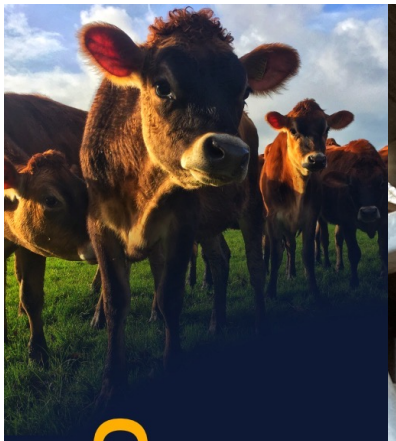

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US and EU commitments for reducing methane emissions – is reducing the beef cow herd the answer?

23rd May 2022

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Source: Dr. Jude L. Capper, 2022

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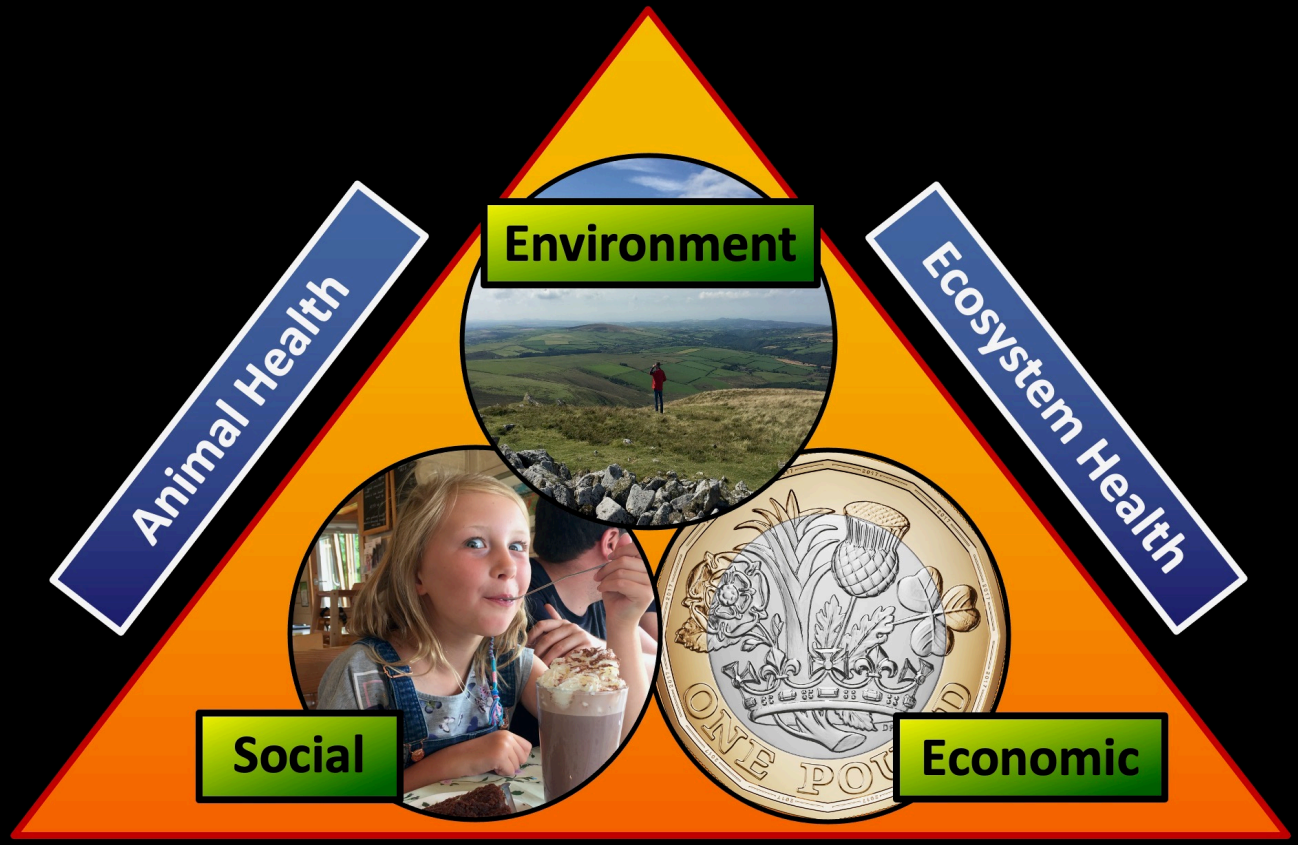
Sustainability comprises three pillars, all under the umbrella of One Health



Source: Created by Dr. Jude L. Capper, 2020.

