



Sustainability and the impact of cattle on the environment

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PhD DSc (*h.c.*) FRAGS FRASE

12th September 2024

Source: Jude L. Capper, 2024

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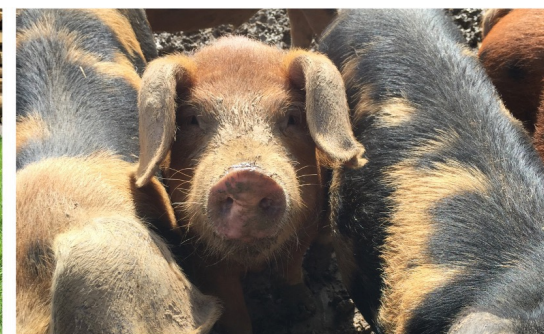
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There is no definitive sustainable livestock system – every system can be sustainable

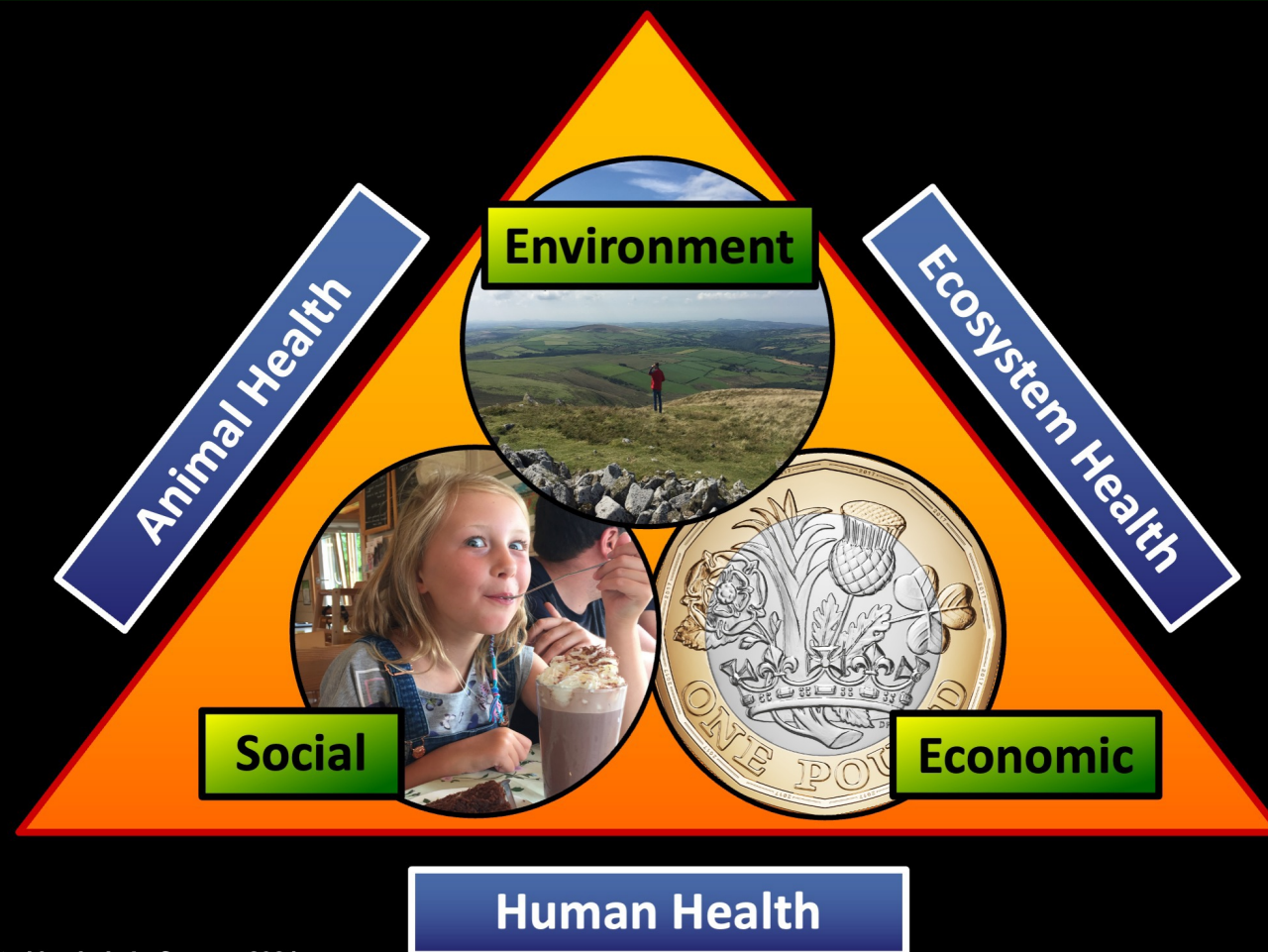
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Source: Created and photos by Jude L. Capper, 2024.

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Sustainability comprises three pillars, all under the umbrella of One Health



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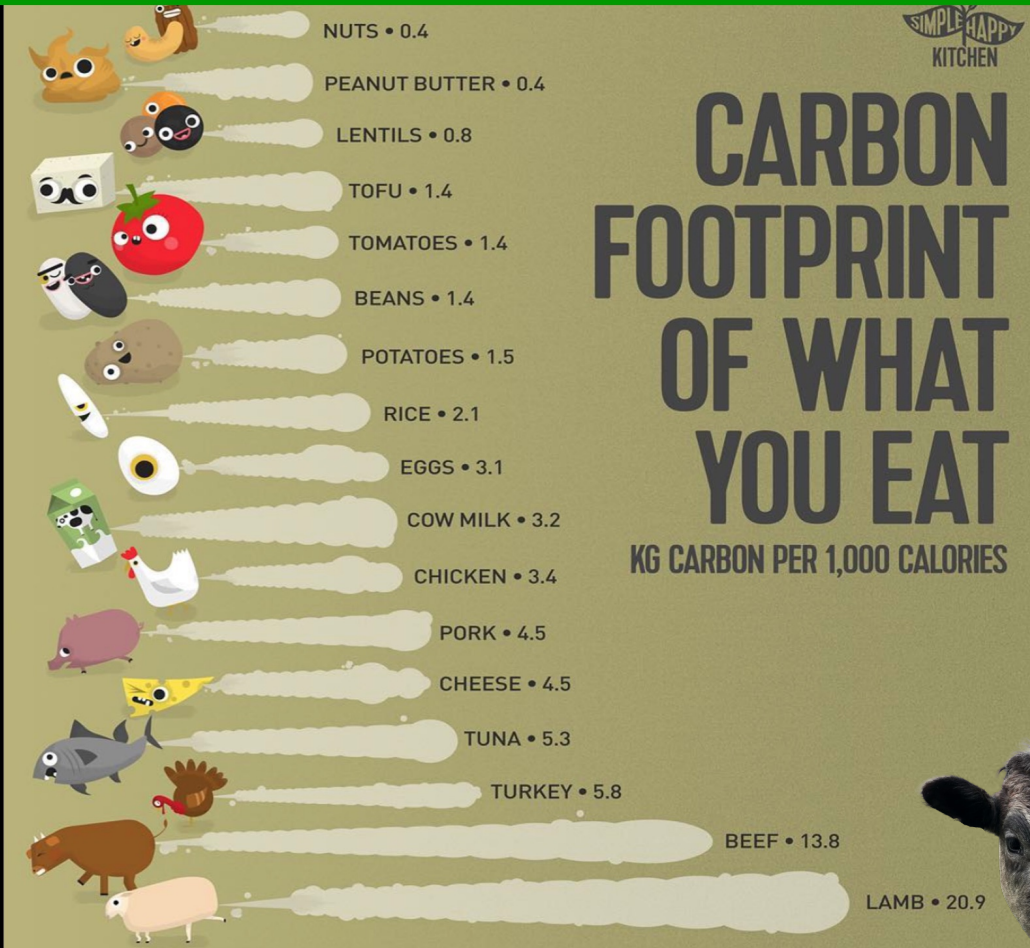
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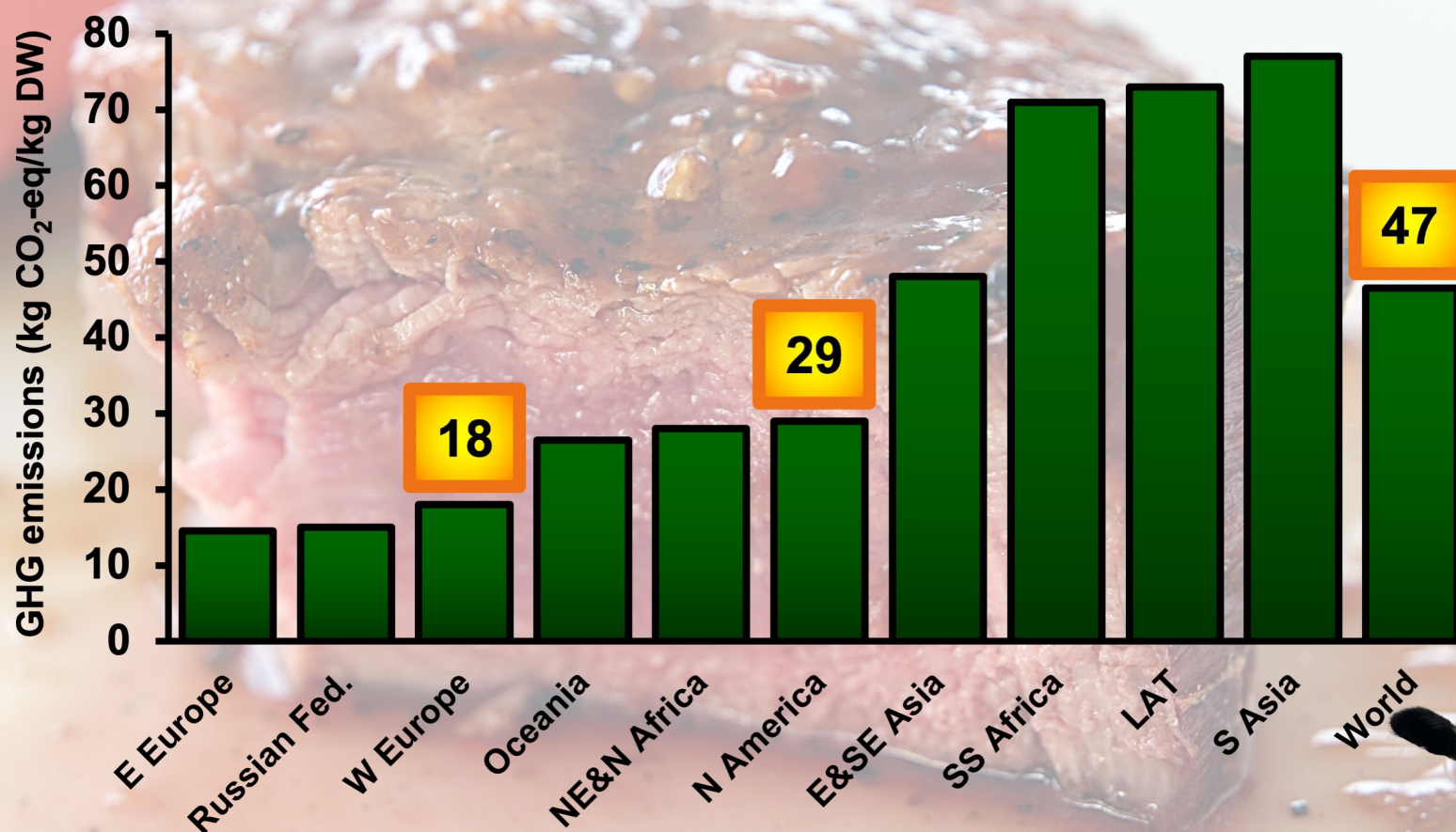
Global averages are meaningless

