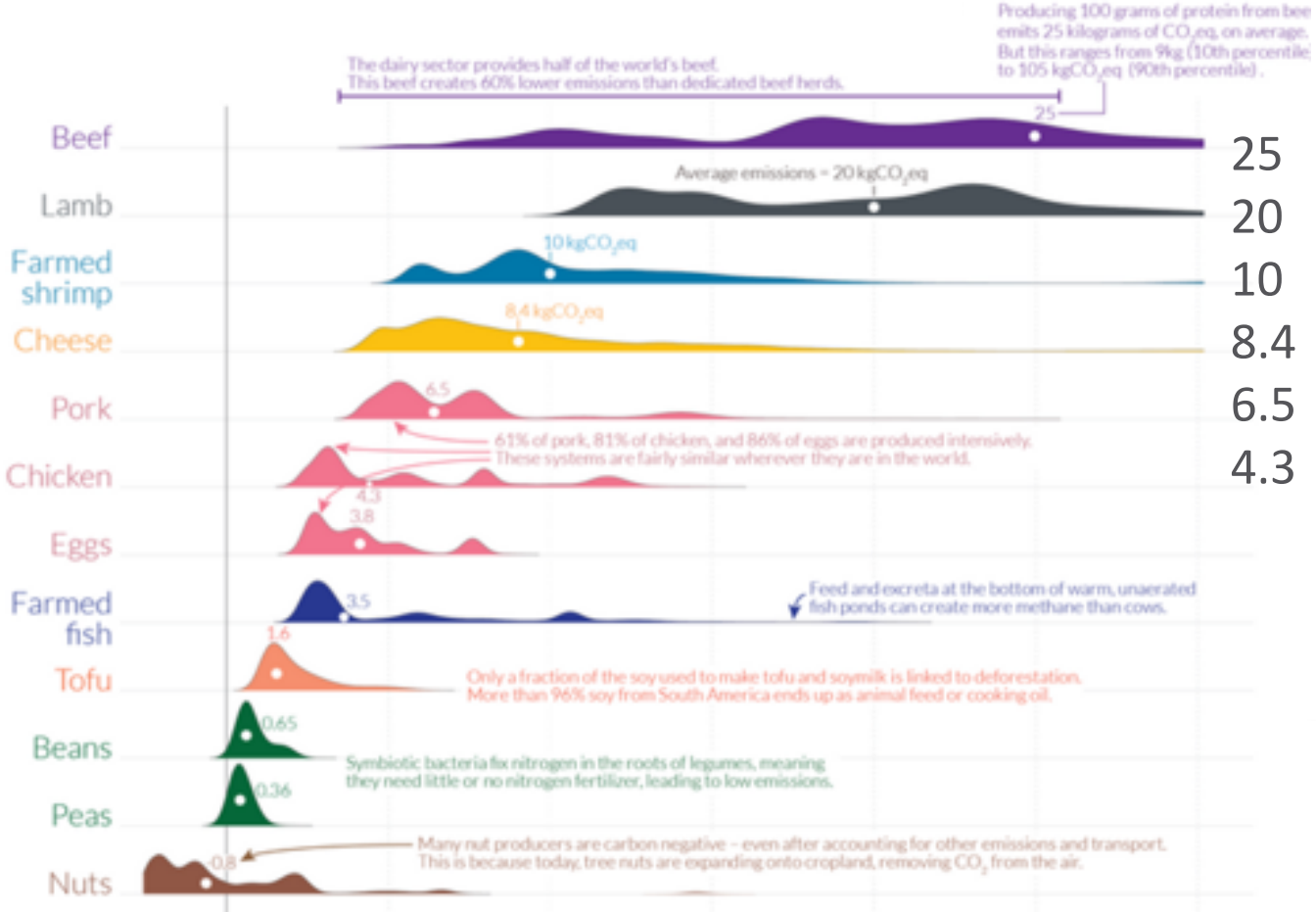
Carbon footprint of protein kg CO_2/100g protein



