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How do we keep the beef industry sustainable in culture led by consumers?

12<sup>th</sup> May 2023

Source: Jude L. Capper, 2023

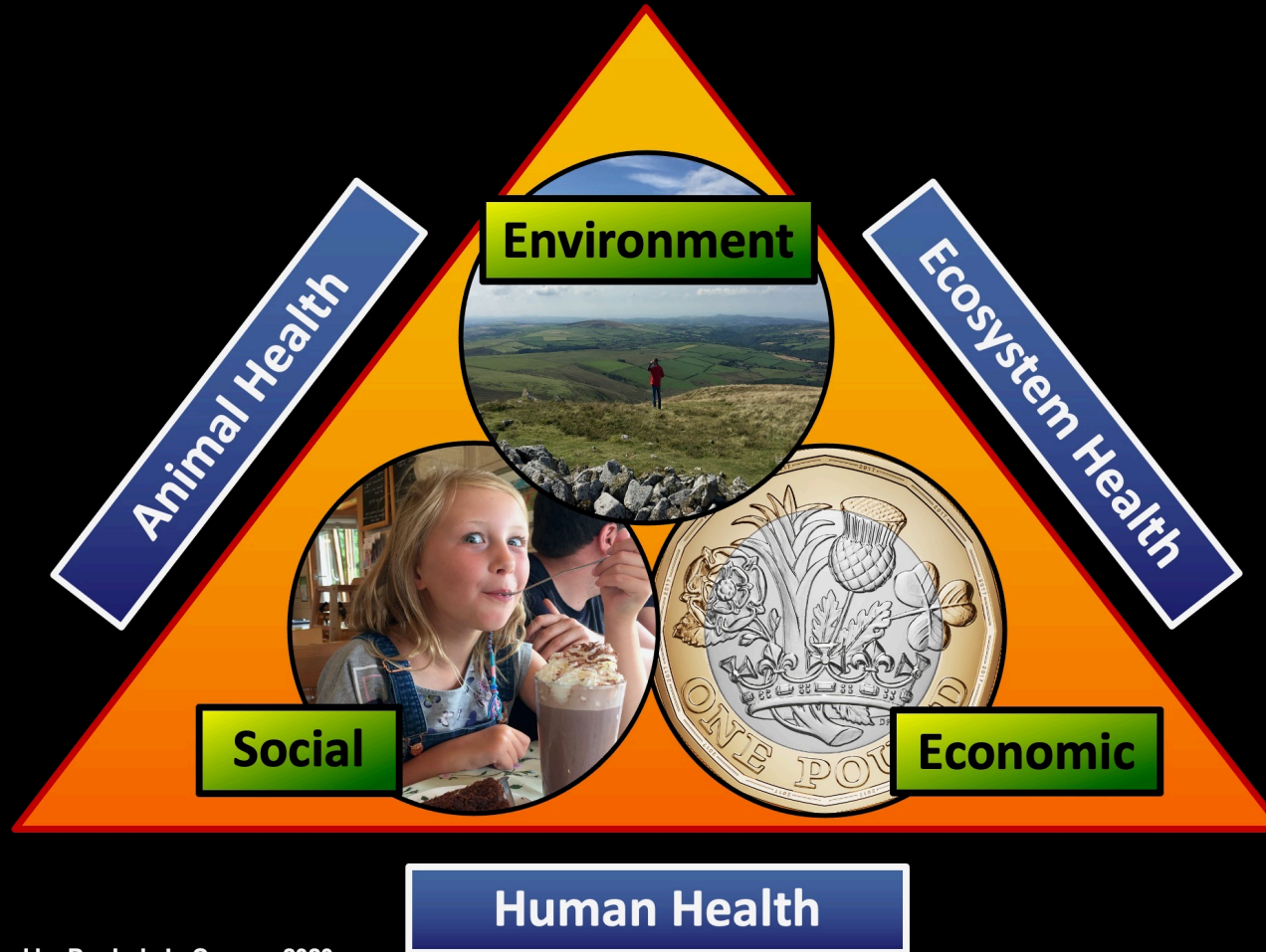
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# Sustainability comprises three pillars, all under the umbrella of One Health



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



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There is no definitive sustainable protein system – but every system can be sustainable

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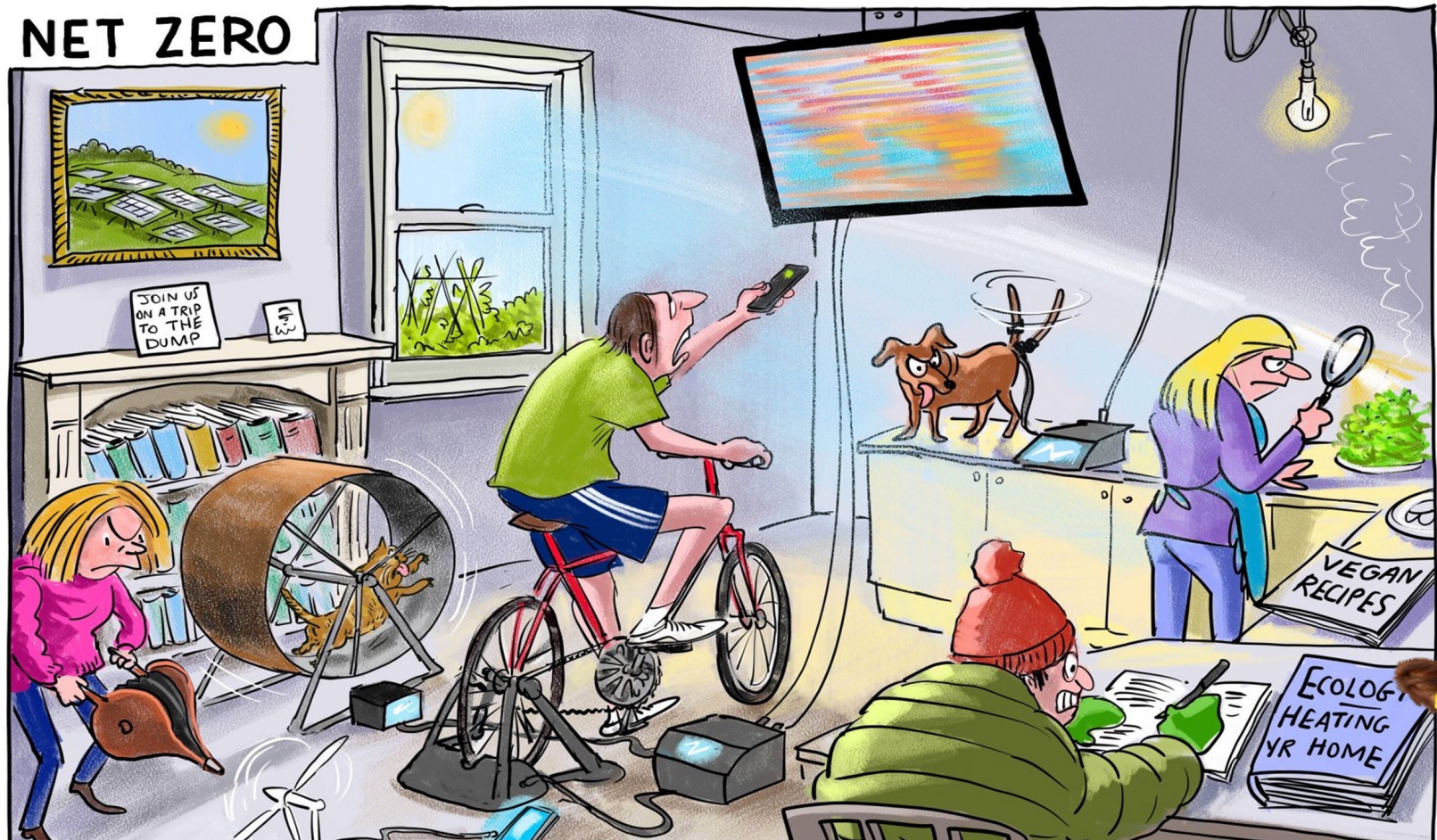
Source: Created and photos by Dr. Jude L. Capper, 2020