The carbon footprints of foods vary considerably – global average figures do not represent individual dietary choices



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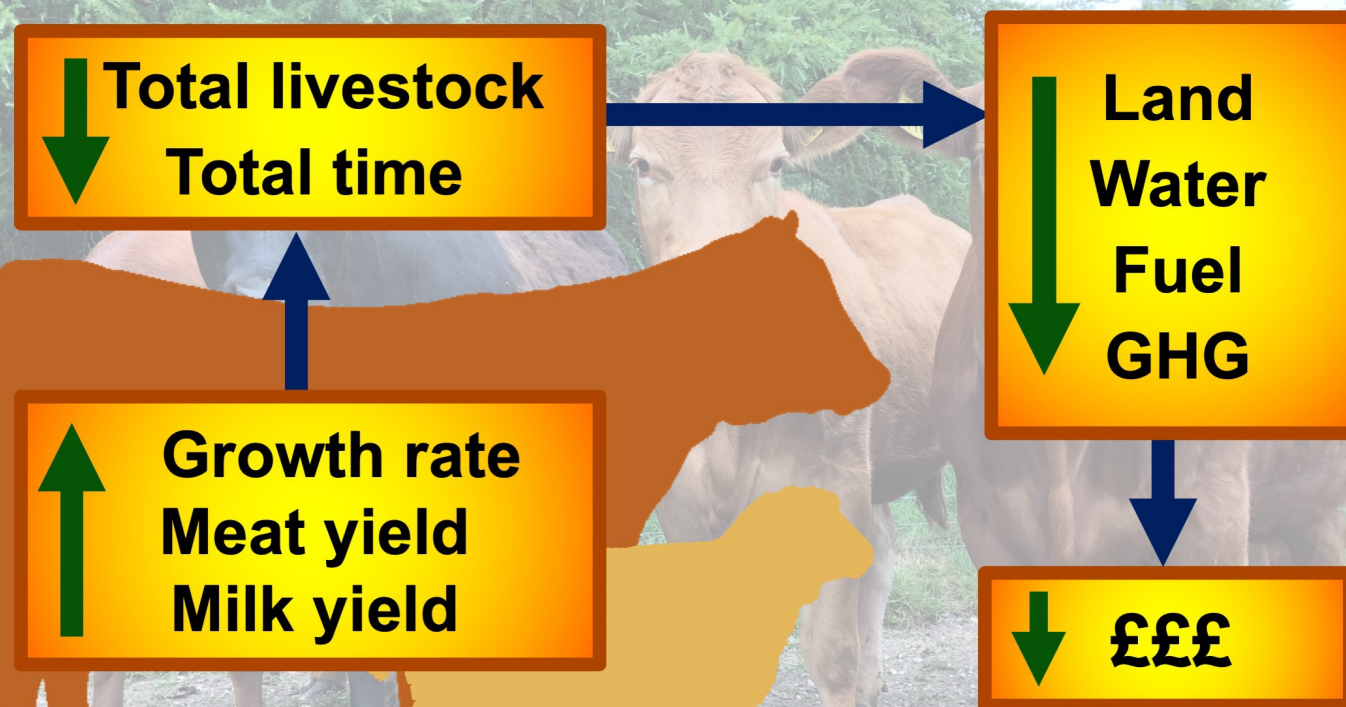
The carbon footprint of beef production varies across the globe



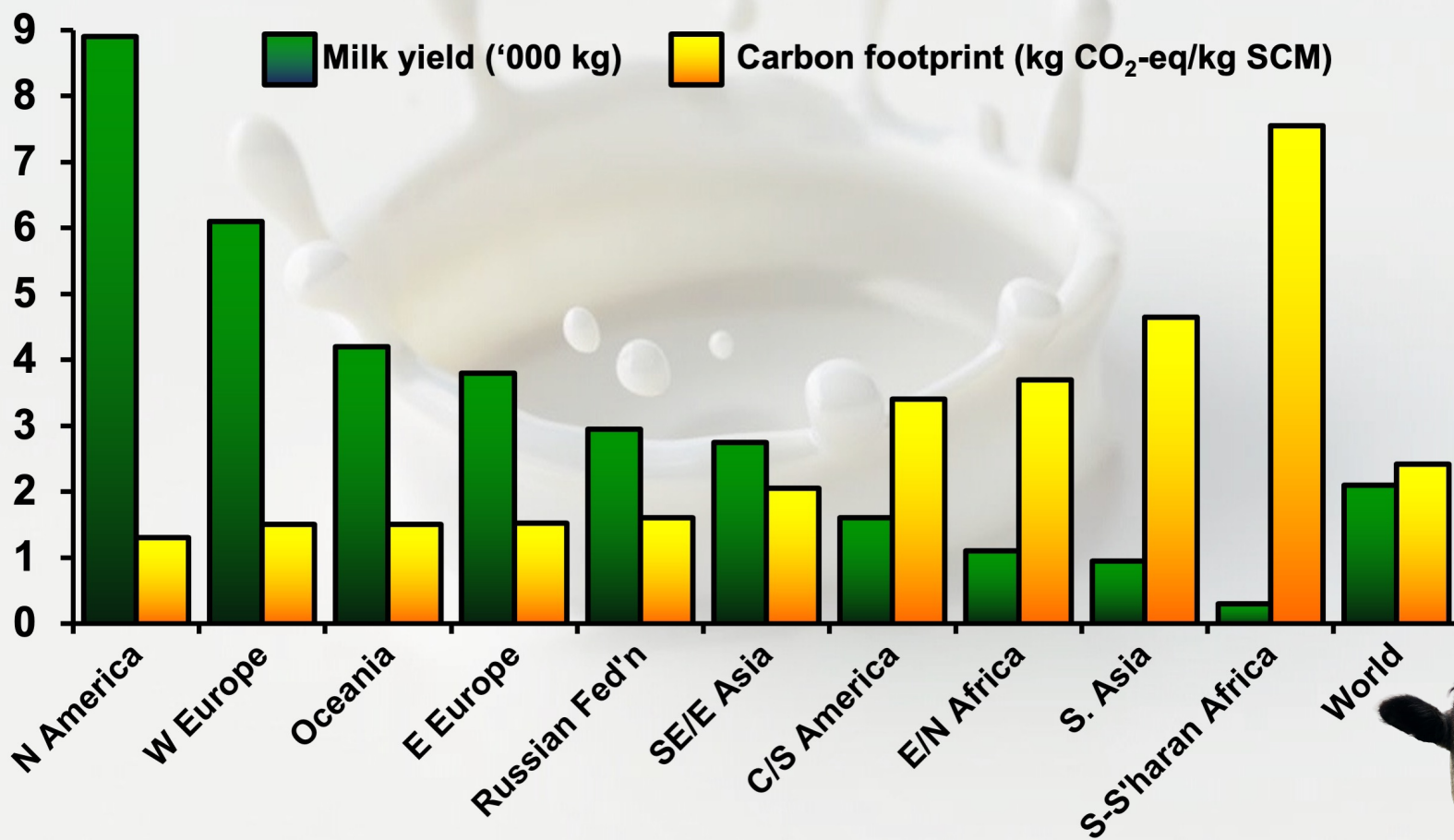
Source: Created by Jude L. Capper, 2024; data from Gerber et al. (2013) Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. FAO, Rome, Italy.

