



**Dr. Jude Capper**  
**@bovidiva**



# Cattle industry sustainability



Source: Slide and photo by Dr. Jude L. Capper, 2020

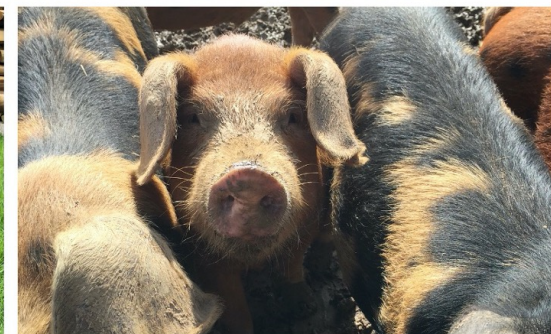
**CAVI Conference 2021**



s

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

Dr. Jude Capper @bovidiva

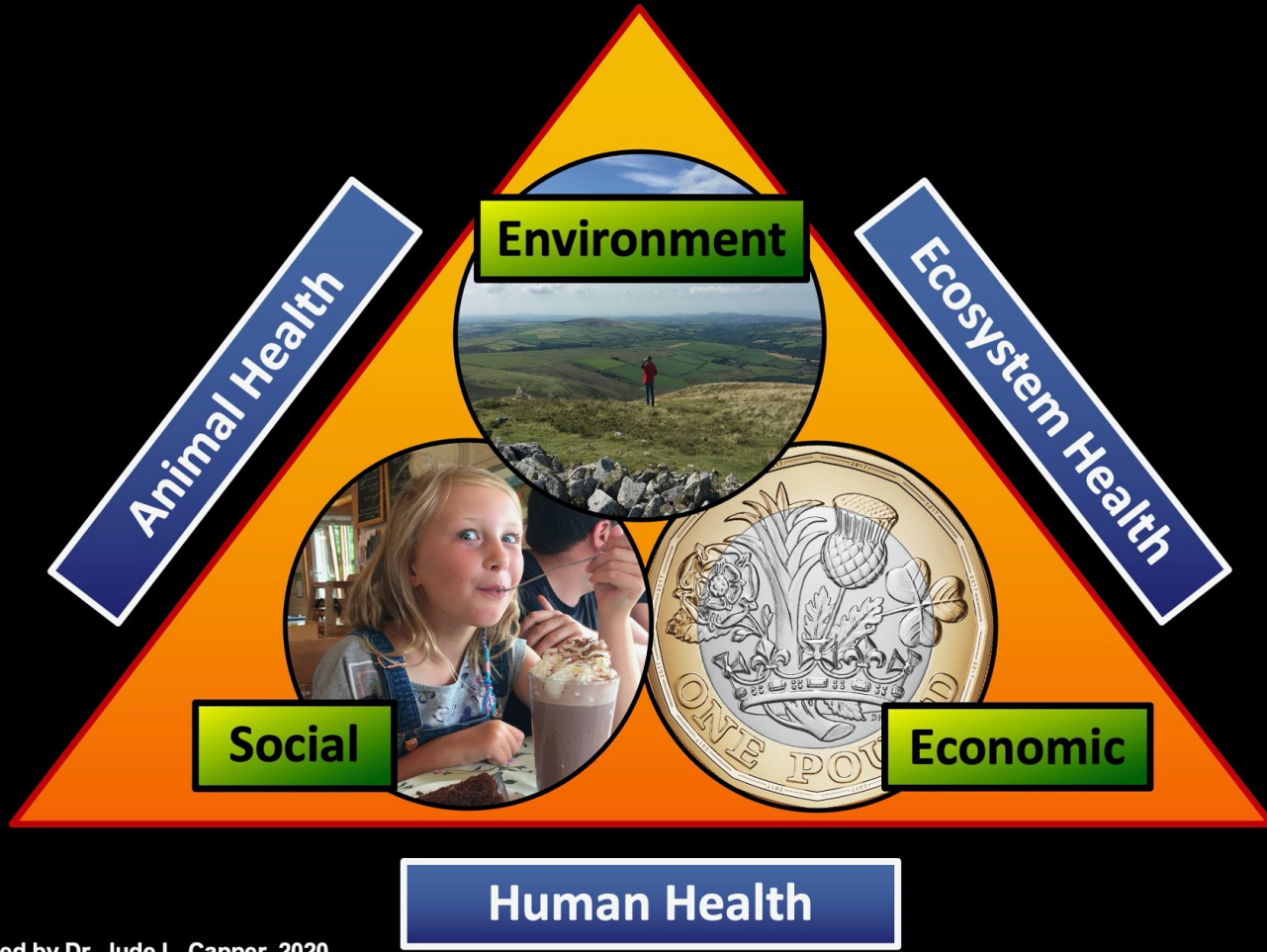


Source: Created and photos by Dr. Jude L. Capper, 2020

CAVI Conference 2021

s

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



**Dr. Jude Capper**  
**@bovidiva**



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

**CAVI Conference 2021**



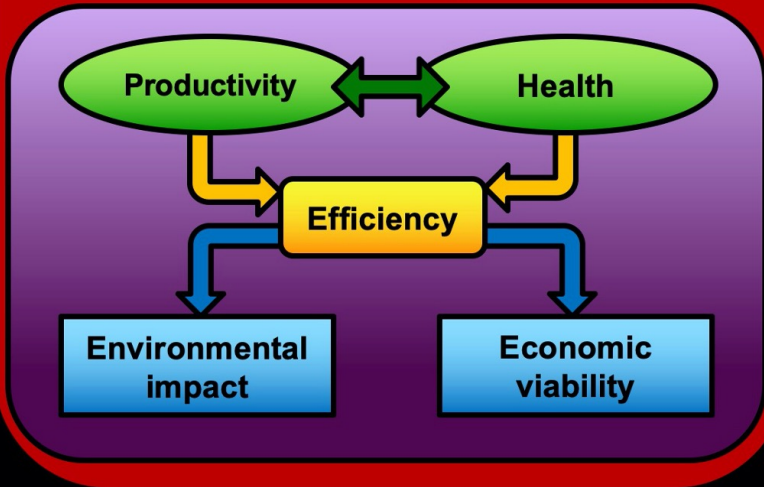
COM

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

Dr. Jude Capper  
@bovidiva



## Social Acceptability



## Sustainability



CAVI Conference 2021



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

B

# The global livestock industry is under threat

Dr. Jude Capper  
@bovidiva



Source: Created by Dr. Jude L. Capper, 2011; Photos from: <http://www.goveg.com/environment-globalwarming.asp>  
<http://culturemap.com/newsdetail/09-03-10-is-sex-in-the-shower-killing-our-water-supply-relax-beef-production-is-a-bigger-culprit/>;  
[http://animals.change.org/blog/view/save\\_the\\_animals\\_save\\_the\\_planet\\_blog\\_action\\_day\\_09\\_climate\\_change;](http://animals.change.org/blog/view/save_the_animals_save_the_planet_blog_action_day_09_climate_change;)  
<http://www.peta.org/mc/ads/PAMpartsPETA300.jpg>