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# Net Zero is a clear priority

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

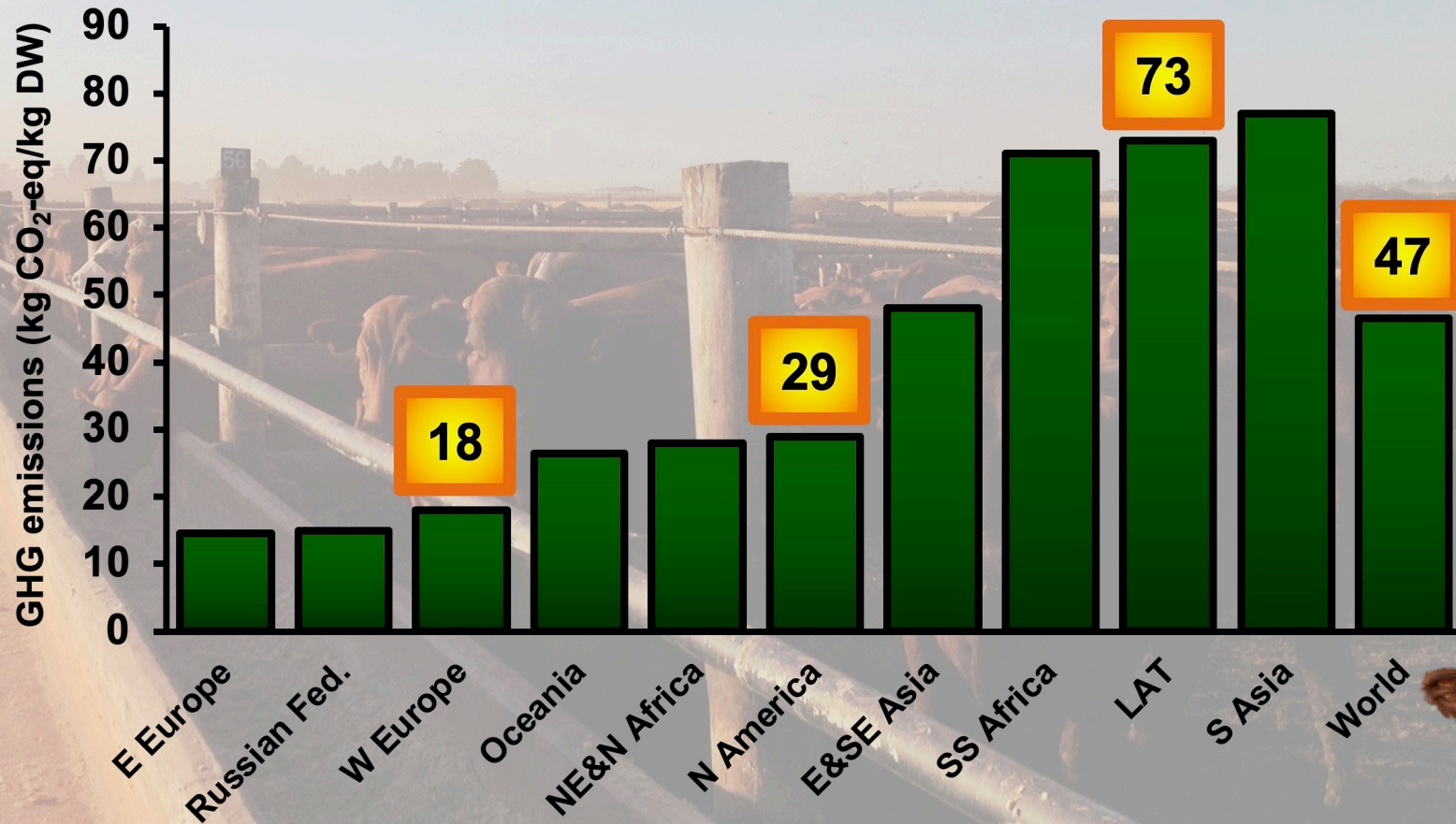
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# The carbon footprint of beef production varies across the globe



Source: Created by Dr. Jude L. Capper, 2020; 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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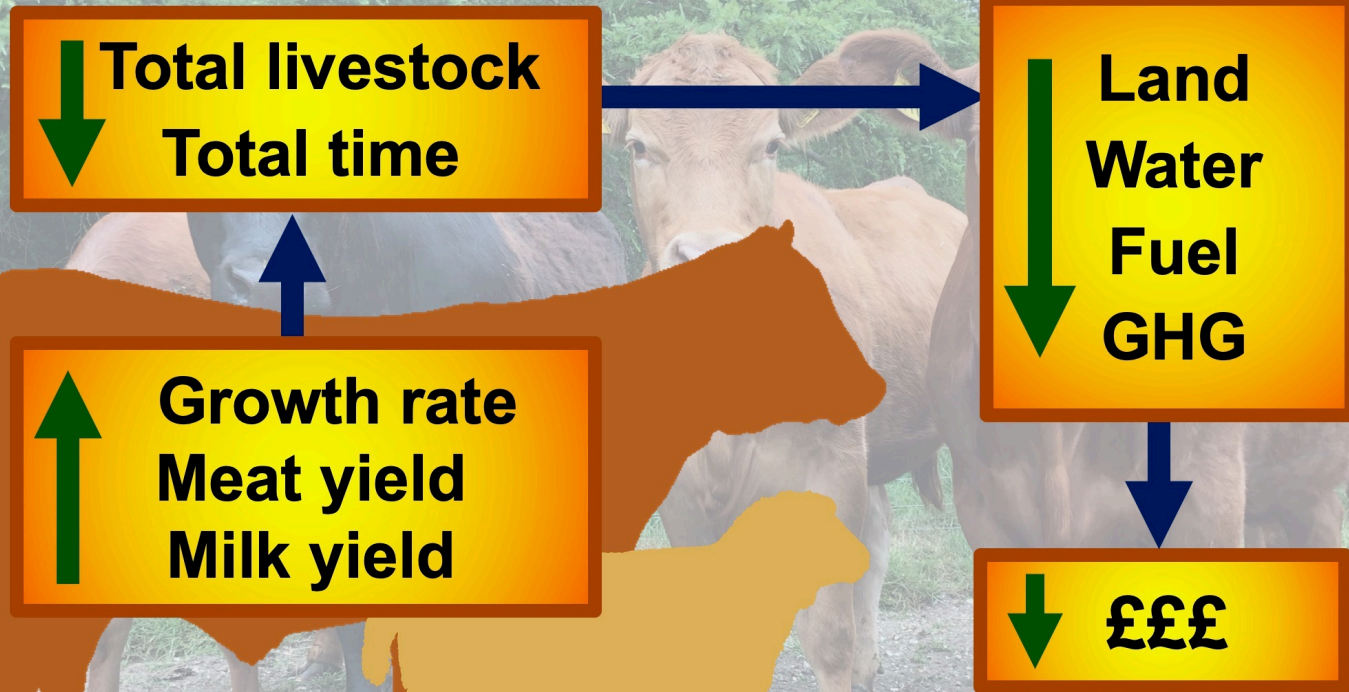
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# Improving animal productivity reduces the environmental impact of milk and meat