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Improving animal productivity reduces the environmental impact of milk and meat



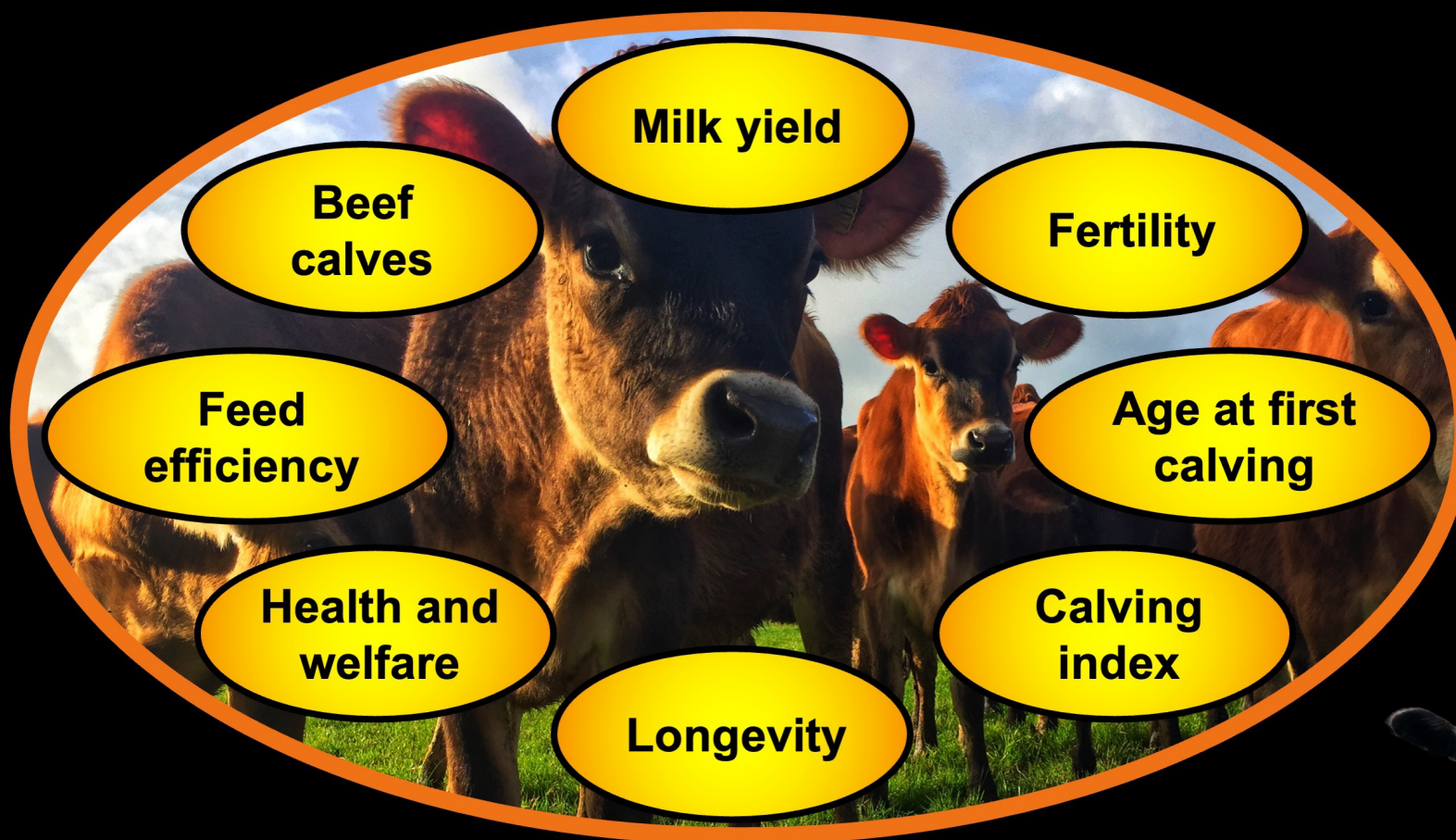
A negative correlation exists between milk yield and carbon emissions



Source: Created by Jude L. Capper, 2024. Data from FAO (2010) Greenhouse Gas Emissions from the Dairy Sector. FAO, Rome, Italy.

D

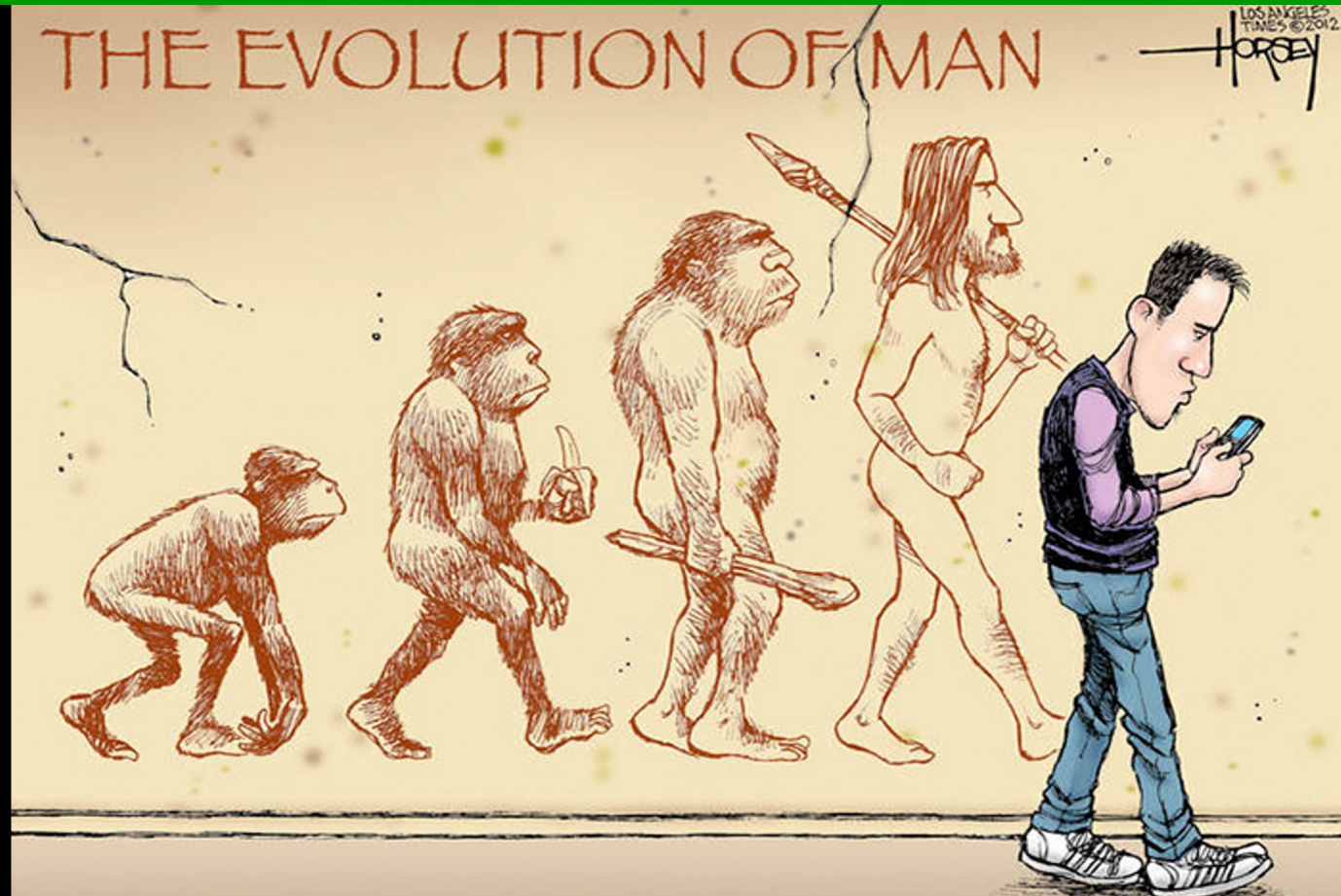
Improving key performance indicators reduces GHG emissions...but how do they compare?