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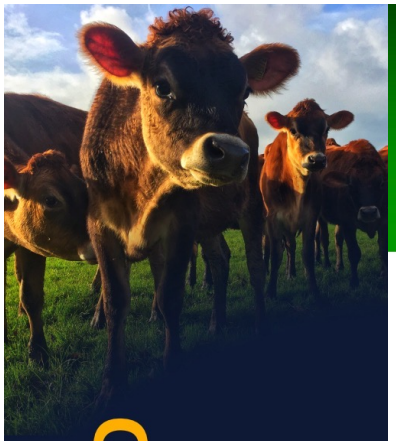

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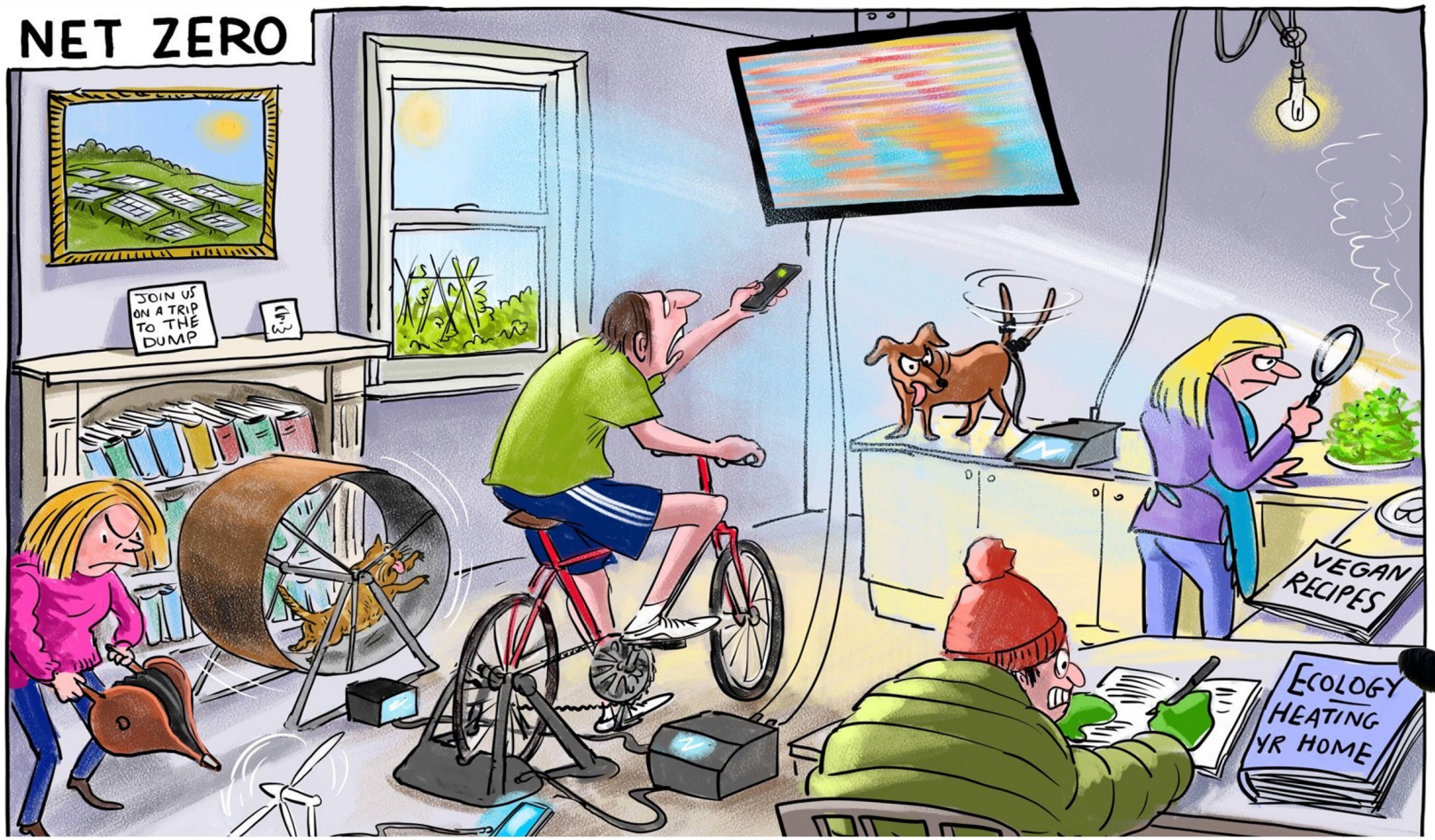
Net Zero is a clear priority



Source: Created by Dr. Jude L. Capper, 2021. Cartoon from: https://twitter.com/Cartoon4sale/status/1384537729460056067?s=20