CAVI Conference 2021

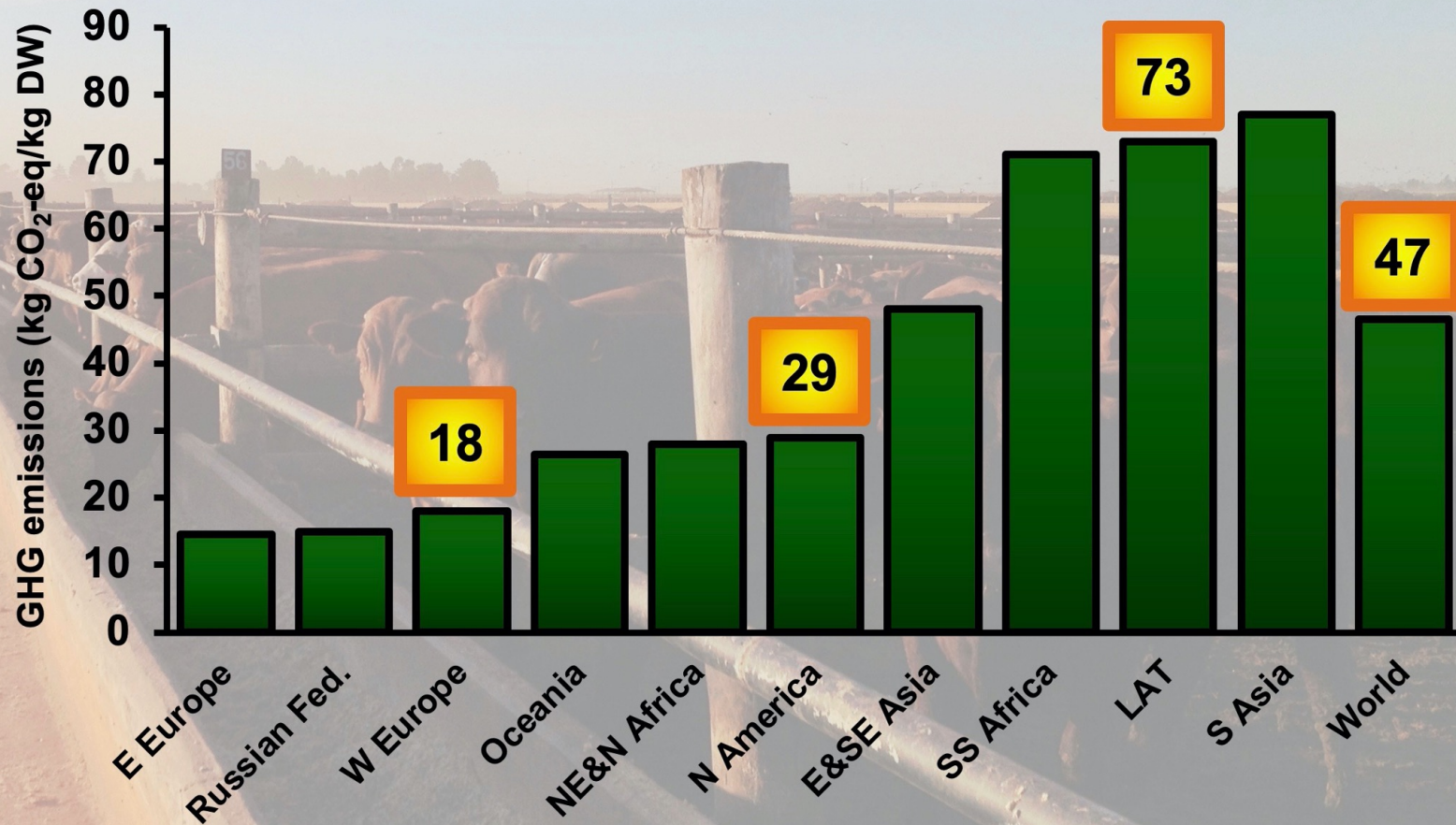


Dr. Jude Capper  
@bovidiva



B

## 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.

CAVI Conference 2021



B

# Improving animal productivity reduces the environmental impact of milk and meat



Dr. Jude Capper  
@bovidiva



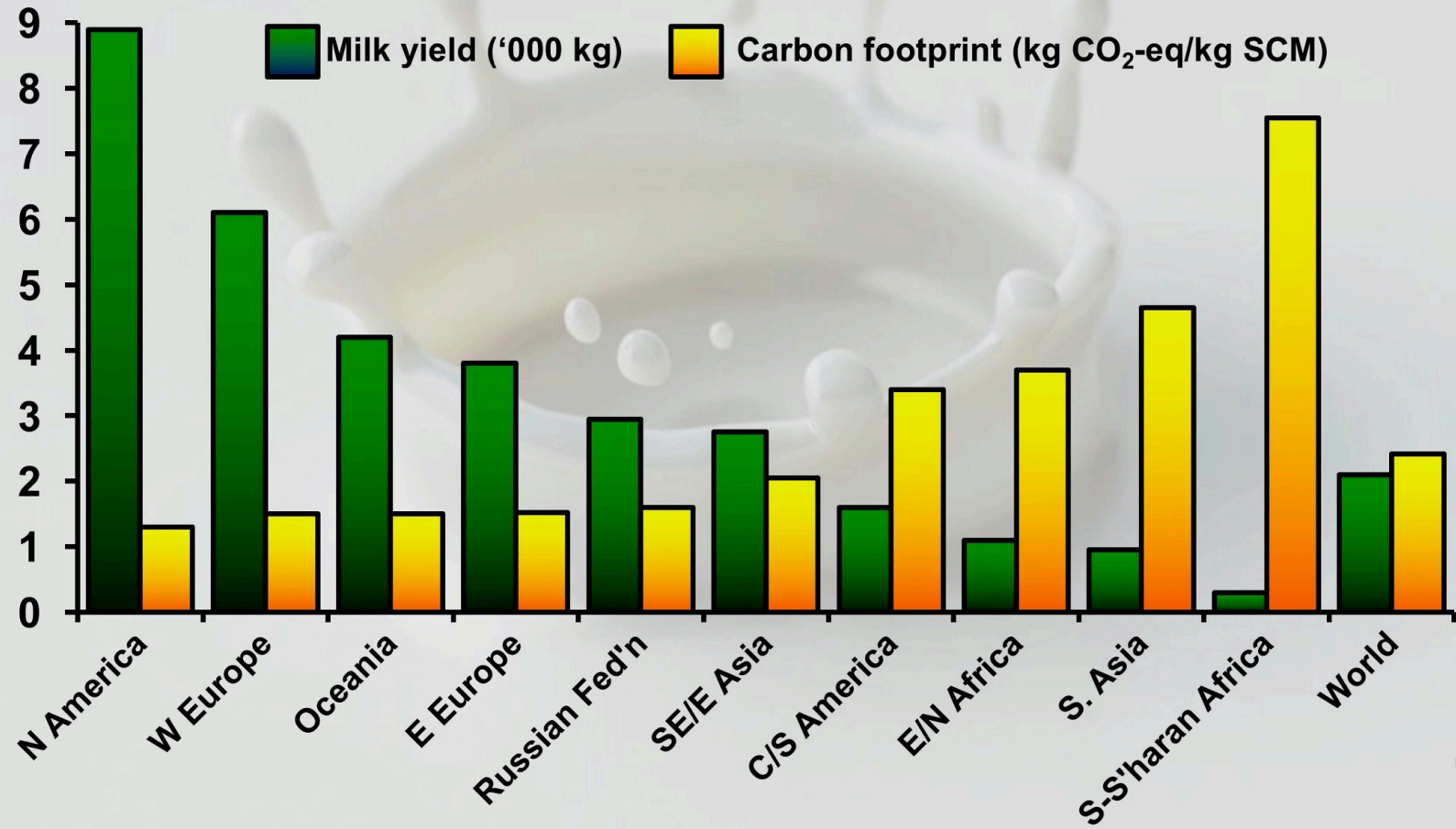
Source: Created by Dr. Jude L. Capper, 2020. Data from: Capper, JL. 2015. Sustainability and One Health. In: Cockcroft, P. *Bovine Medicine*. Wiley-Blackwell, Oxford, UK.

CAVI Conference 2021



DS

# A negative correlation exists between milk yield and carbon emissions



Source: Created by Dr. Jude L. Capper, 2016; data from: FAO (2010) Greenhouse Gas Emissions from the Dairy Sector. FAO, Rome, Italy.