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Climate science constantly evolves – new data and metrics will change food footprints



Source: Created by Jude L. Capper, 2024. Cartoon from: https://static.boredpanda.com/blog/wp-content/uploads/2016/02/funny-satirical-evolution-charles-darwin-day-251__700.jpg

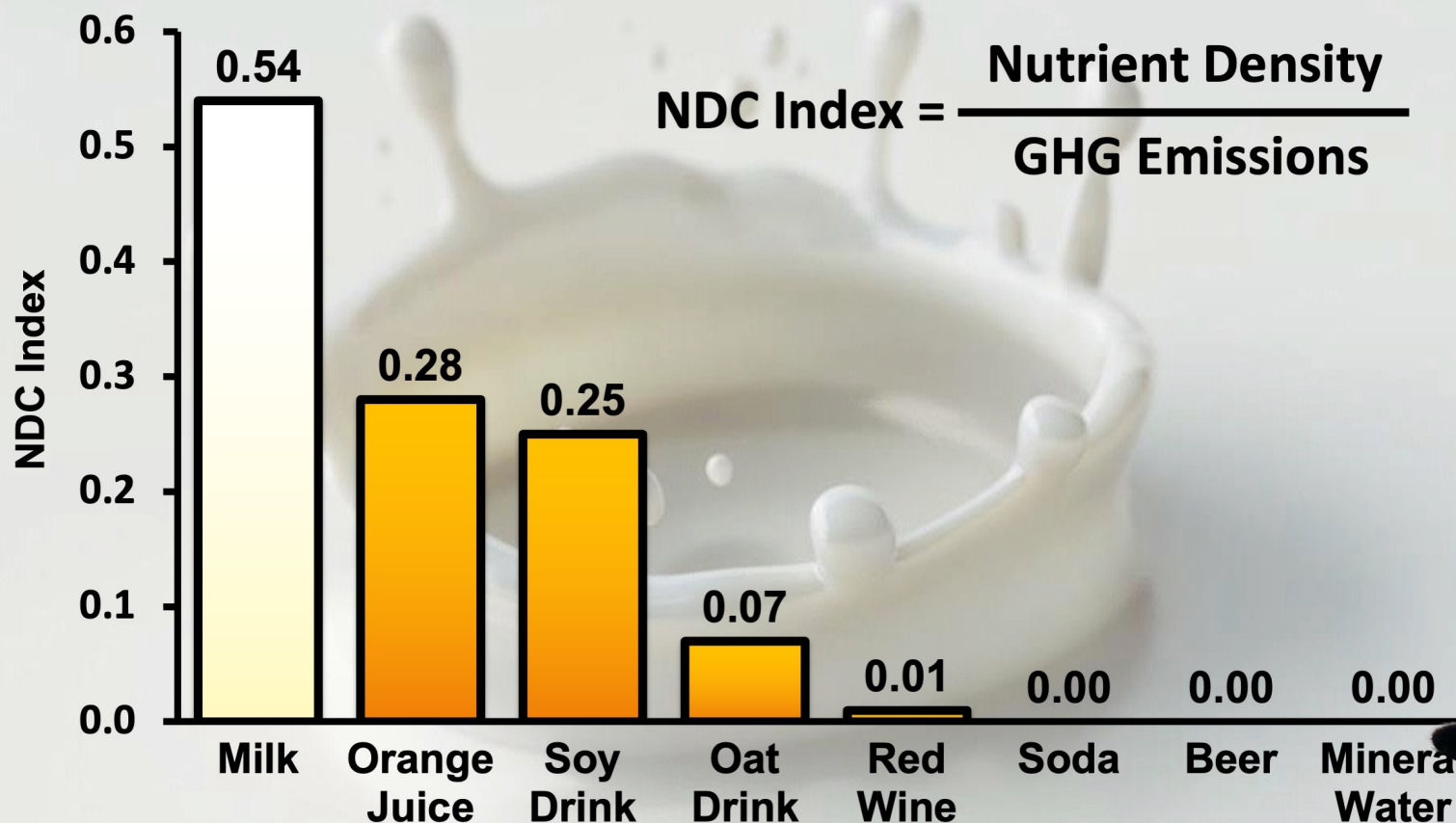


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Drinks vary in nutrient density and greenhouse gas emissions

	Nutrient density	Carbon footprint g CO ₂ /100 g drink
Whole milk	53.8	99
Orange juice	17.2	61
Soya juice	7.6	30
Oat juice	1.5	21
Red wine	1.2	204
Soda	0.0	109
Beer	0.0	101
Water	0.0	10

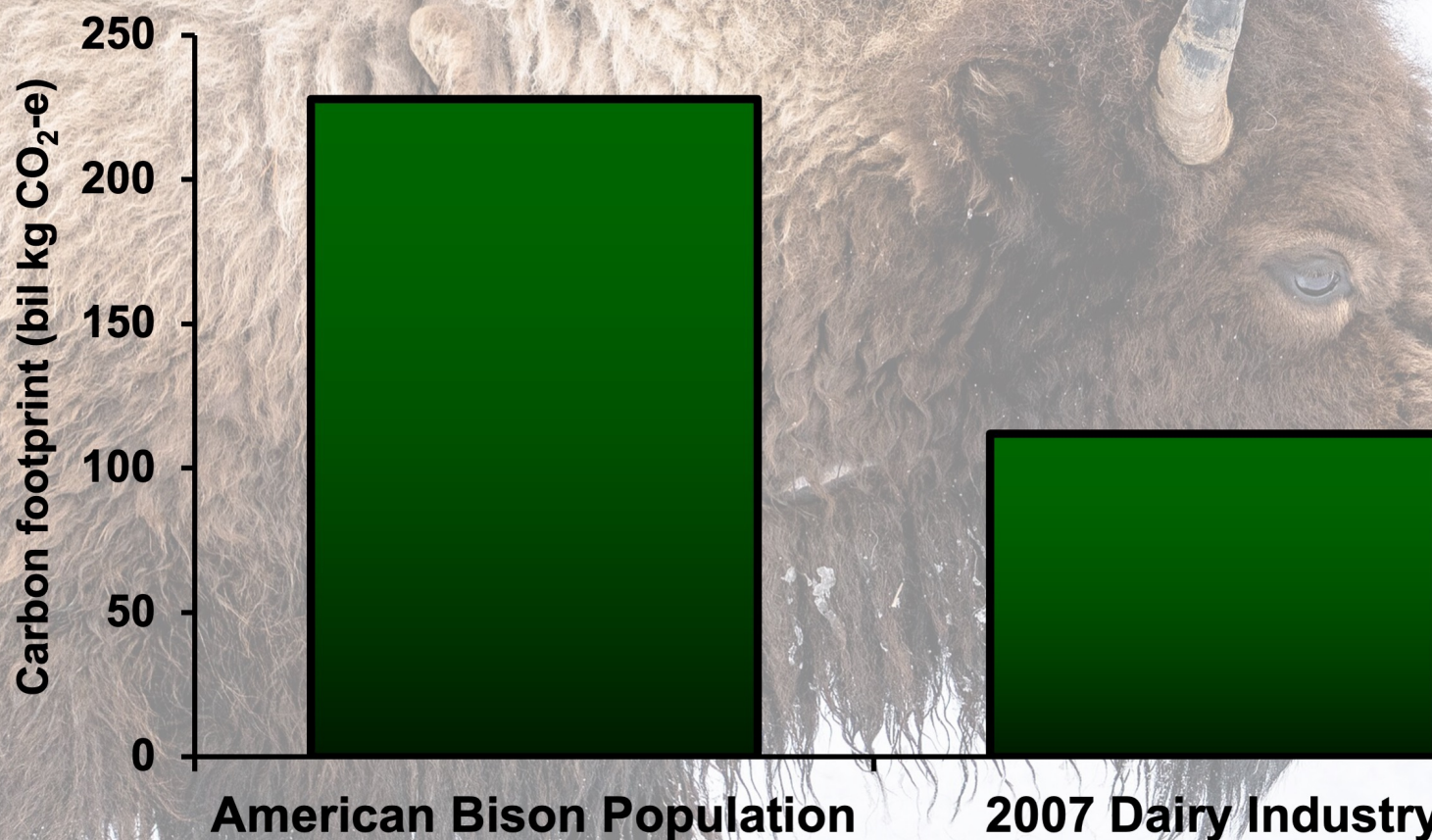
Nutrient density should be included when assessing carbon footprint



Source: Created by Jude L. Capper, 2023. Data from: Smedman et al. (2010). <https://doi.org/10.3402/fnr.v54i0.5170>

D

Historical bison population had GHG emissions twice that of the 2007 US dairy industry



Source: Created by Jude L. Capper, 2023. Data from Capper (2011) <https://doi.org/10.2527/af.2011-0009> based on the bison population in 1800. Photo from: Aleksomber, CC BY-SA 4.0 <<https://creativecommons.org/licenses/by-sa/4.0/>>, via Wikimedia Commons.