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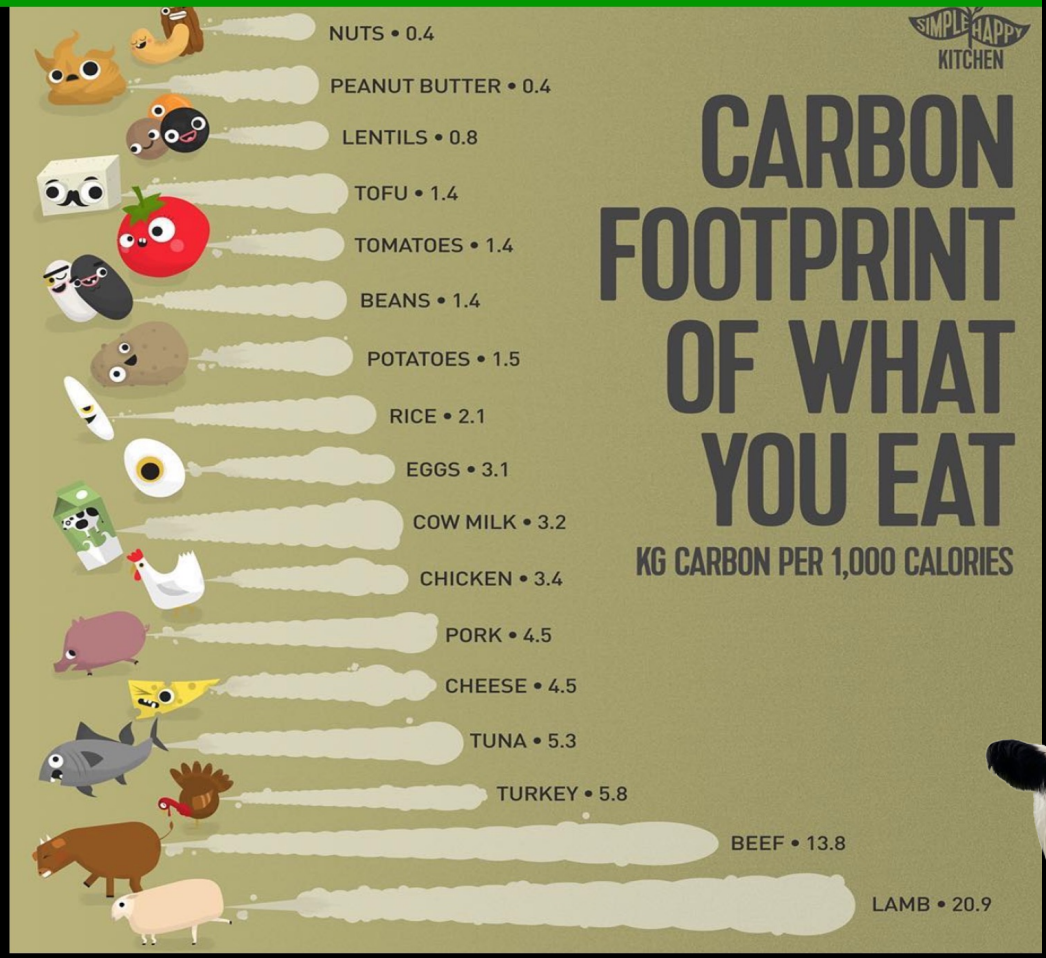
Global averages are meaningless

The carbon footprints of the foods we eat vary considerably – global average figures are inappropriate when food production is regional



Source: Created by Dr. Jude L. Capper, 2020, infographic from: https://www.instagram.com/simple_happy_kitchen/

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Improved efficiency has reduced GHG emissions from U.S. livestock production

19% decrease in GHG emissions per litre of ECM between 2007 and 2017

18% decrease in GHG emissions per kg of HCW beef between 1977 and 2007

35% decrease in GHG emissions per kg of pork between 1959 and 2009

63% decrease in GHG emissions per ton of eggs between 1960 and 2010

Source: Created by Dr. Jude L. Capper, 2020. Data from: Capper and Cady (2019) The effects of improved performance in the U.S. dairy cattle industry on environmental impacts between 2007 and 2017. *J. Anim. Sci.* and Capper (2011). The environmental impact of U.S. beef production: 1977 compared with 2007. *J. Anim Sci.* and Cady et al. (2013) A 50-year comparison of the environmental impact and resource use of the US swine herd: 1959 vs. 2009. ADSA-ASAS Annual Meeting, 2013, Indianapolis, IN and Pelletier et al. (2014) Comparison of the environmental footprint of the egg industry in the United States in 1960 and 2010. *Poult. Sci.*