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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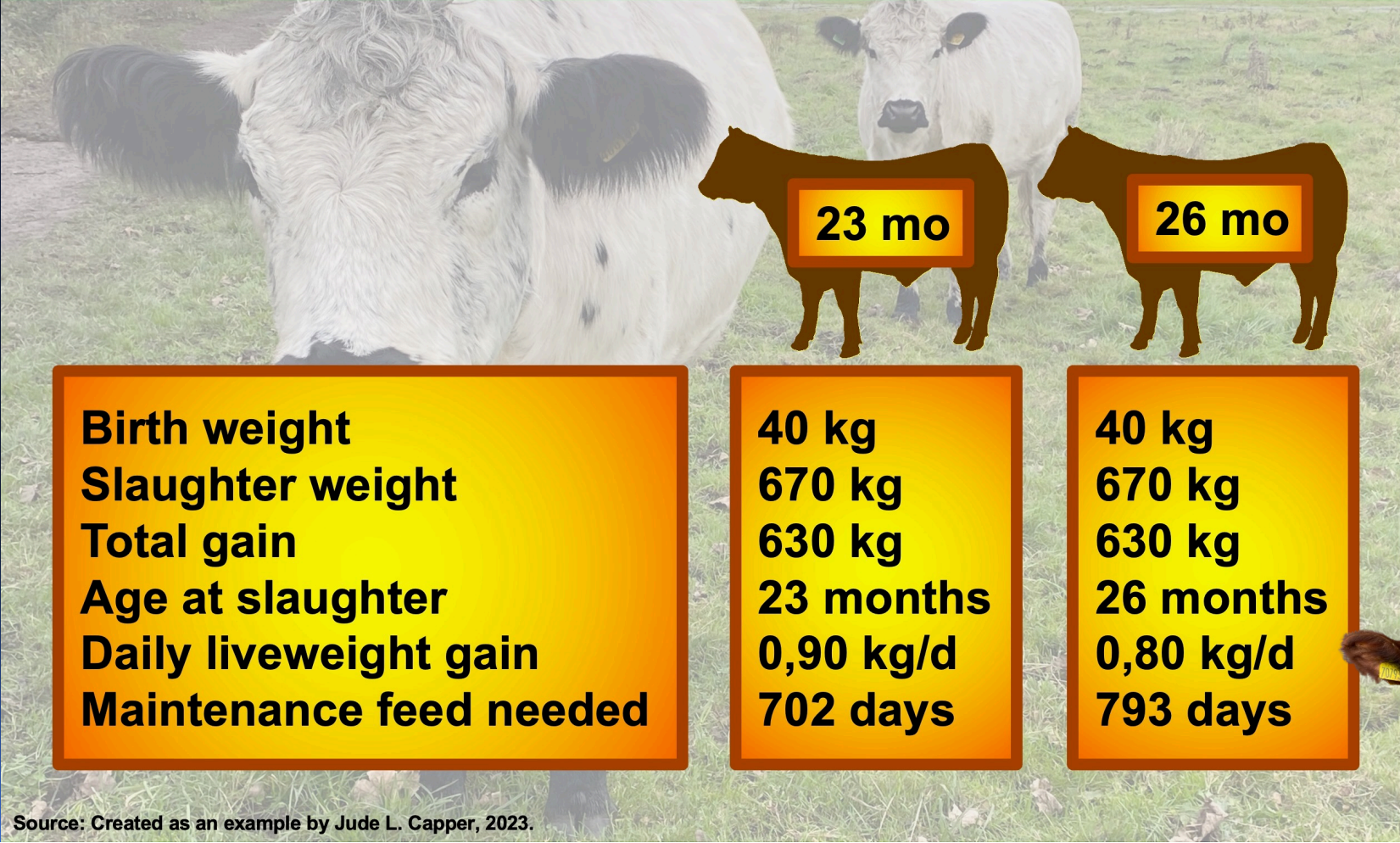
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# Reducing age at slaughter has both economic and environmental benefits



Source: Created as an example by Jude L. Capper, 2023.

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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

Birth weight
Slaughter weight
Total gain
Age at slaughter
Daily liveweight gain
Maintenance feed needed

40 kg
670 kg
630 kg
23 months
0,90 kg/d
702 days

40 kg
670 kg
630 kg
26 months
0,80 kg/d
793 days

Source: Created as an example by Jude L. Capper, 2023.

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# Reproductive interventions must be economically and environmentally sustainable

Improving maternal genetics via artificial insemination

95 – 2.009 kg CO<sub>2</sub> reduction in GHG emissions per cow

Reduced mature weight and calving interval over 20 yrs

€54-€392 improved economic returns per cow calving

Source: Created by Jude L. Capper, 2023. 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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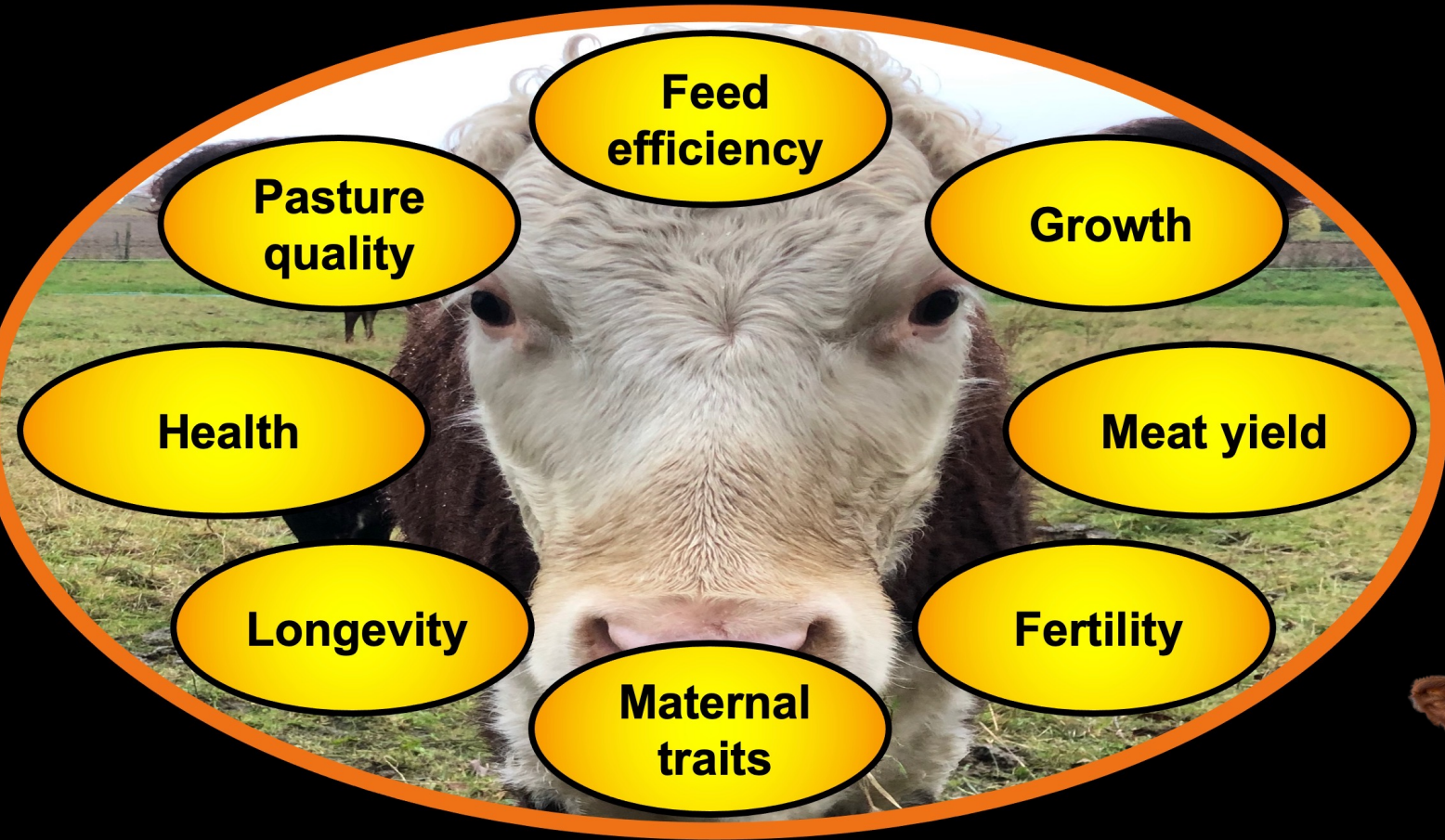




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Doing everything better on-farm improves economic and environmental sustainability

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Source: Created 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<sub>2</sub>

Need to justify these impacts vs. beef from dairy.