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We need to be realistic about opportunities
and limitations for reducing emissions

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Source: Created by Jude L. Capper, 2024.

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We need to be realistic about opportunities
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Source: Created by Jude L. Capper, 2024.

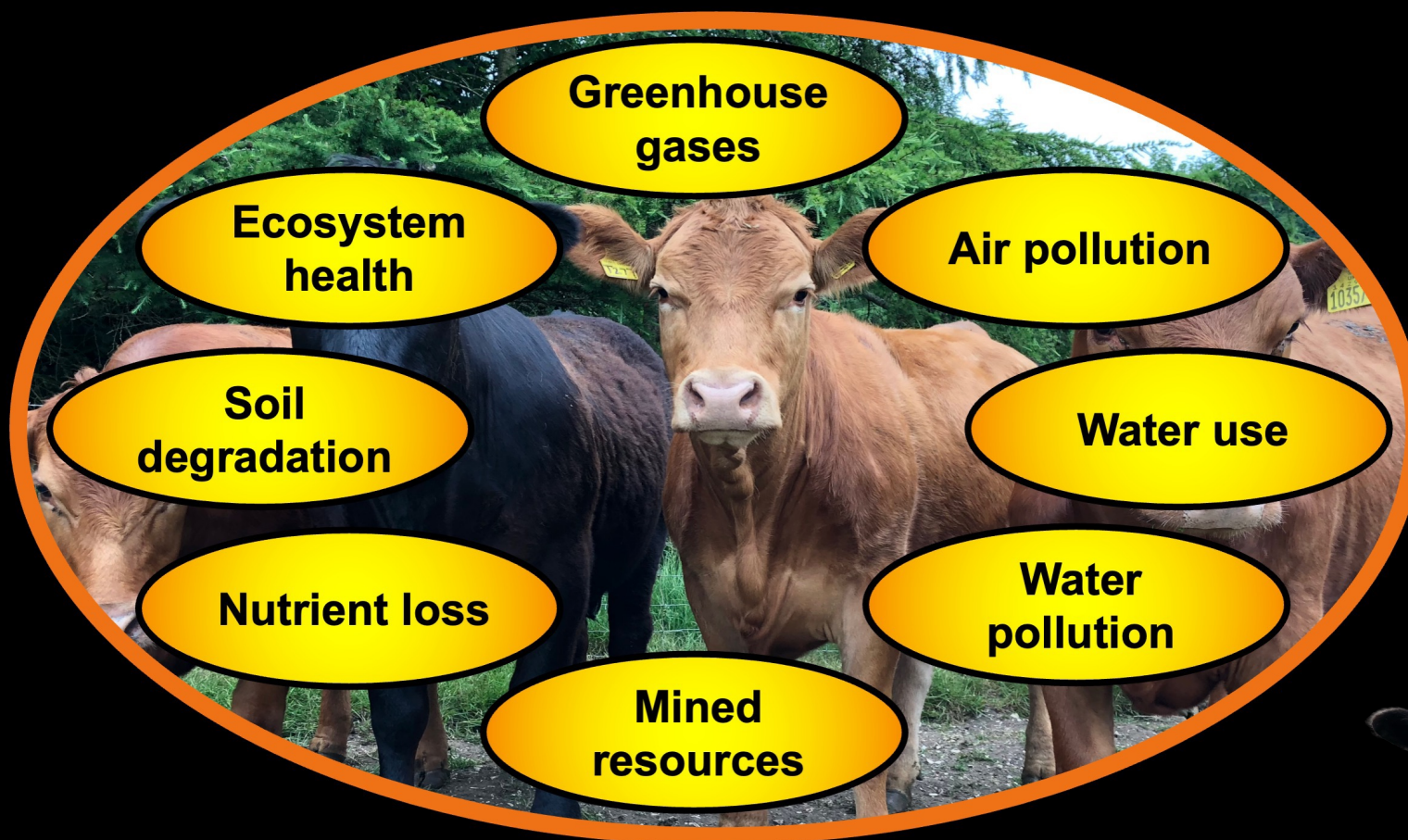
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Environmental impacts are not limited to greenhouse gas emissions



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Can we grow human food crops everywhere?

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Source: Created by Jude L. Capper, 2024

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Can we grow human food crops everywhere?

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Source: Created by Jude L. Capper, 2023



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>60% of UK land is not suitable for growing arable crops