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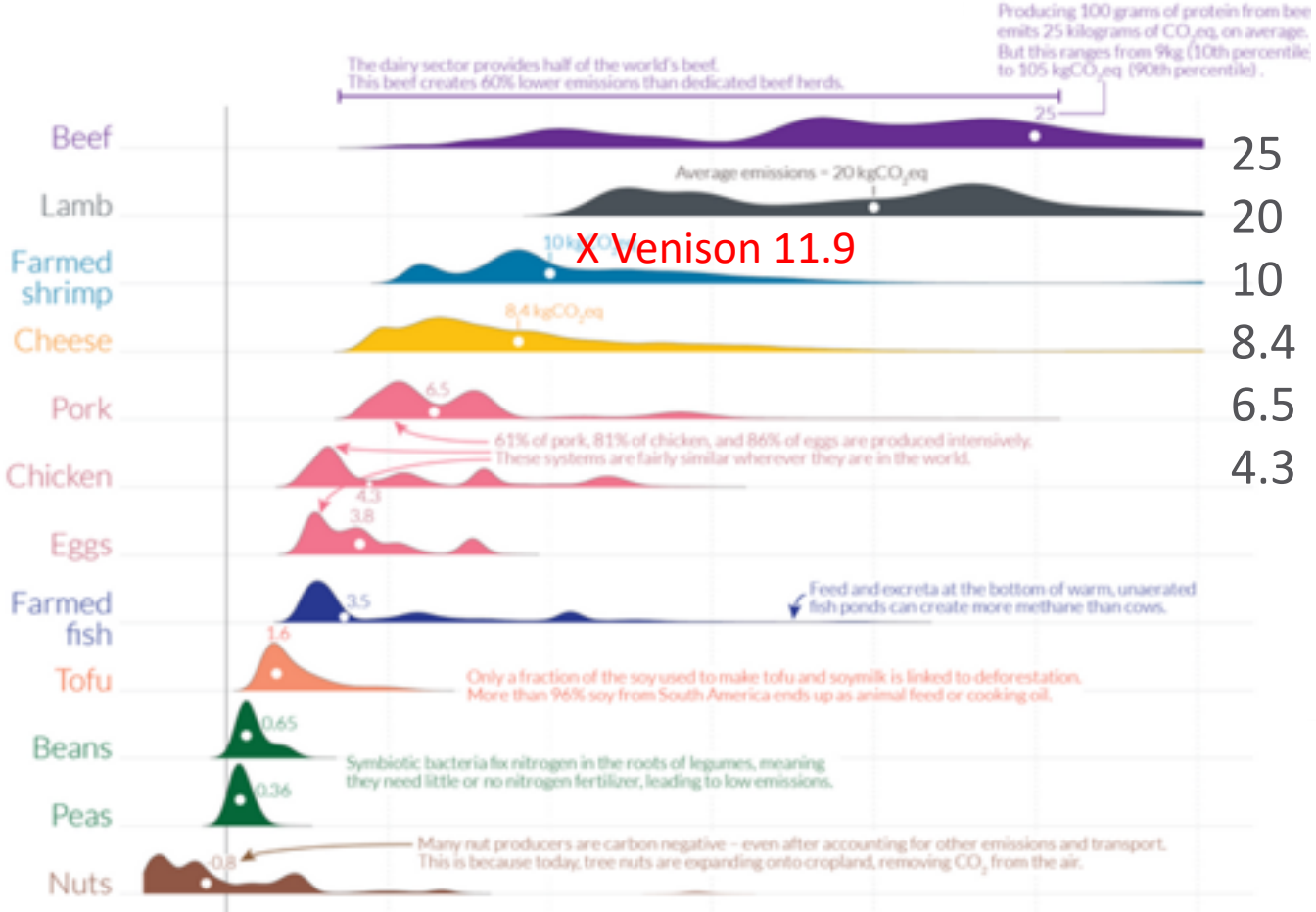