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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# Can we grow human food crops everywhere?



Source: Created by Dr. Jude L. Capper, 2021

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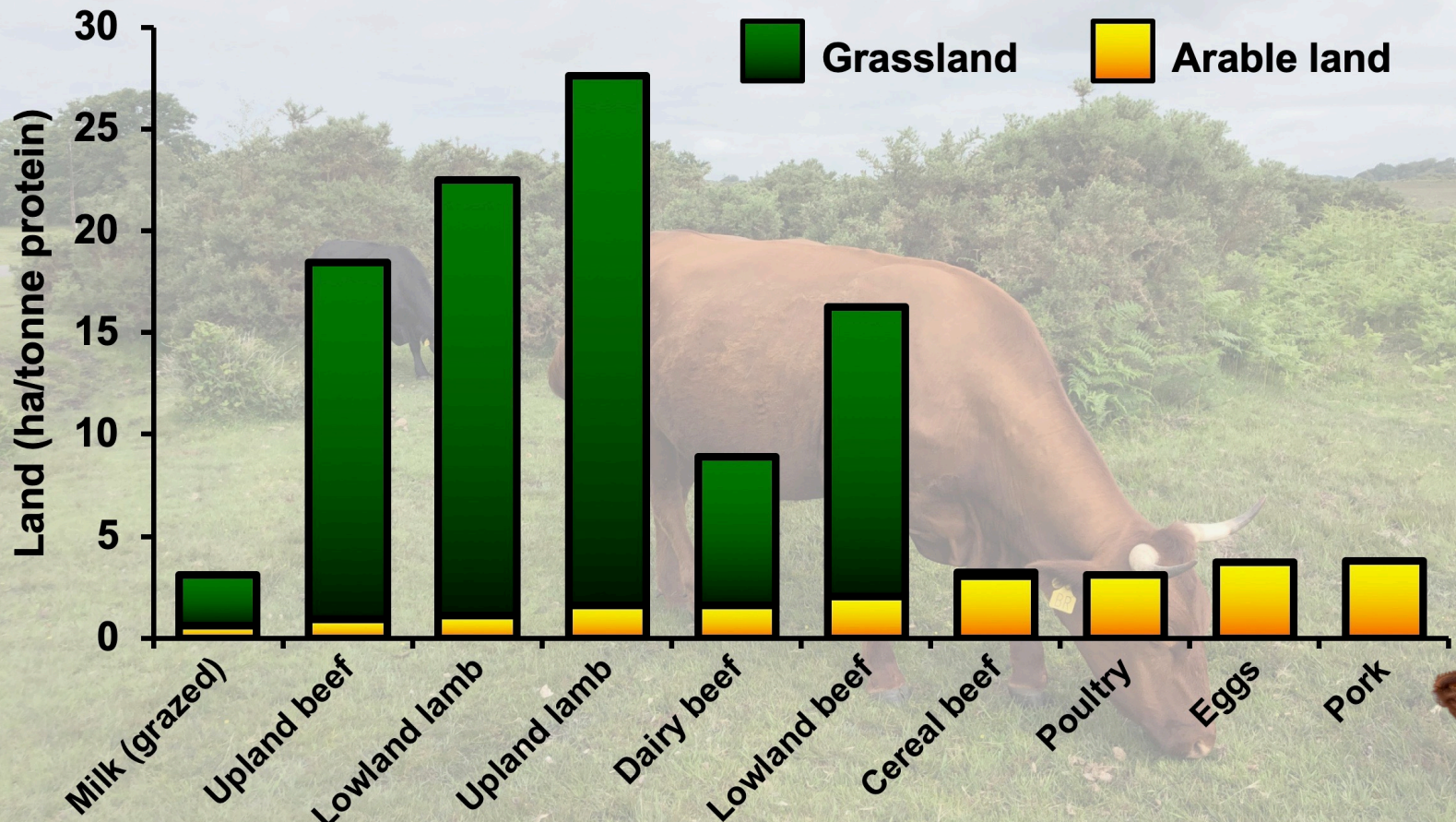
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# Livestock systems vary widely in arable and grassland use



Source: Created by Dr. Jude L. Capper, 2020; data from Wilkinson and Lee (2018) Review: Use of human-edible animal feeds by ruminant livestock. *Animal*.

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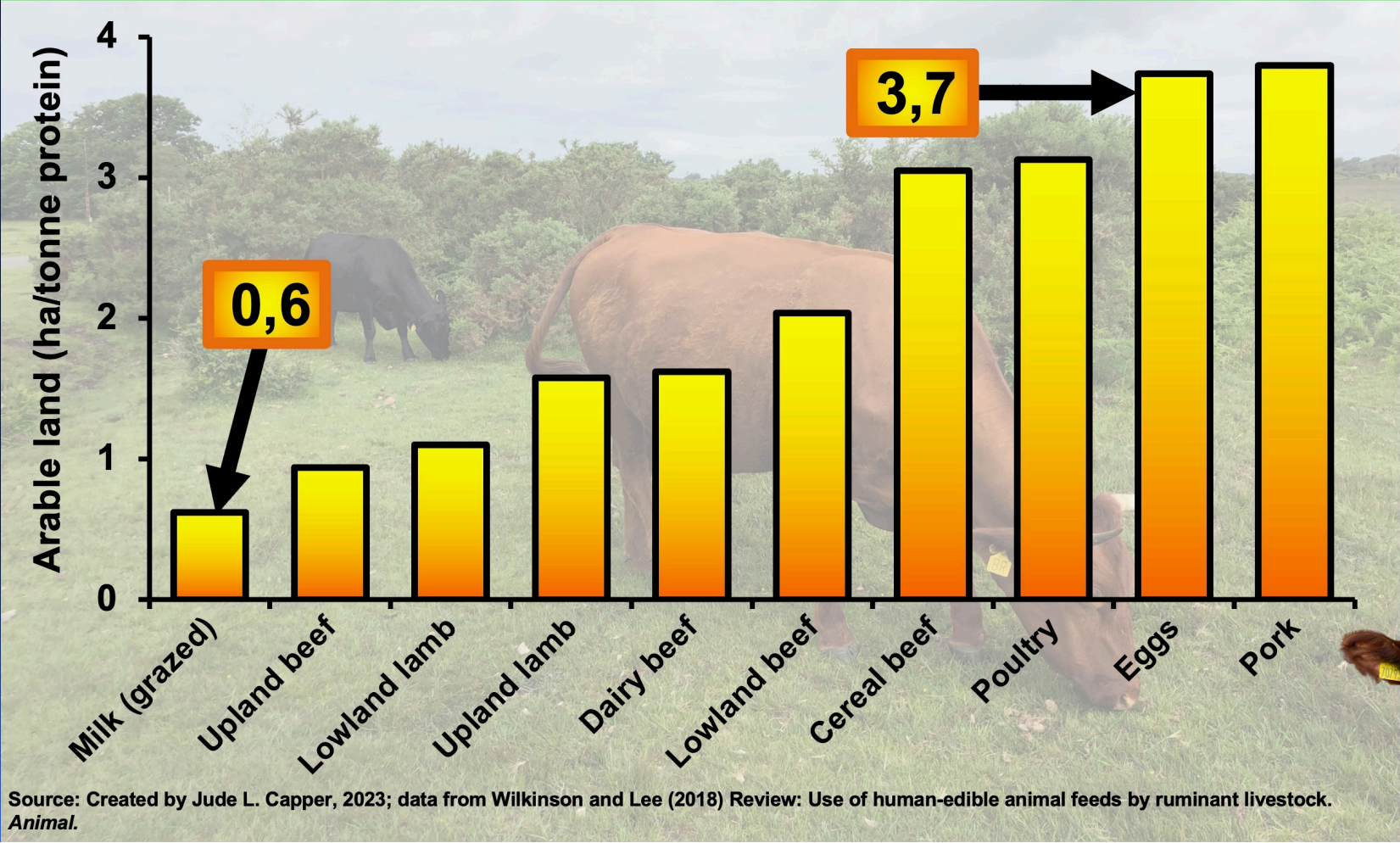