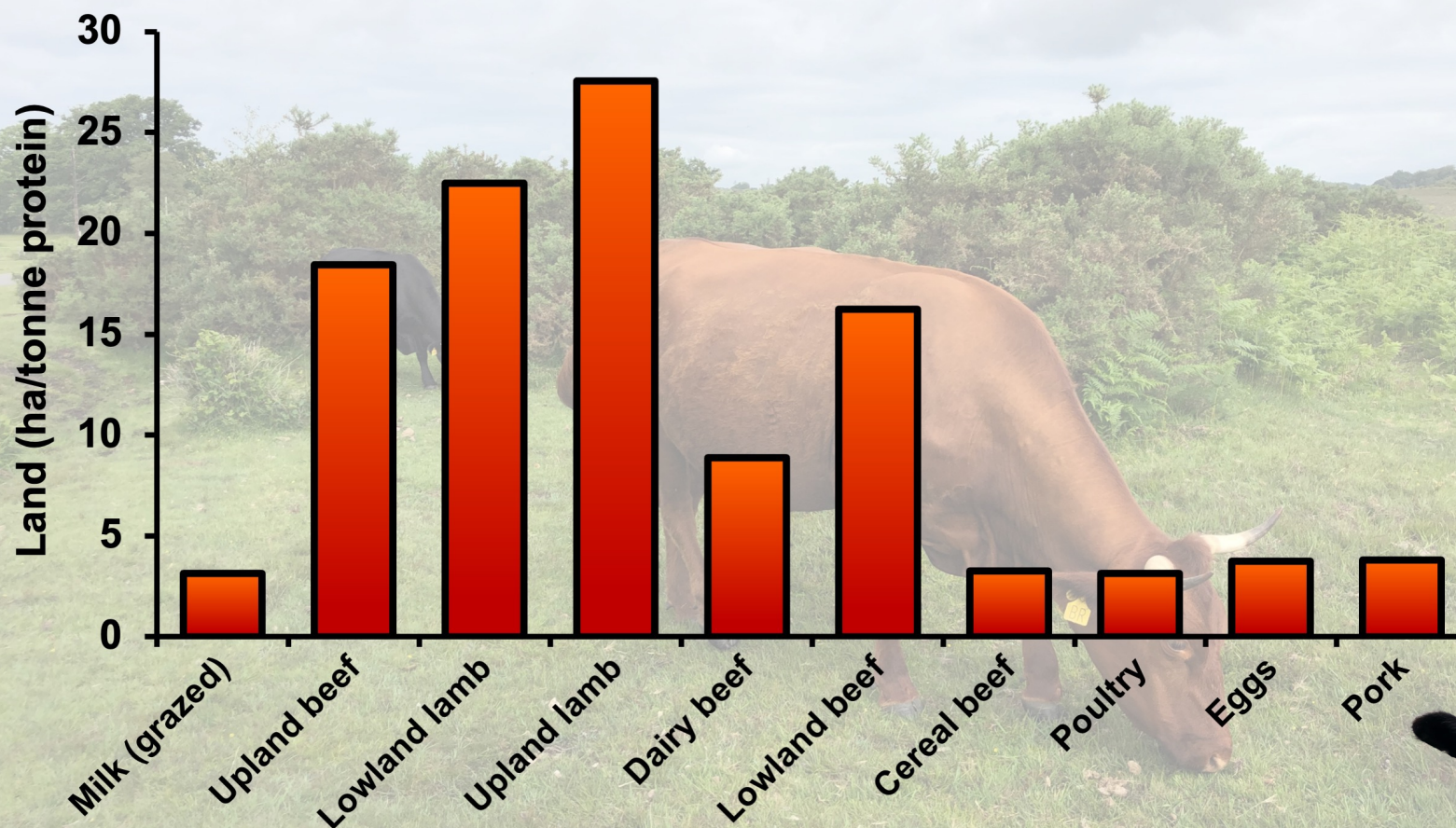


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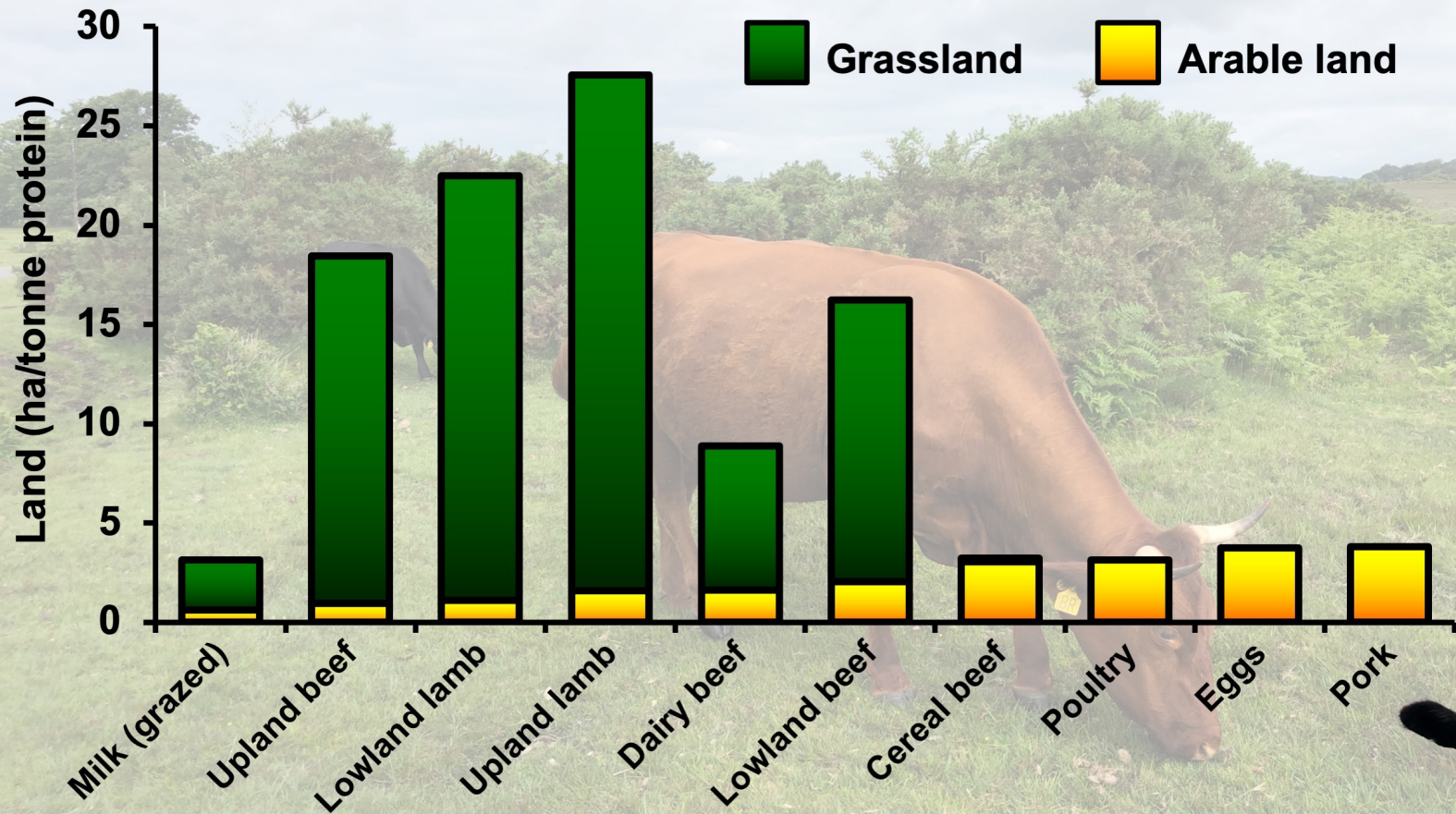
Livestock systems vary widely in land use





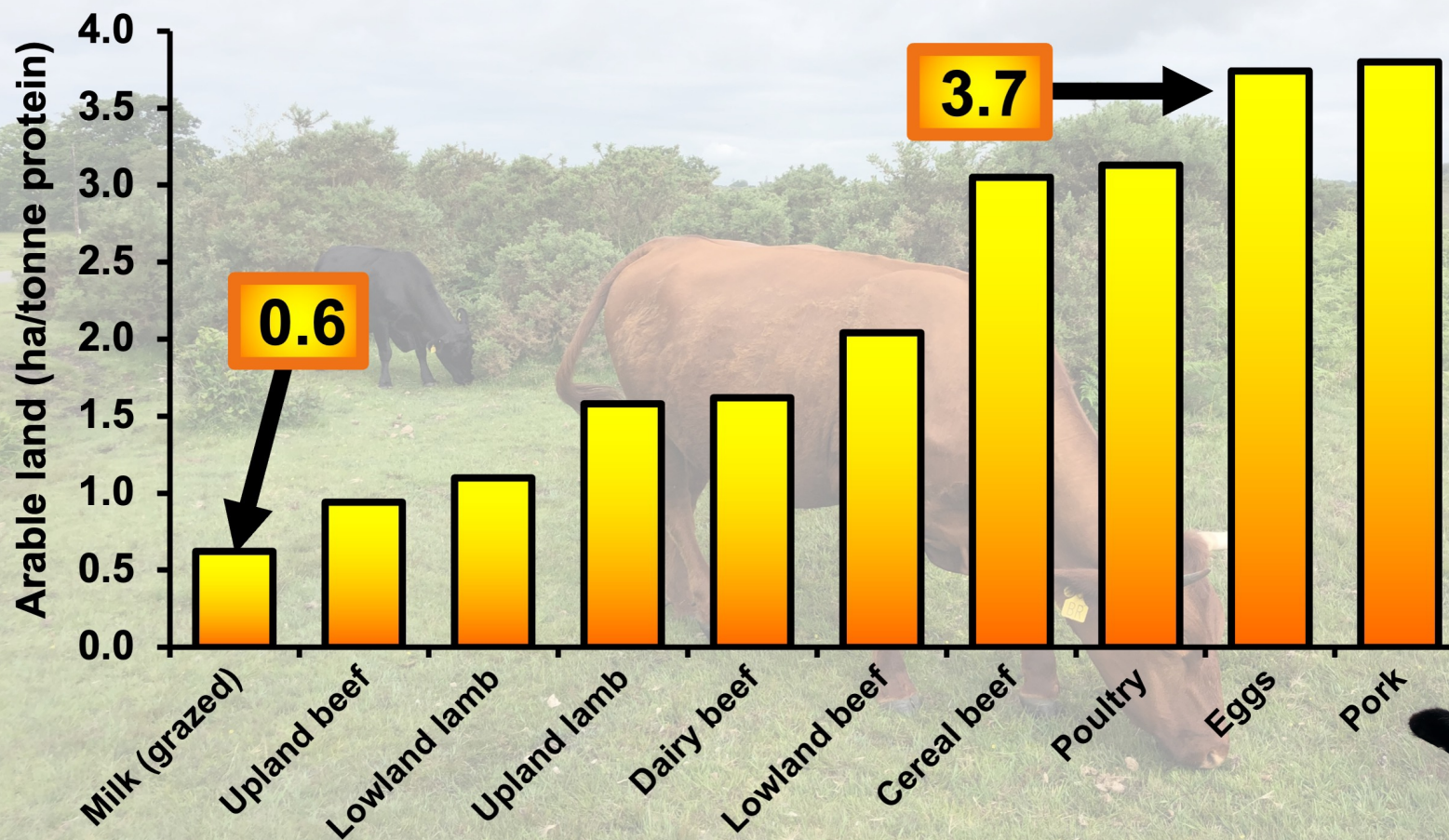
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Livestock systems vary widely in arable and grassland use



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Livestock systems vary widely in arable land use



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Feed efficiency is one of the principal issues
used to denigrate animal agriculture