Dr. Jude Capper  
@bovidiva



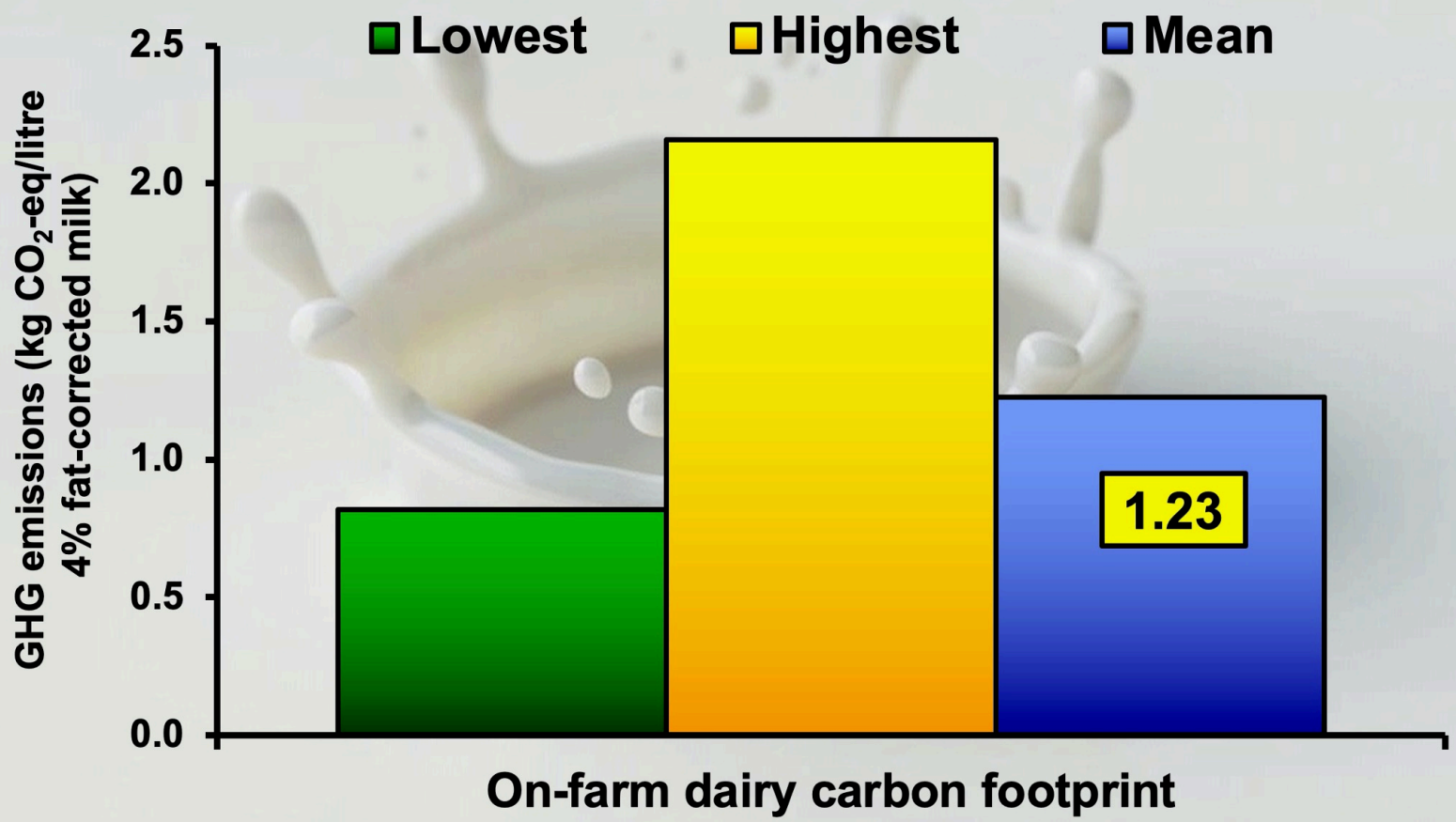
CAVI Conference 2021





DS

# GHG emissions from UK dairy vary, but were cut by 24% from 1990-2015



On-farm dairy carbon footprint

Source: Created by Dr. Jude L. Capper, 2020; data from: DairyCo (2013) Greenhouse gas emissions on British dairy farms. AHDB, Stoneleigh, UK and The Dairy Roadmap (2018) The UK dairy roadmap – Showcasing 10 years of environmental commitment. AHDB, Stoneleigh, UK

Dr. Jude Capper  
@bovidiva



CAVI Conference 2021



D

# Improving key performance indicators reduces environmental impact and economic cost

- Nutrition**
- Reproduction**
- Lameness**
- Mastitis**
- Metabolic disease**
- Infectious disease**
- Dry period length**
- Age at first calving**
- Antibiotic residues**
- Feed wastage**
- Pasture management**



**Dr. Jude Capper**

**@bovidiva**



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

**CAVI Conference 2021**

Dr. Jude Capper

@bovidiva



D

What could global dairying look like if we improved health, nutrition and genetics?

Global average yield

2,577  
kg

UK average yield

8,140  
kg

Dairy cows

-181  
million

If all dairy cattle had UK yields, global milk supply could be maintained using 181 million fewer cows (69%).