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# Livestock systems vary widely in arable land use



Source: Created by Jude L. Capper, 2023; data from Wilkinson and Lee (2018) Review: Use of human-edible animal feeds by ruminant livestock. Animal.

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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**



**Carbon footprint (under GWP\*)**



**Water footprint**



**Antibiotic footprint**



**Community support rating**



**Farm webcam and sustainability assessment data**



\*compared to ideal protein



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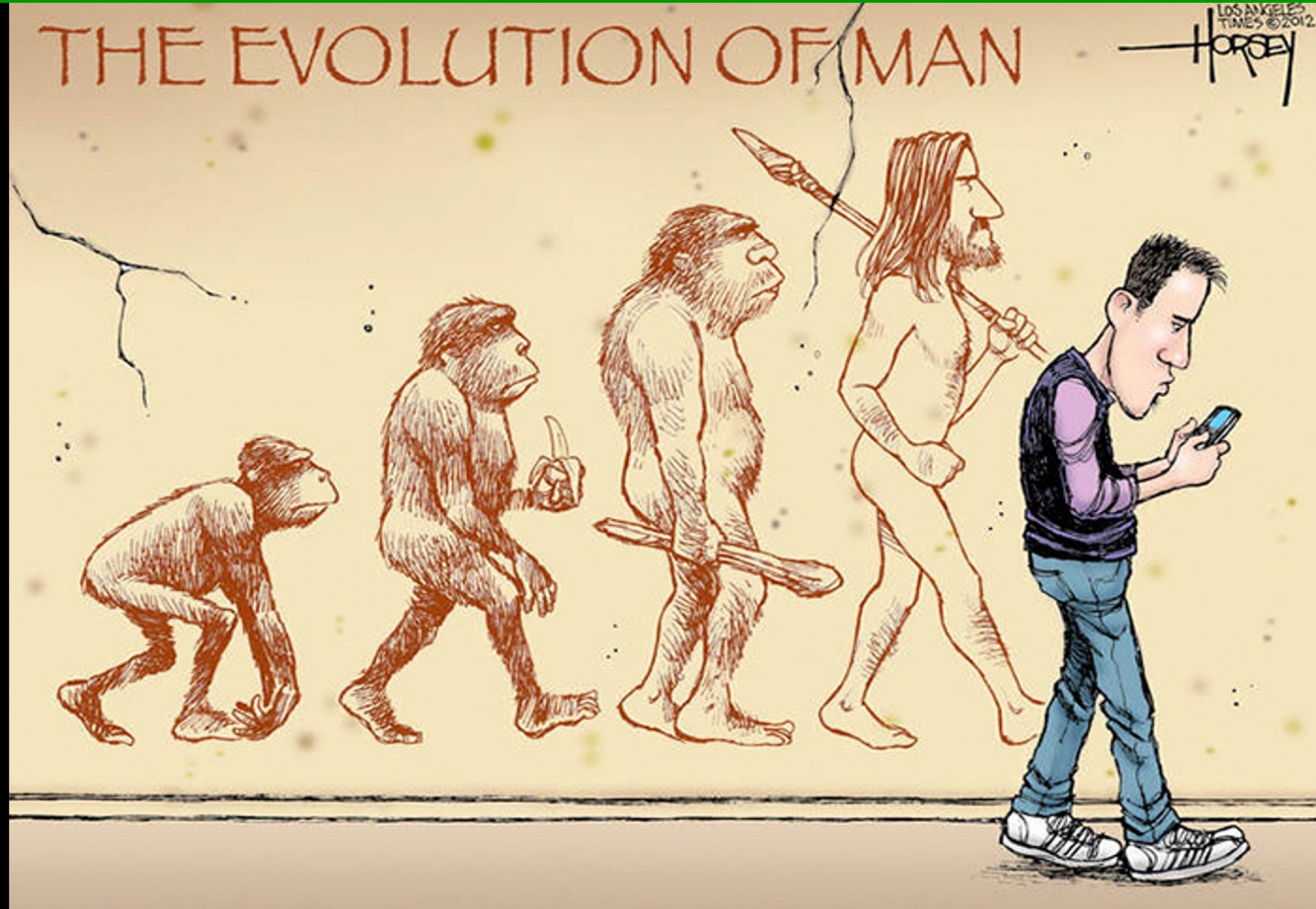
Source: Created by Dr. Jude L. Capper, 2020.

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We've got the technology –  
now we need to use it to its potential



Source: Created by Dr. Jude L. Capper, 2021. Cartoon from: [https://static.boredpanda.com/blog/wp-content/uploads/2016/02/funny-satirical-evolution-charles-darwin-day-251\\_700.jpg](https://static.boredpanda.com/blog/wp-content/uploads/2016/02/funny-satirical-evolution-charles-darwin-day-251_700.jpg)

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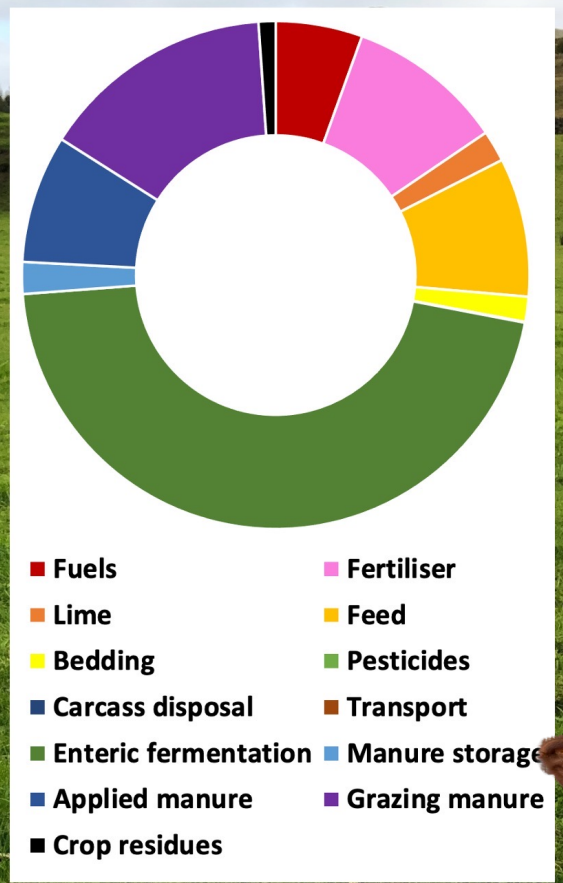


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# Standard footprinting tool urgently needed across the industry