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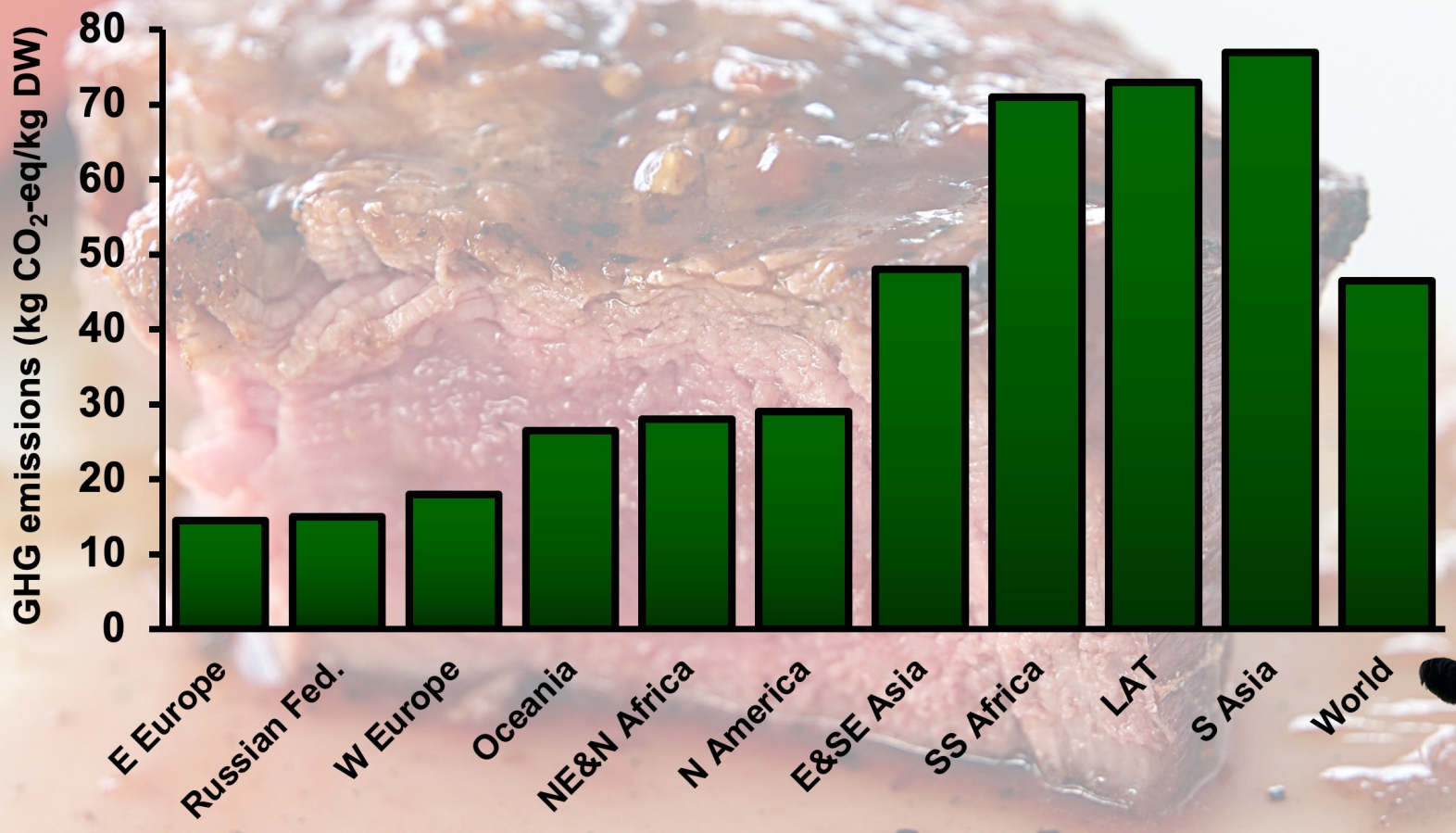
The carbon footprint of beef production varies across the globe



Source: Created by Dr. Jude L. Capper, 2022; 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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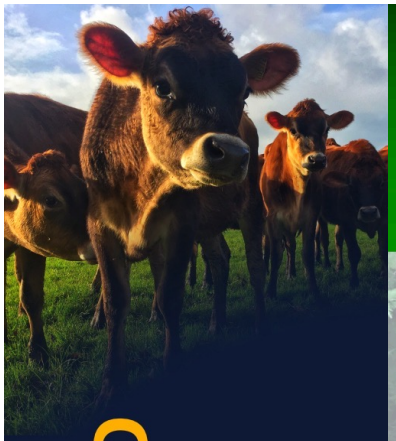

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Improving animal productivity reduces the environmental impact of milk and meat

Total livestock
Total time

Land
Water
Fuel
GHG

Growth rate
Meat yield
Milk yield

£££

Source: Created by Dr. Jude L. Capper, 2020. Data from: Capper, JL. 2015. Sustainability and One Health. In: Cockcroft, P. *Bovine Medicine.* Wiley-Blackwell, Oxford, UK.