At US average yields, 200 million fewer cows (75%)

Source: Created by Dr. Jude L. Capper, 2020. Data from: FAOSTAT (2020) <http://www.fao.org/faostat/en/>

CAVI Conference 2021

AH

Disease losses are significant and preventable, but the sustainability impacts aren't quantified

Lost: 20%

Harvested: 80%

At the worldwide level, average losses due to animal diseases are more than 20% (OIE, 2008)

Dr. Jude Capper  
@bovidiva



Source: Created by Dr. Jude L. Capper, 2020. Data from: World Organization for Animal Health. 2008. <http://www.oie.int/for-the-media/editorials/detail/article/feeding-the-world-better-by-controlling-animal-diseases>

CAVI Conference 2021

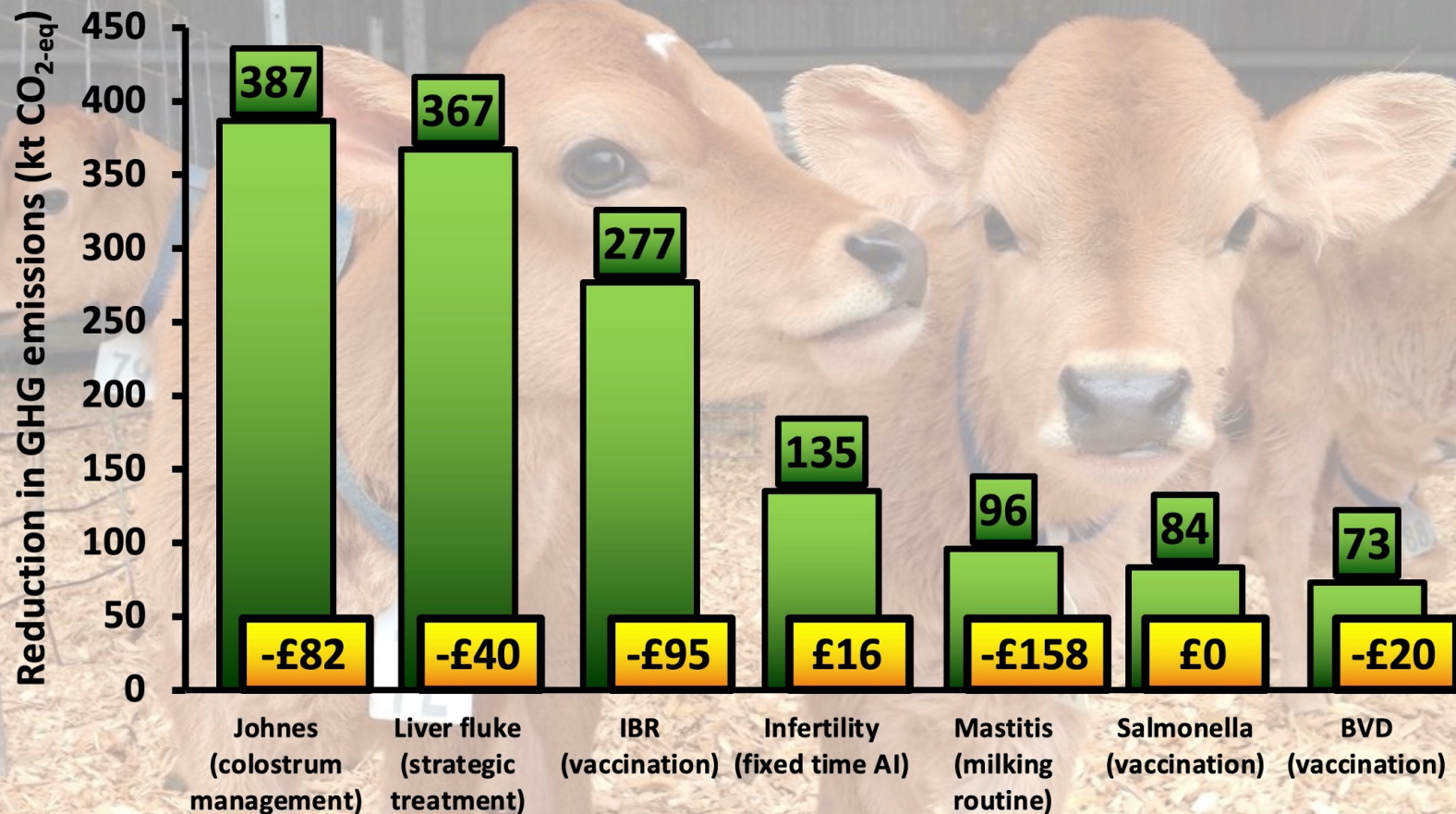


Dr. Jude Capper  
@bovidiva



AH

# Disease mitigation measures have varying impacts on GHG emissions and economic cost



Source: Created by Dr. Jude L. Capper, 2020. Data from: ADAS (2015) Study to Model the Impact of Controlling Endemic Cattle Diseases and Conditions on National Cattle Productivity, Agricultural Performance and Greenhouse Gas Emissions. ADAS UK Ltd, Herts, UK.

CAVI Conference 2021



AH

# Consumers consider antibiotic use to be acceptable in sick livestock

*“Should sick farm animals be treated with antibiotics if this is the most appropriate treatment?”*