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

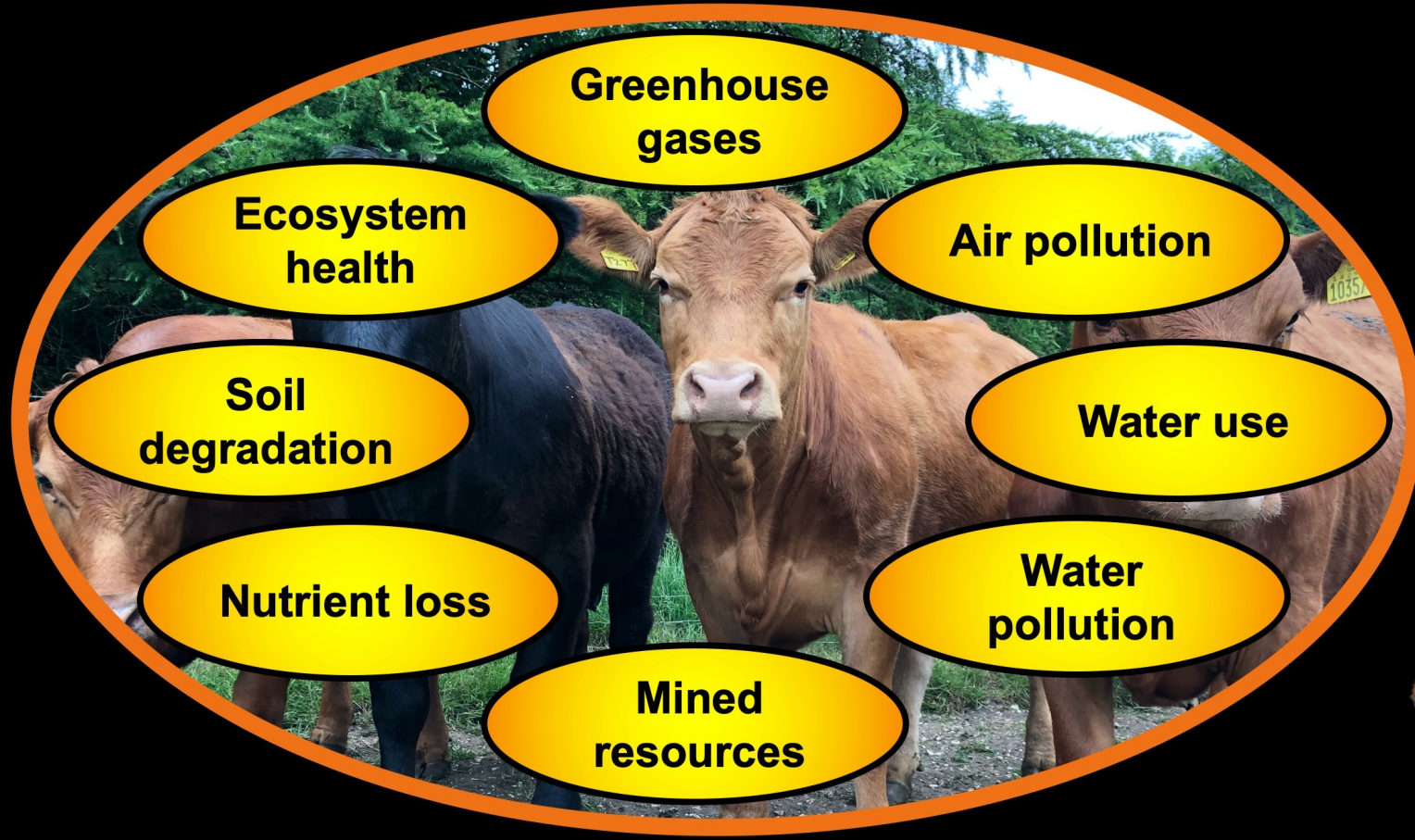
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# Environmental impacts are not limited to greenhouse gas emissions



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



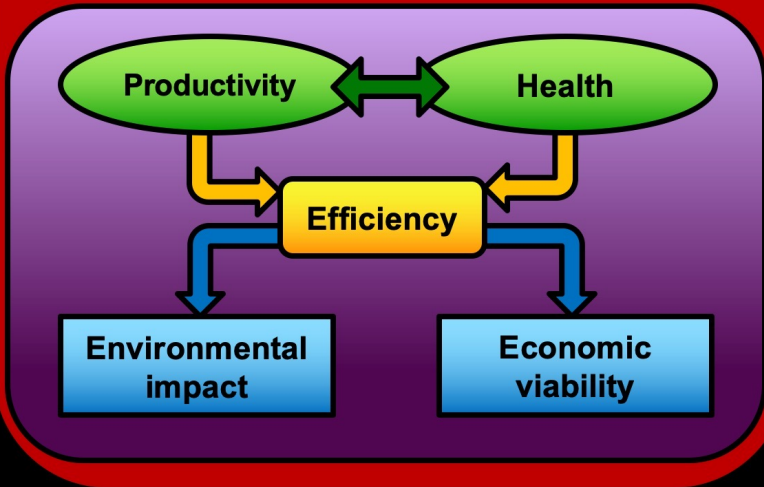
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# Social acceptability and consumer trust are vital for sustainable livestock production

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## Social Acceptability



## Sustainability



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



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

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*"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 Dr. Jude L. Capper, 2020. Information from: YouGov (2019) Is the future of food flexitarian?  
[https://yougov.co.uk/topics/resources/articles-reports/2019/03/18/future-food-flexitarian?](https://yougov.co.uk/topics/resources/articles-reports/2019/03/18/future-food-flexitarian)



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# Animal welfare and human health are major concerns for people giving up animal products

Animal welfare

Healthiness

Environment

Labelling

Economic cost



Source: Created by Dr. Jude L. Capper, 2020. 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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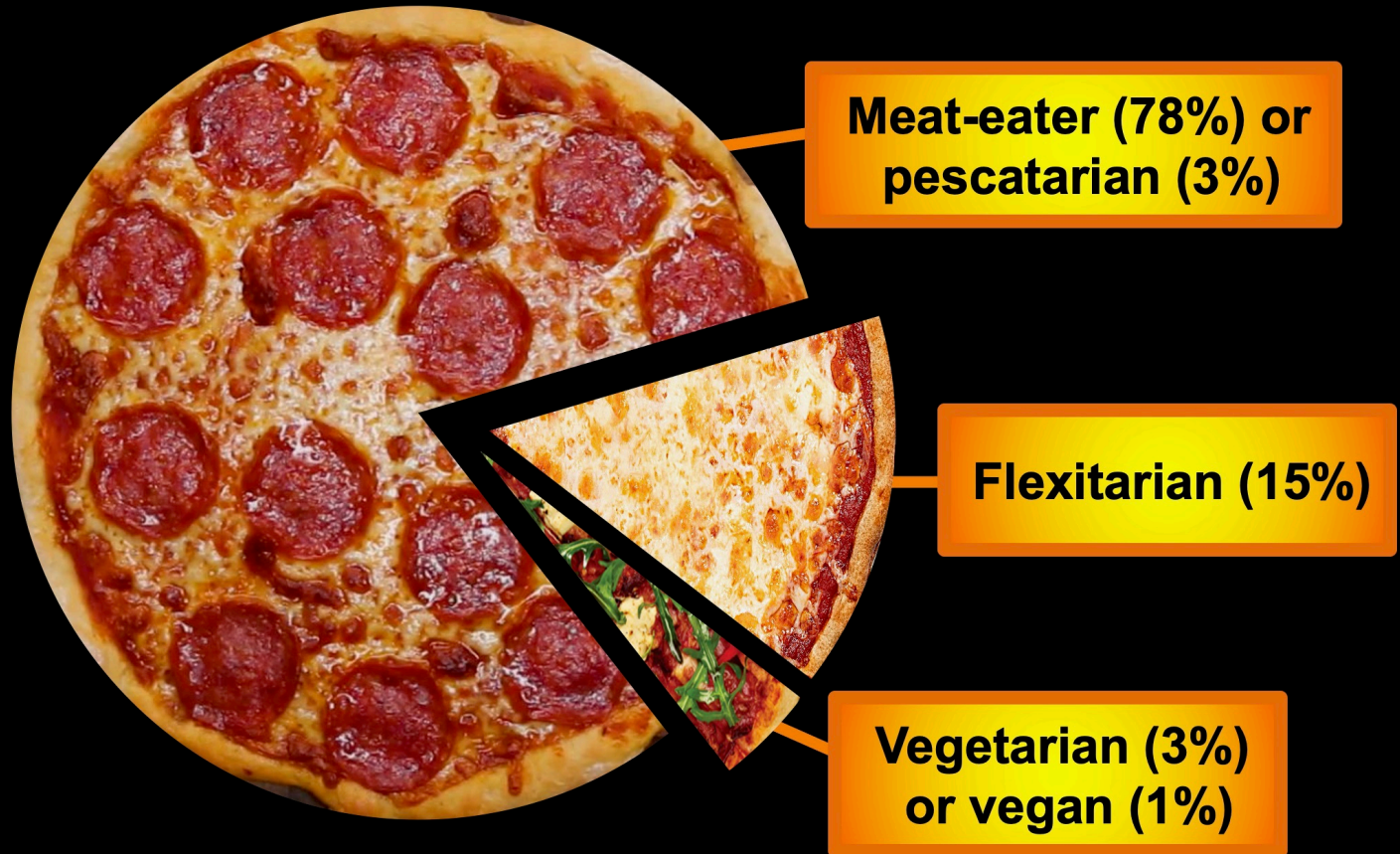
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# The future probably isn't vegan, but it may be flexitarian?