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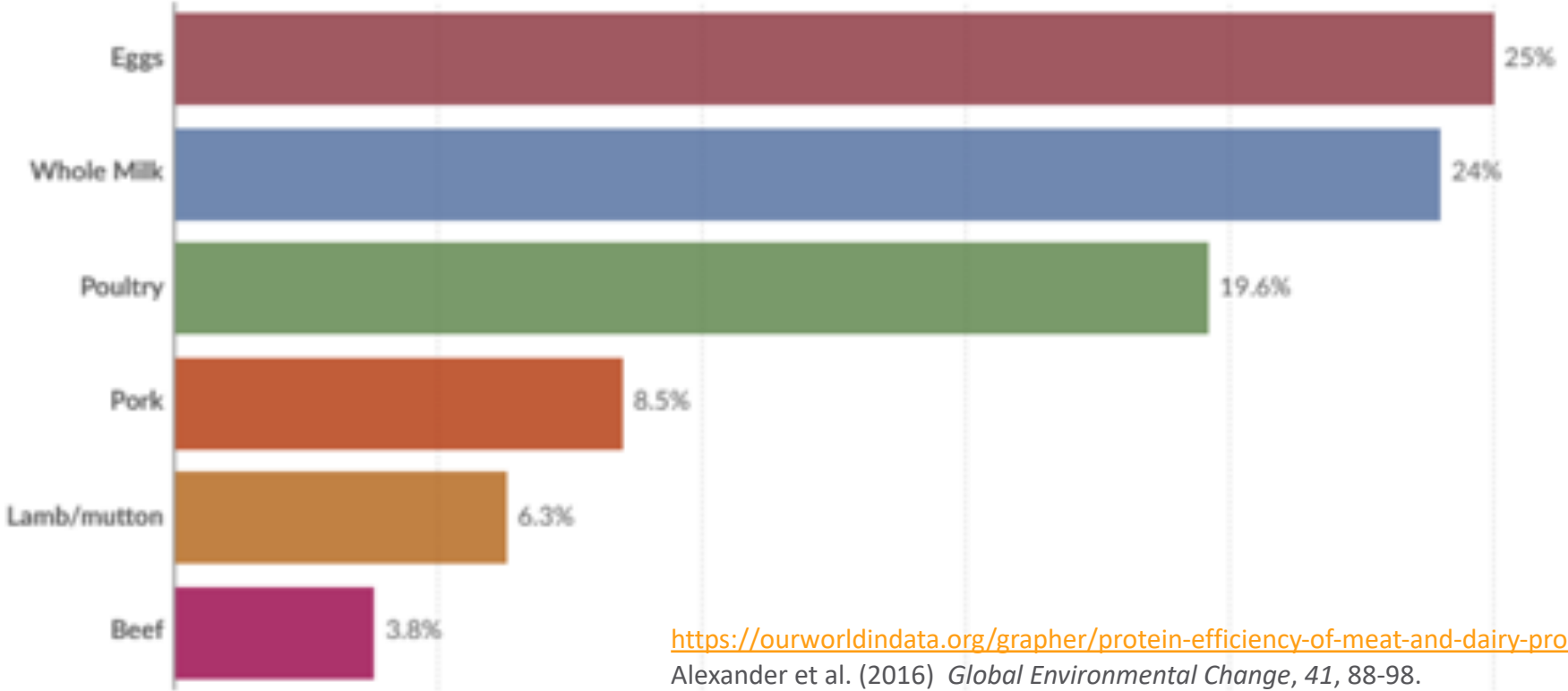
Are these comparisons valid?

- Don’t include impacts on woodland and peatlands
- Red deer numbers lower than they would be without culling
- Should you include the emissions of wild animals?
- If not, then emissions are 2.5 kg CO_2/kg or 1.1 kg CO_2 /100g protein, which puts it between tofu and beans in terms of venison’s GHG impact.

Comparisons are based on GHGs – others?

- Protein conversion efficiency



https://ourworldindata.org/grapher/protein-efficiency-of-meat-and-dairy-production

Alexander et al. (2016) *Global Environmental Change*, *41*, 88-98.

Arable land needed for protein production

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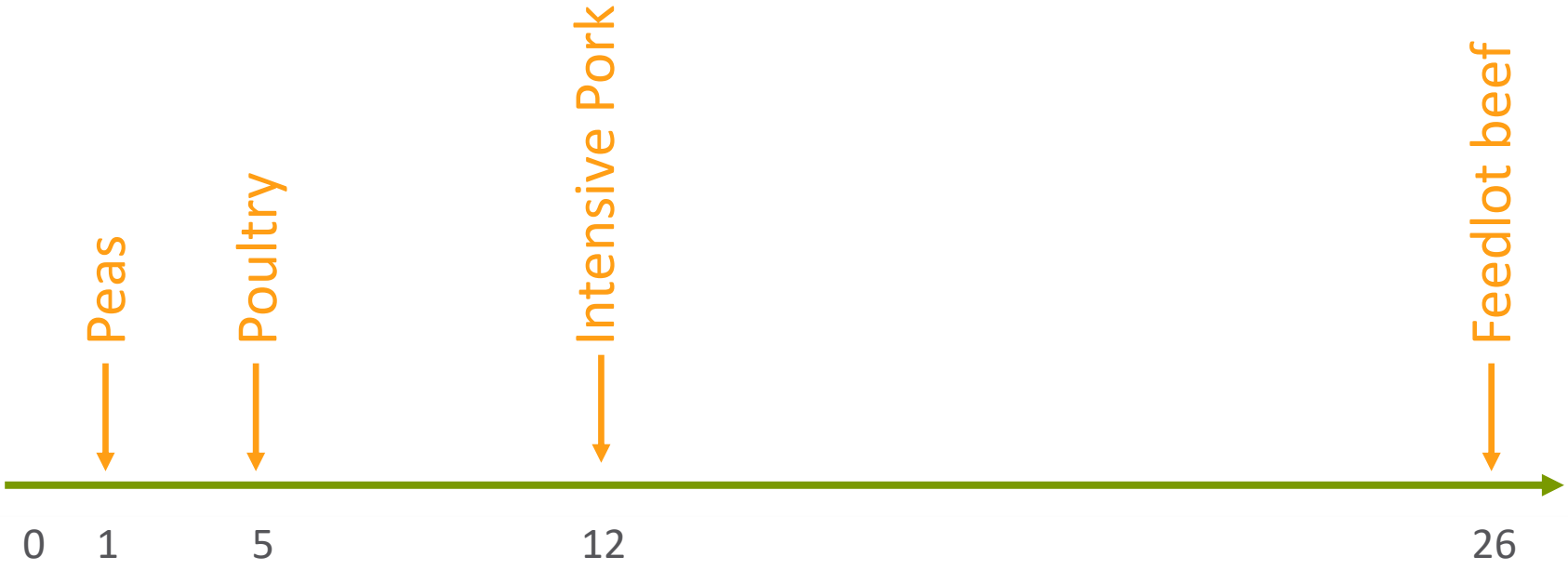