IF EVERY
AMERICAN
STOPPED
EATING MEAT
THERE WOULD
BE ENOUGH
GRAIN TO FEED
1.4 BILLION
PEOPLE

#IMAGREENMONSTER

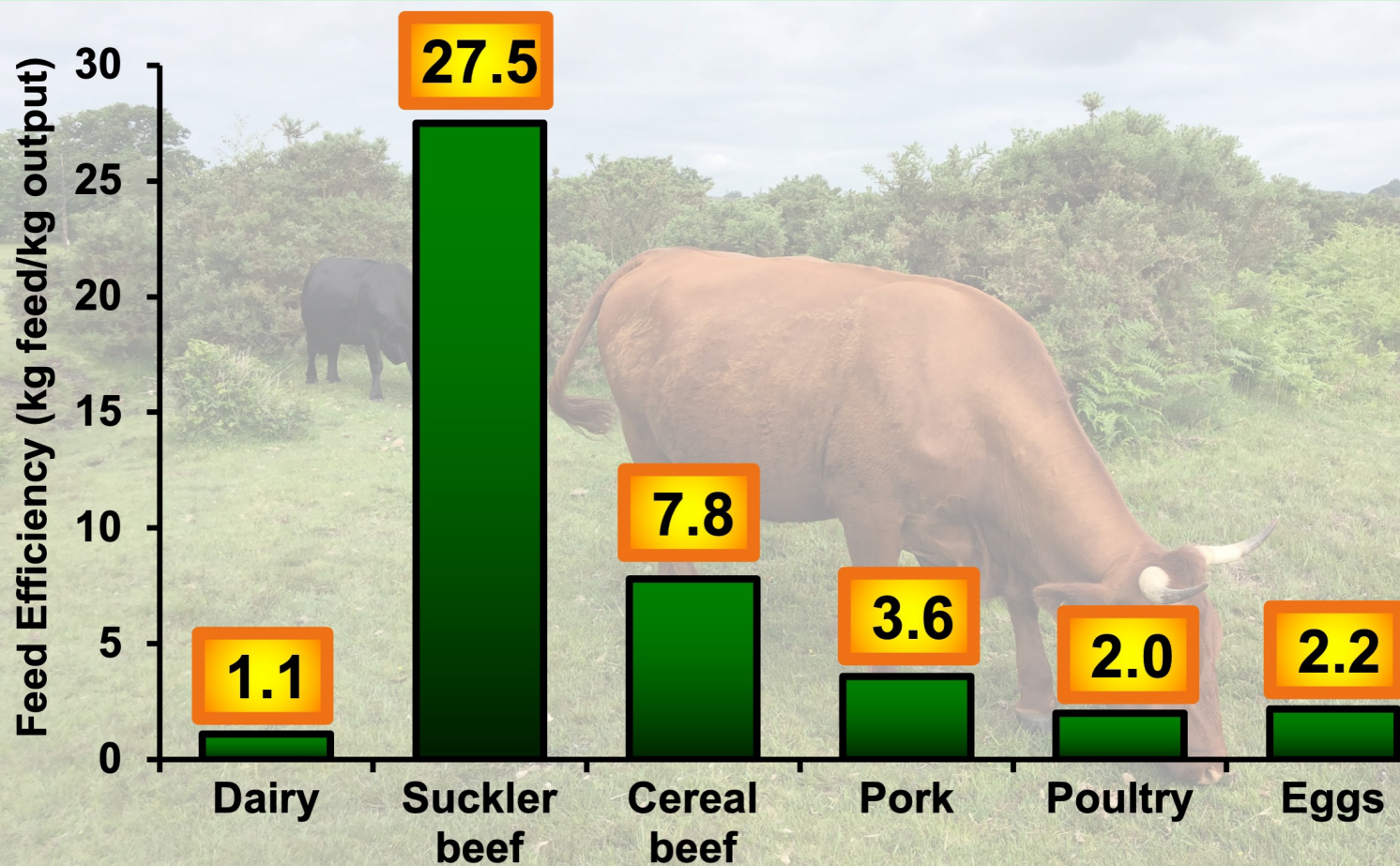
Source: Created by Jude L. Capper, 2024. Infographic from <https://www.onegreenplanet.org/animalsandnature/eat-for-the-planet-meat-and-the-environment/>

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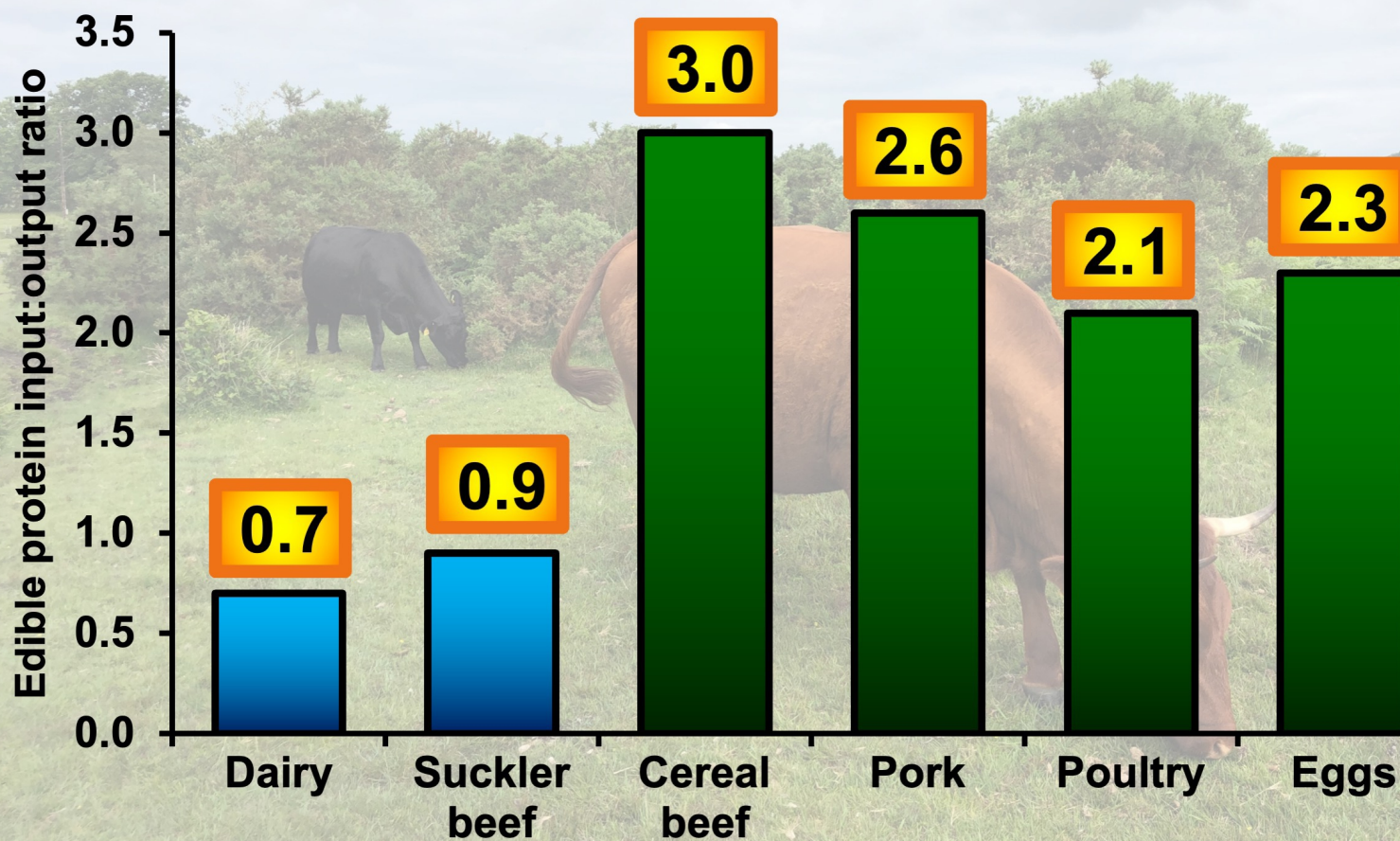
Feed efficiency ratios vary between systems and species



Source: Created by Jude L. Capper, 2023; data from Wilkinson (2011) <https://doi.org/10.1017/S175173111100005X>

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Grazing cattle systems produce more human-edible protein than they consume



Source: Created by Jude L. Capper, 2024; data from Wilkinson (2011) <https://doi.org/10.1017/S175173111100005X>

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Removing cattle from pasture disadvantages ground-nesting birds



Source: Created by Jude L. Capper, 2024. Photo from Odd Falch <https://www.pexels.com/photo/brown-bird-on-brown-grass-12084162/>

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Dung beetles have myriad ecosystem benefits

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Source: Created by Jude L. Capper, 2024.