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

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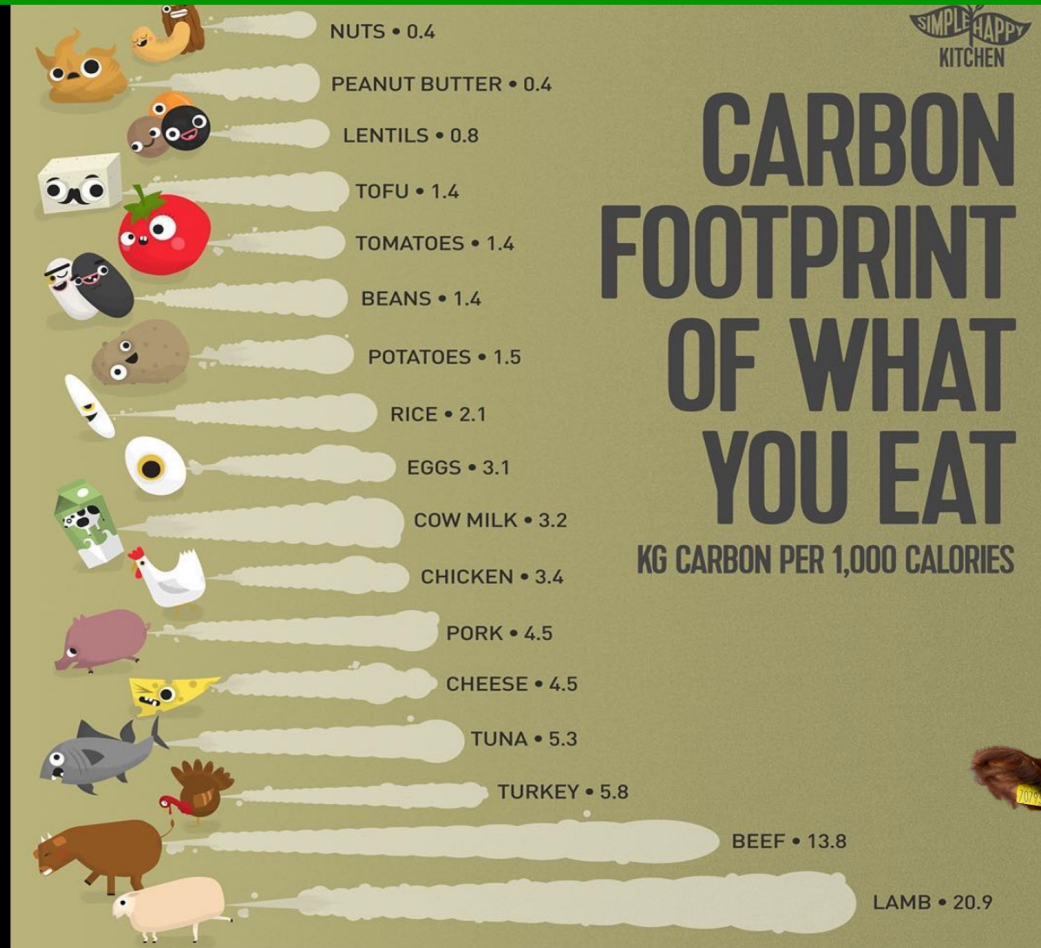




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# Global averages are meaningless

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/](https://www.instagram.com/simple_happy_kitchen/)

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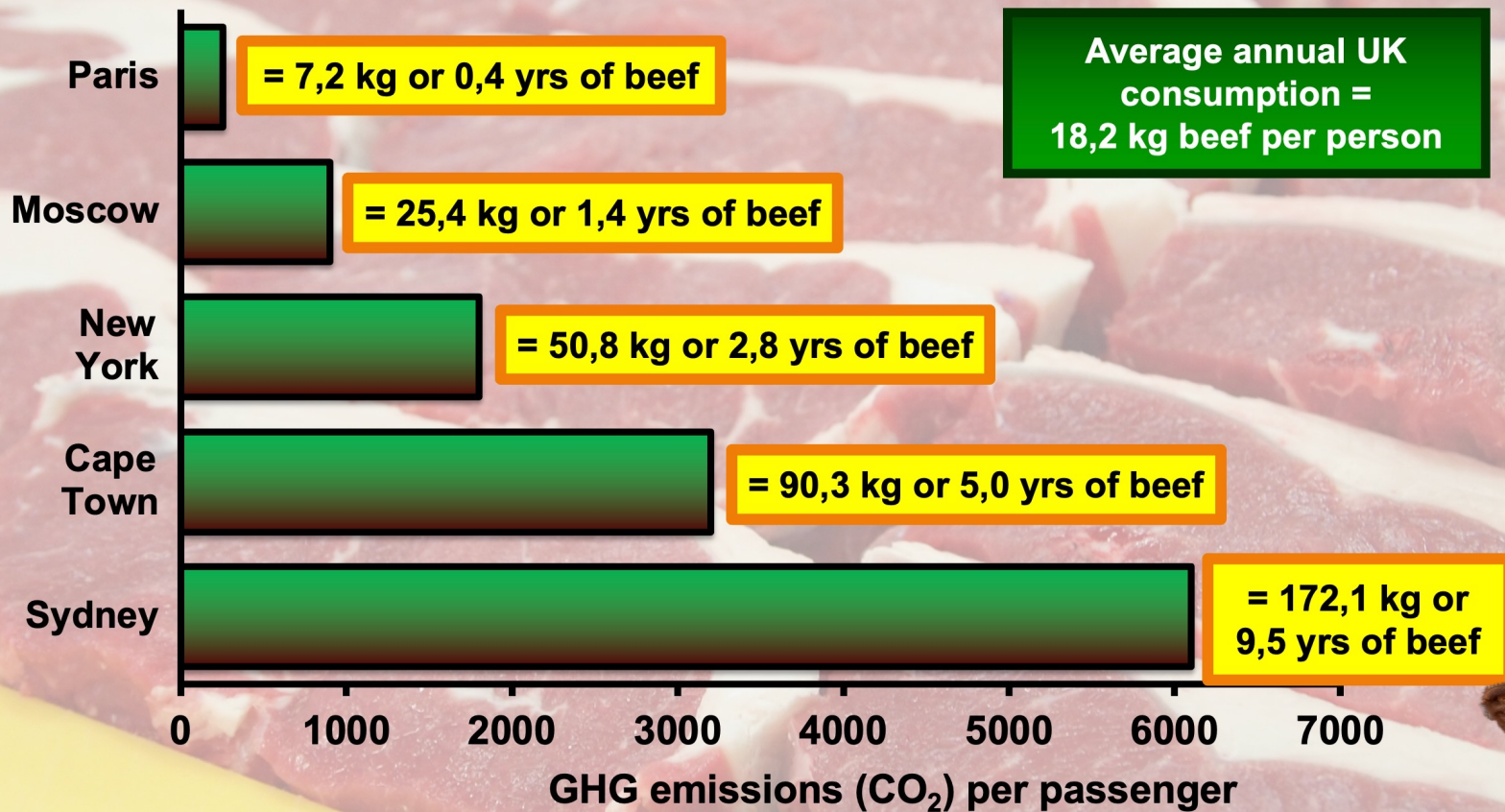
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# International flights emit considerable quantities of carbon compared to beef production