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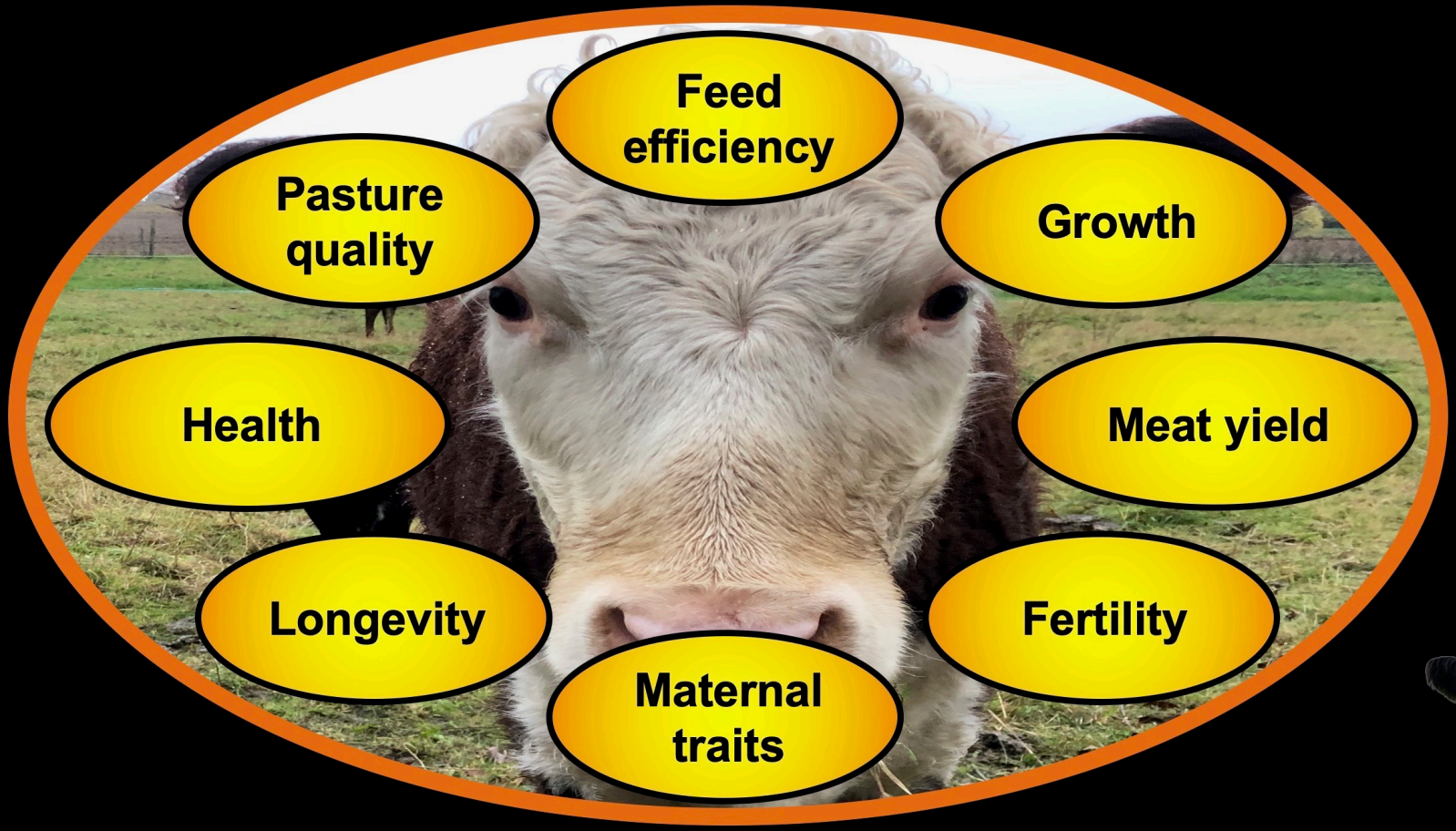
Improving key performance indicators reduces environmental impacts



Source: Created by Dr. Jude L. Capper, 2020

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Reducing age at slaughter has both economic and environmental benefits

Birth weight	40 kg	40 kg
Slaughter weight	670 kg	670 kg
Total gain	630 kg	630 kg
Age at slaughter	23 months	26 months
Daily liveweight gain	0.90 kg/d	0.80 kg/d
Maintenance feed needed	702 days	793 days

Source: Created as an example by Dr. Jude L. Capper, 2021.

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Reducing age at slaughter has both economic and environmental benefits

91 fewer days of feed, land and greenhouse gases. Opportunity cost?

	23 mo	26 mo
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Source: Created as an example by Dr. Jude L. Capper, 2021.

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GHG benefits of dairy-beef now recognized – sucklers will need to demonstrate benefits

Annual requirements of one suckler cow:

- **3,954 kg feed DM**
- **20,047 litres water**
- **2,459 kg CO_2**

Need to justify these impacts *vs.* beef from dairy.

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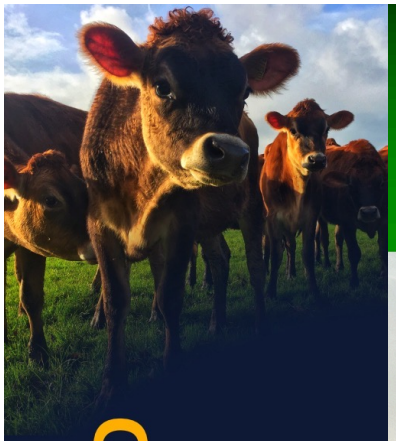
Source: Created by Dr. Jude L. Capper, 2021. Calculation based on feed and water requirements of one Angus cow weighing 544 kg producing 7.8 kg of milk per day, with calf weaned at 207 days of age.



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Reproductive interventions must be economically and environmentally sustainable

Improving maternal trait genetics via AI over 20 yrs

Decreased mature weight and calving interval

£47-344 improved economics per cow calving

95 - 2,009 kg CO_2 reduction in GHG emissions per cow

Source: Created by Dr. Jude L. Capper, 2022. Data from Quinton et al. (2018) Predicted economic and greenhouse gas benefits from using improved maternal genetics in UK beef cattle. Proceedings of the World Congress on Genetics Applied to Livestock Production, 11.364

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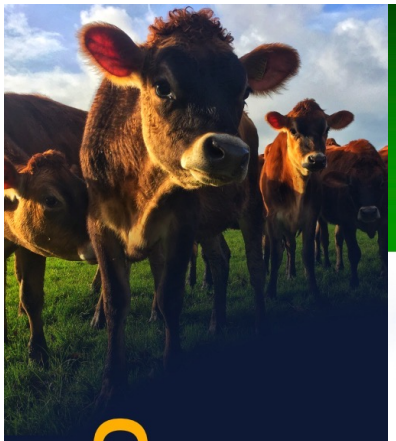