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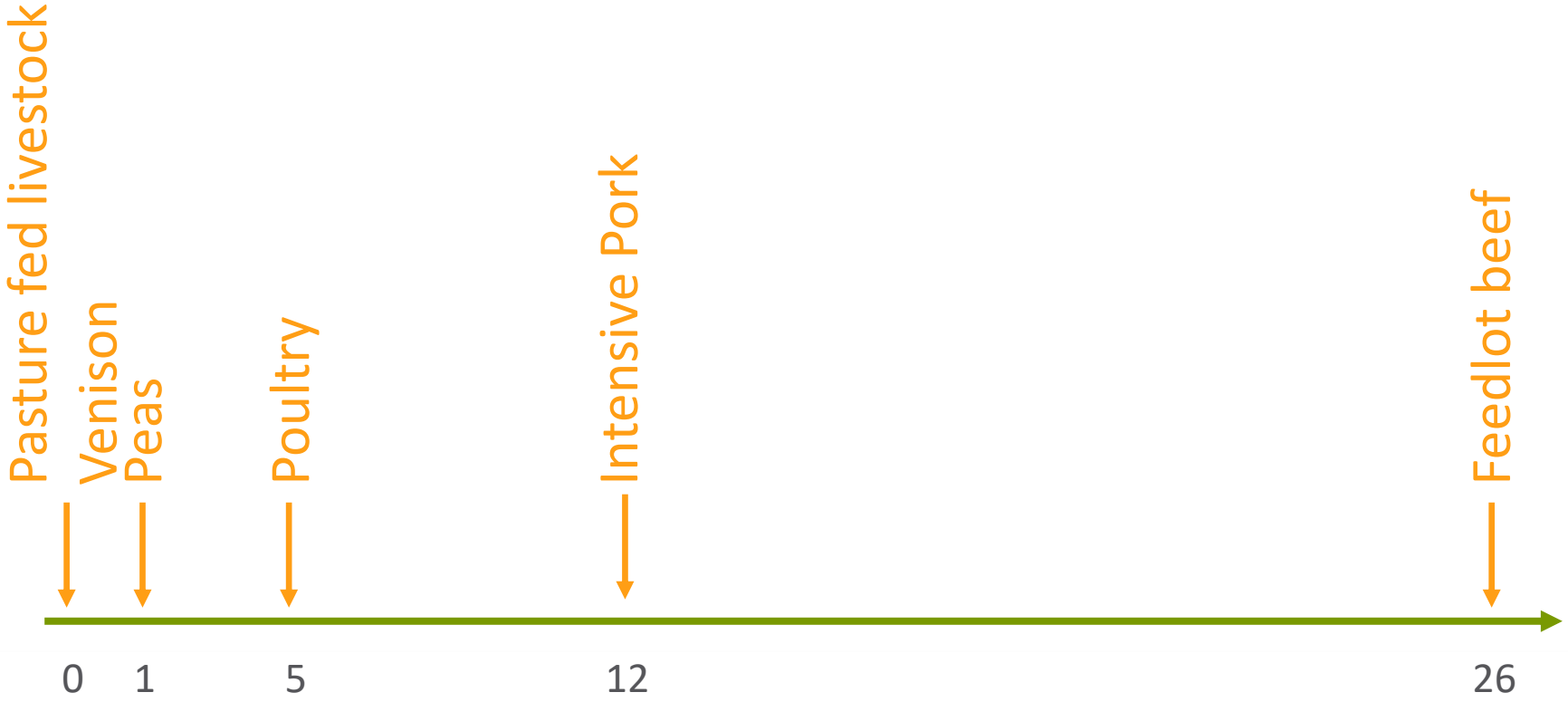

Conclusions

- Venison better than most beef and mutton in terms of GHG
- Routes to improve efficiency for estates and producers
- Insetting – woodlands* and peatland restoration
- Biodiversity impacts local not global

*https://rse.org.uk/wp-content/uploads/2024/02/RSE-inquiry-into-public-financial-support-for-tree-planting-and-forestry-2024.pdf