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(Almost) all of our food comes from the soil

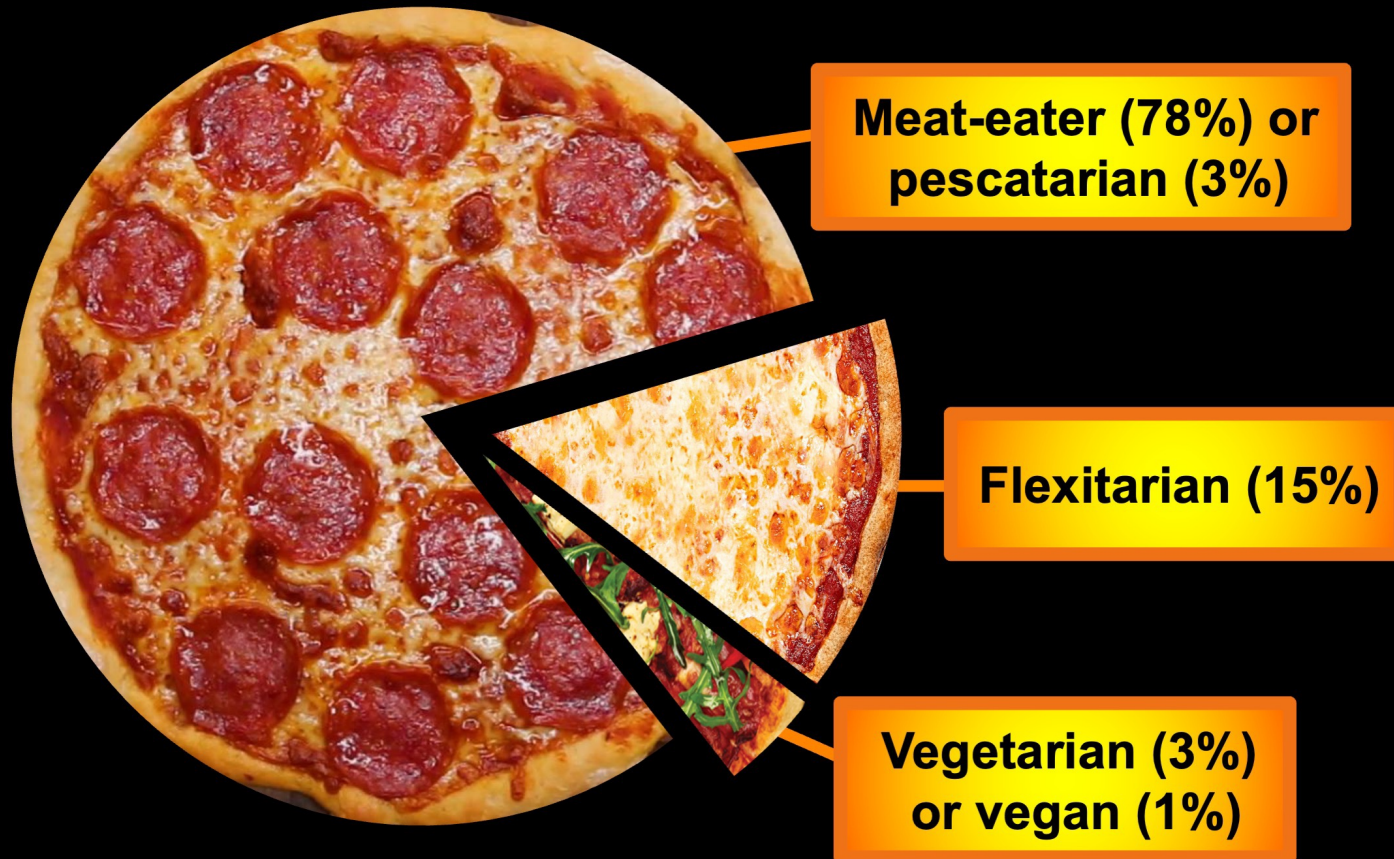
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Source: Created by Jude L. Capper, 2024.

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The future probably isn't vegan, but it may be flexitarian?



Source: Created by Jude L. Capper, 2024. Data from YouGov (2019) Is the future of food flexitarian? <https://yougov.co.uk/topics/resources/articles-reports/2019/03/18/future-food-flexitarian> Question: "Which, if any, of these best describes your usual eating habits?" Results adjusted for people who answered "don't know" (3%) or "other" (3%).



COM

Guilt is a primary motivator for people considering going vegetarian or vegan

"I sometimes feel guilty when consuming meat and dairy products"

66% of meat-eaters and flexitarians thinking of giving up meat said "yes" compared to 25% of national population

**No guilt
34%**

**Feel guilty
66%**

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Source: Created by Jude L. Capper, 2023. Information from YouGov (2019) Is the future of food flexitarian?
<https://yougov.co.uk/topics/resources/articles-reports/2019/03/18/future-food-flexitarian>

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Bad news bias – do we believe all that we read/see?



TRACEY ALISON
@TRACEYALISON1

Follow

This calf is about to be killed with a bolt gun.
Give a [redacted] & go #vegan



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Source: Created by Jude L. Capper, 2024. Screenshot from Twitter.

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Do 706,965 Veganuary participants in 2023 amount to more than a hill of beans?

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NEW YEAR'S
REVOLUTION**



- Total is equal to 1.95x the population of Coventry
- If all participants were based in the UK they would comprise 1.05% of the population
- Average of 3,663 per participating country
- 60% of participants already vegan, vegetarian or pescatarian



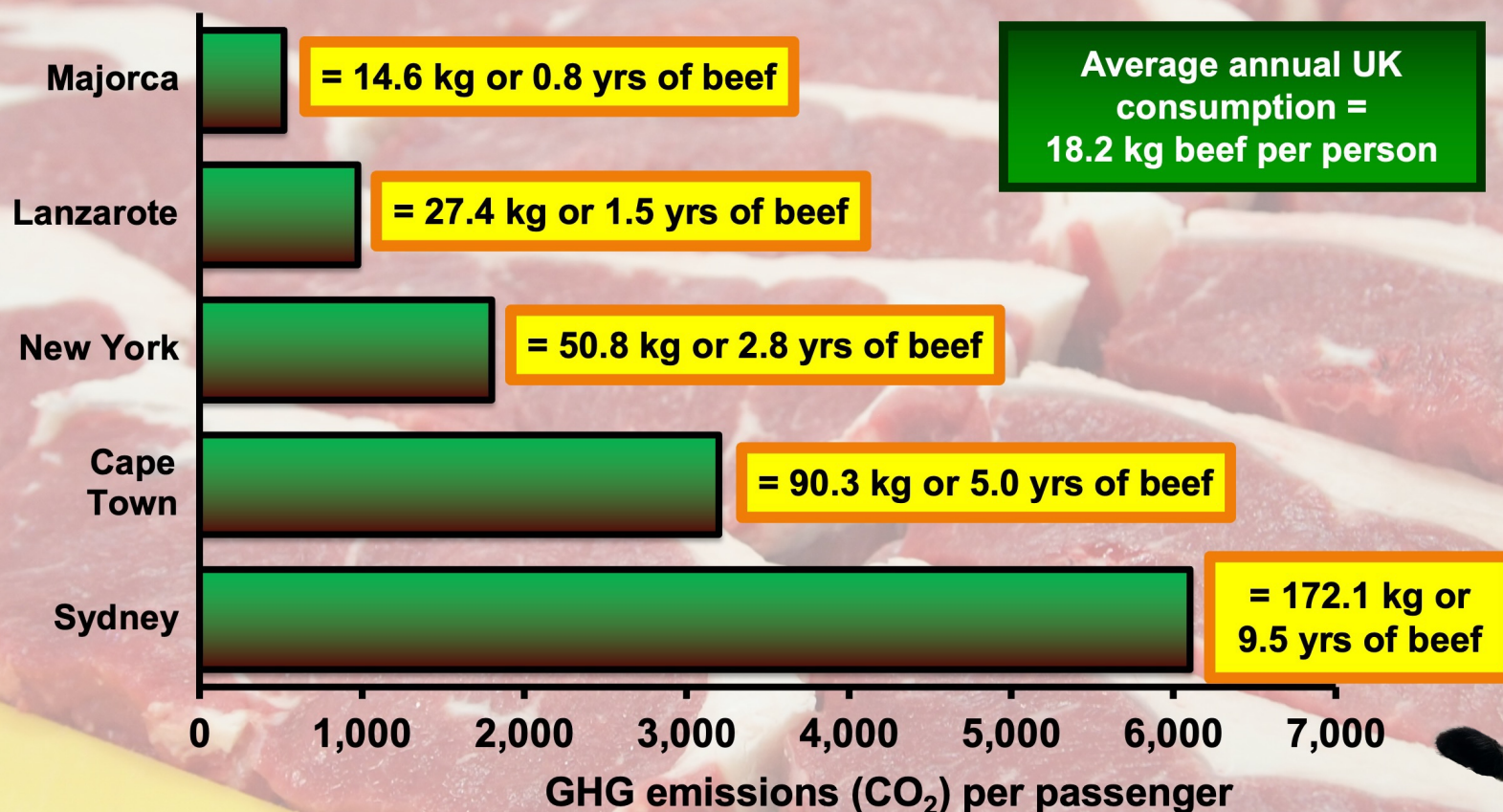
Source: Created by Jude L. Capper, 2023. Information from: <https://veganuary.com/blog/>

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International flights emit considerable quantities of carbon compared to beef production



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Thank you!

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Questions?

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Source: Created by Jude L. Capper, 2024. Cartoon from: <http://snipurl.com/methanecartoon>