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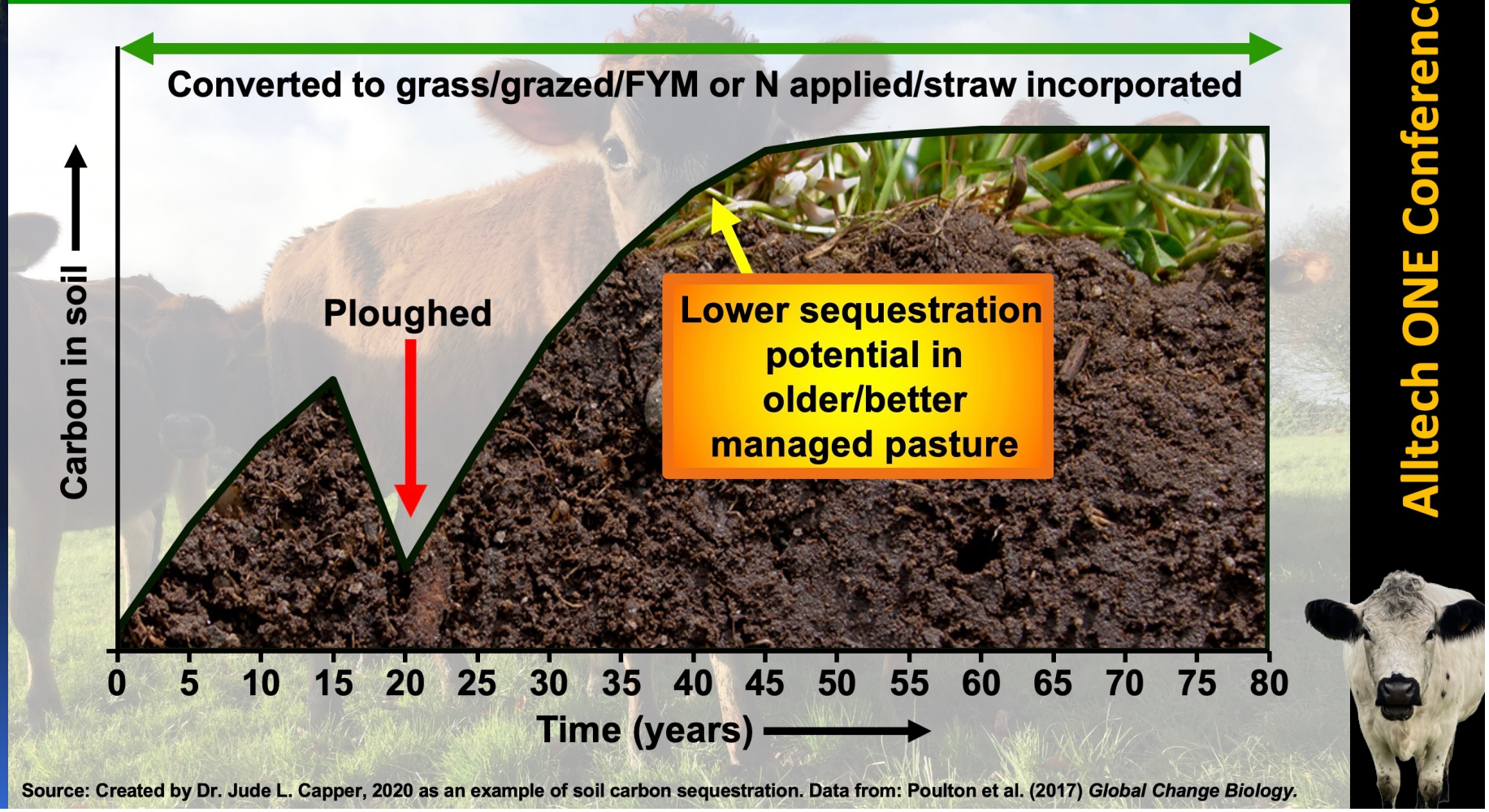
Carbon sequestration offers promise – but isn't a magic bullet



Source: Created by Dr. Jude L. Capper, 2020 as an example of soil carbon sequestration. Data from: Poulton et al. (2017) *Global Change Biology.*