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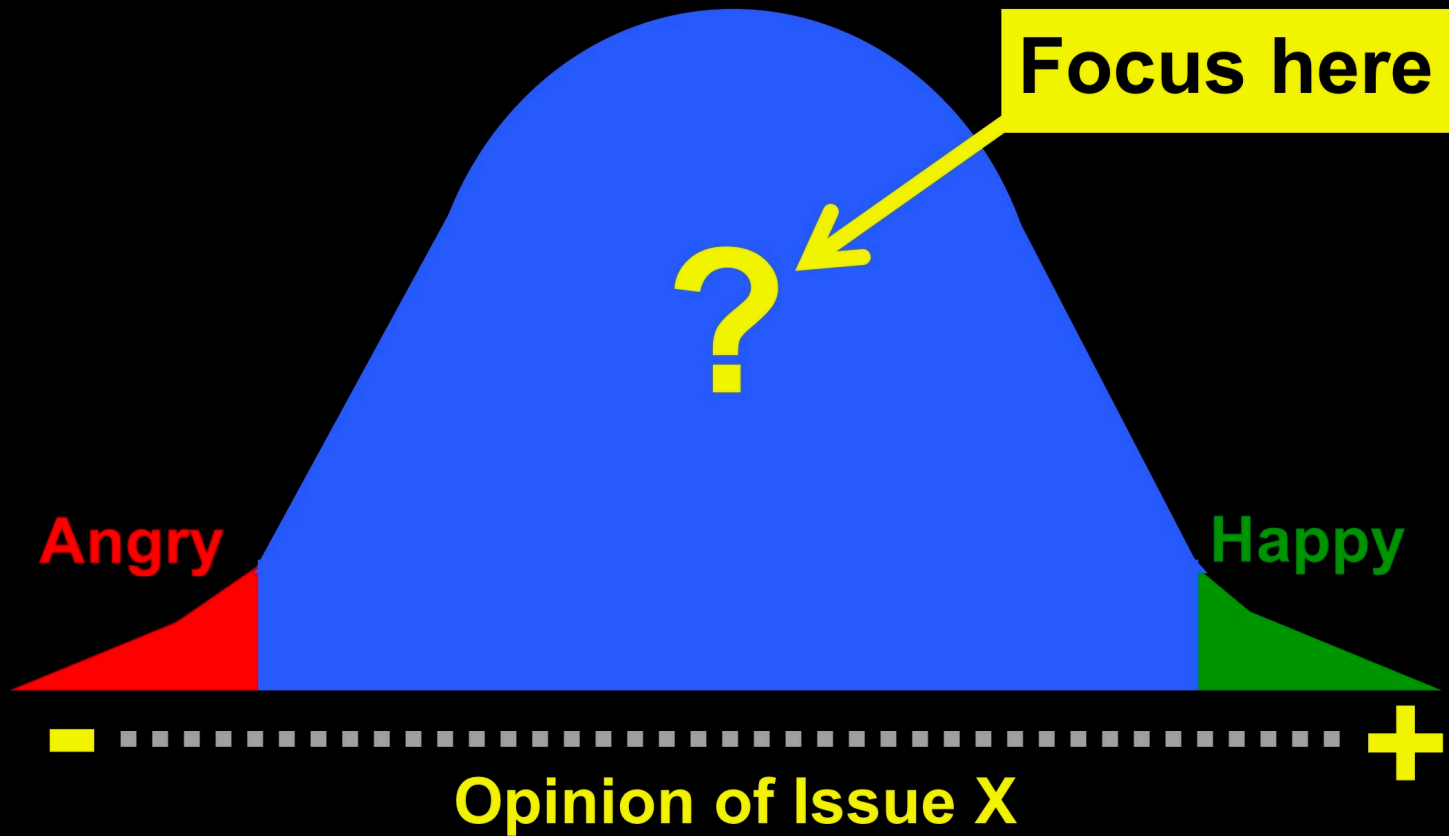


Source: Created by Dr. Jude L. Capper, 2021. Calculations based on GHG emissions flight data from: [https://co2.myclimate.org/en/flight\\_calculators/new](https://co2.myclimate.org/en/flight_calculators/new), and on a carbon footprint per kg of boneless beef of 35.5 kg CO<sub>2</sub>-eq (under GWP100) from AHDB: [http://beefandlamb.ahdb.org.uk/wp-content/uploads/2013/05/p\\_cp\\_down\\_to\\_earth300112.pdf](http://beefandlamb.ahdb.org.uk/wp-content/uploads/2013/05/p_cp_down_to_earth300112.pdf)



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We need to communicate with consumers who don't yet have fixed opinions of agriculture



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Source: Created by Dr. Jude L. Capper, 2017



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## 5 easy tips for positive communication

**Share your values**

**Stay positive, polite and personal**

**Keep it short, simple and see-through**

**Focus on the important**

**Know when to walk away**

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Source: Created by Dr. Jude L. Capper, 2019. Adapted from: Capper and Yancey. 2015. Communicating Animal Science to the General Public. *Animal Frontiers*.





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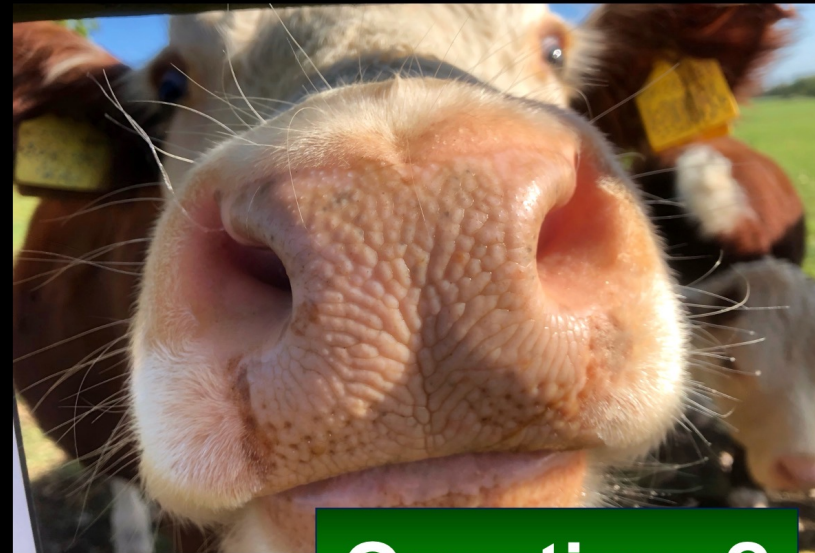
# Thank you!

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<http://bovidiva.com/presentationlinks>

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## Questions?



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