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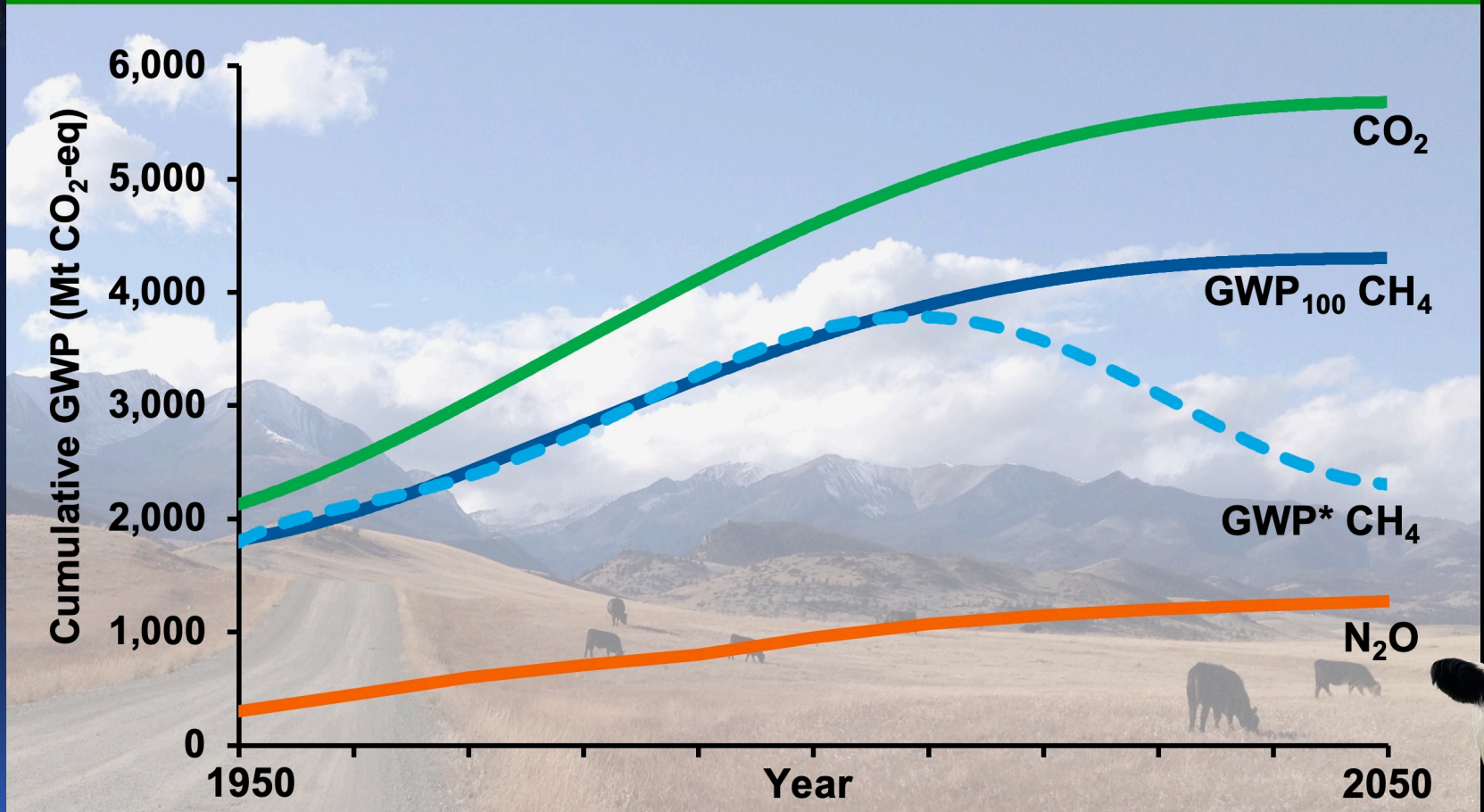
Under GWP*, methane may contribute to global cooling



Source: Created by Dr. Jude L. Capper, 2022. Graph adapted from Allen et al. (2019) Agricultural Emissions on a Path to Net Zero. Available at: https://www.slideshare.net/Sustainablefoodtrust/myles-allen-154983406

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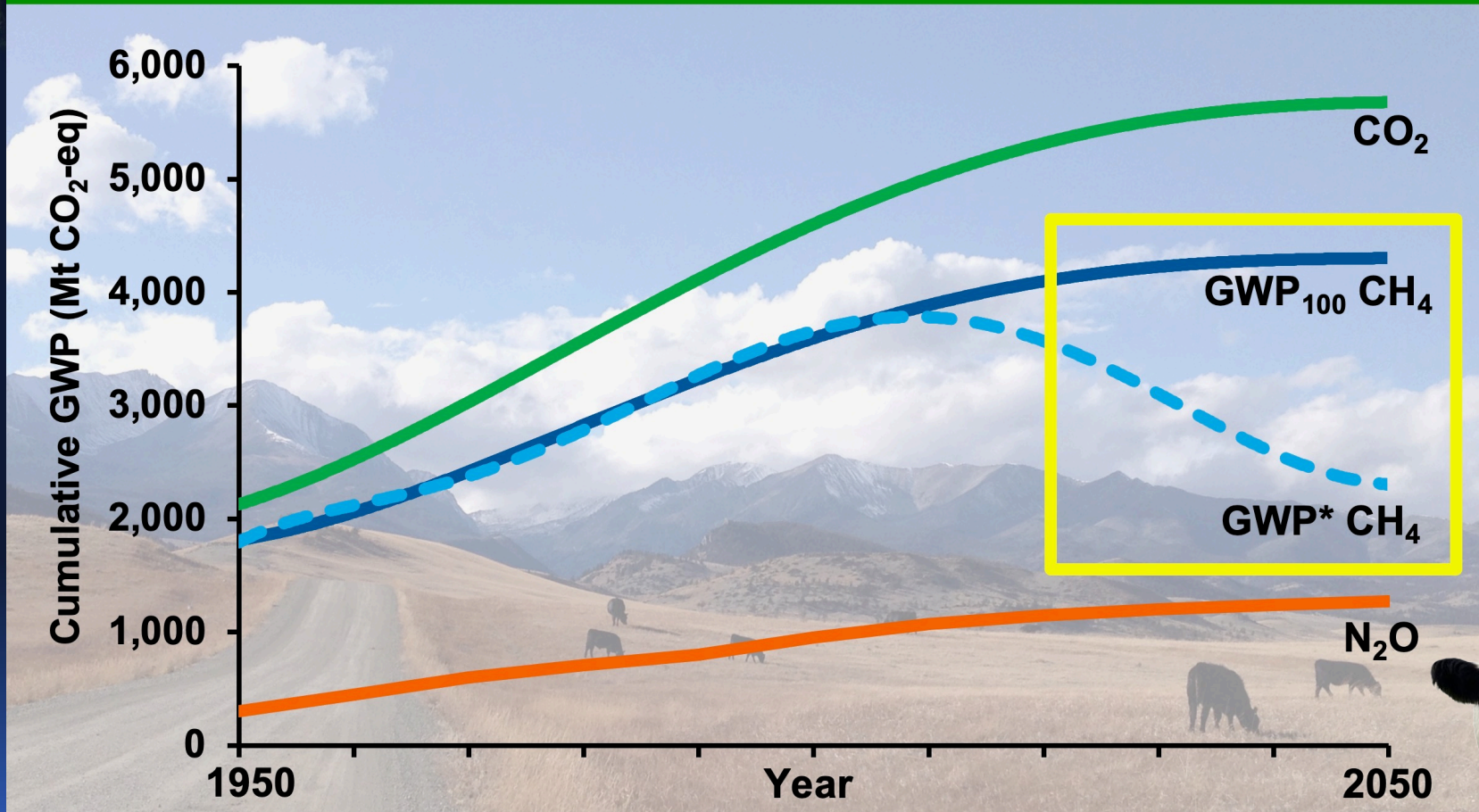
Under GWP*, methane may contribute to global cooling



Source: Created by Dr. Jude L. Capper, 2022. Graph adapted from Allen et al. (2019) Agricultural Emissions on a Path to Net Zero. Available at: https://www.slideshare.net/Sustainablefoodtrust/myles-allen-154983406

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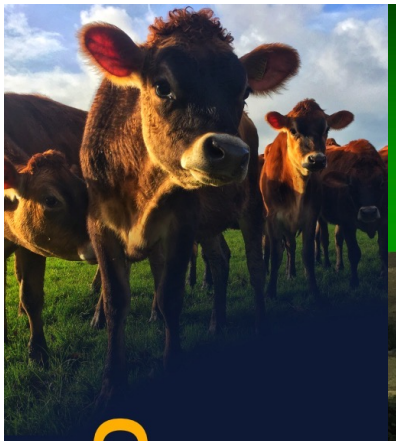

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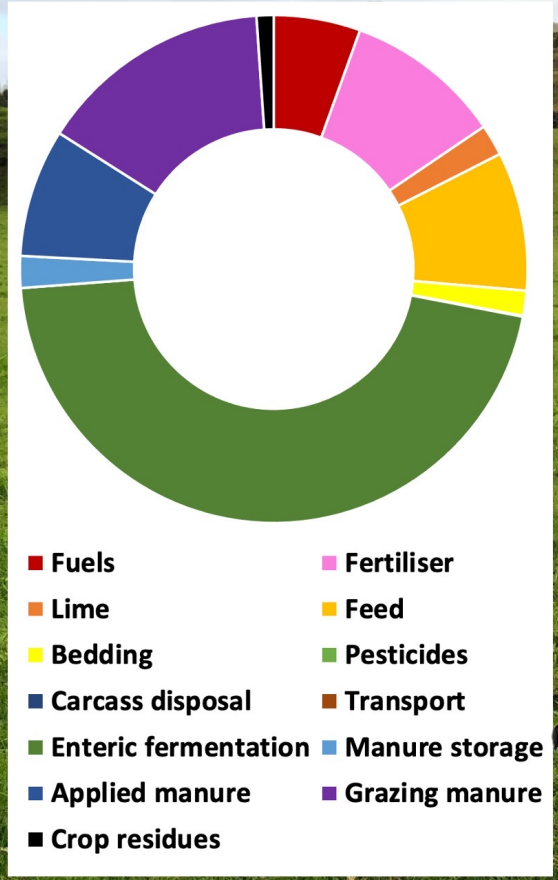
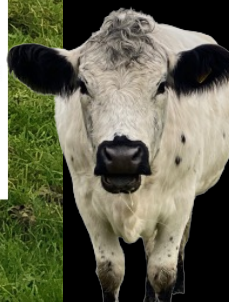
Standard footprinting tool urgently needed across the industry



Source: Created by Dr. Jude L. Capper, 2021. Example carbon footprint results based on a beef finishing farm.



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Sustainability indices will be increasingly present on meat labels in future

Beef (animal-based) patty

Nutritional value*
Serving size: 227 g (8 oz) steak

78%

Pure beef protein – contains no lab-based ingredients!

Sustainability index	76%
Carbon footprint (under GWP*)	81%
Water footprint	66%
Antibiotic footprint	88%
Community support rating	95%

Farm webcam and sustainability assessment data

*compared to ideal protein

Produced on certified culturally appropriate farmsteads

Source: Created by Dr. Jude L. Capper, 2020.

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Thank you!

jude@livestocksustainability.com
http://bovidiva.com/presentationlinks

Questions?

Source: Created by Dr. Jude L. Capper, 2022. Cartoon from: http://snipurl.com/methanecartoon

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