**56% of EU consumers (77% of UK consumers) surveyed agreed or tended to agree that antibiotics should be used**



**Dr. Jude Capper**  
**@bovidiva**



**CAVI Conference 2021**

Source: Created by Dr. Jude L. Capper, 2020. Data from: Eurobarometer. 2018. Antimicrobial Resistance. Special Report 478. The European Commission, Brussels, Belgium.

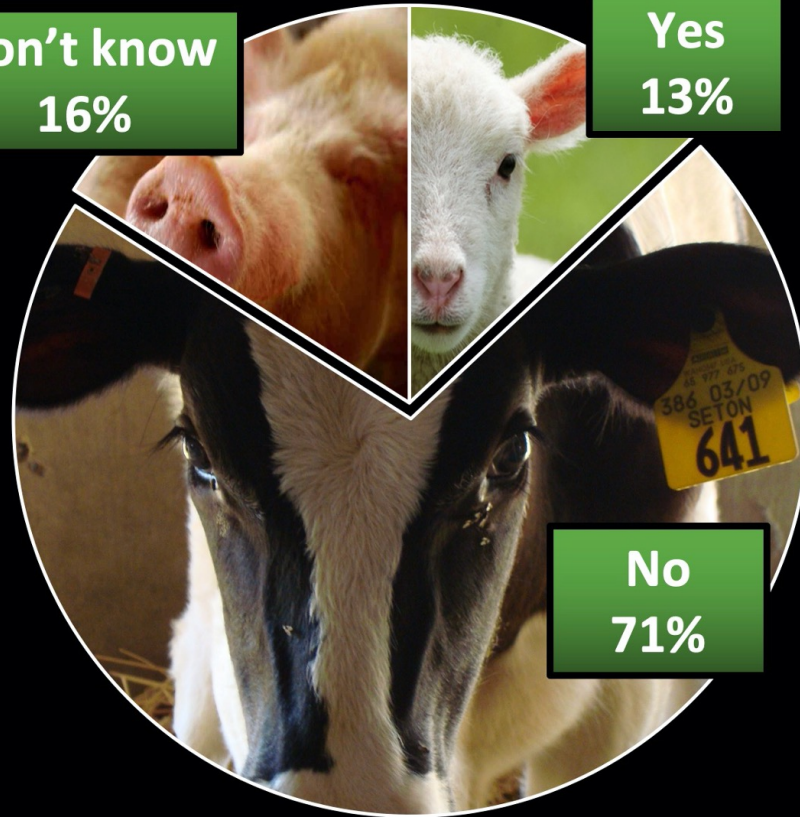


AH

# Consumers do not consider enough is being done to reduce antibiotic use

Don't know  
16%

Yes  
13%



*“Are sufficient actions undertaken to control or prevent overuse of antibiotics in farm animals?”*

**The majority (71%) of EU consumers surveyed considered that not enough was being done**

**Dr. Jude Capper**  
**@bovidiva**



Source: Created by Dr. Jude L. Capper, 2019. Data from: Etienne et al. 2016. EU Insights – Perceptions on the human health impact of antimicrobial resistance (AMR) and antibiotics use in animals across the EU. EFSA Supporting publication 2017:EN-1183.

**CAVI Conference 2021**



B

# 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!

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

**Farm webcam and sustainability assessment data**



\*compared to ideal protein



Dr. Jude Capper  
@bovidiva



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

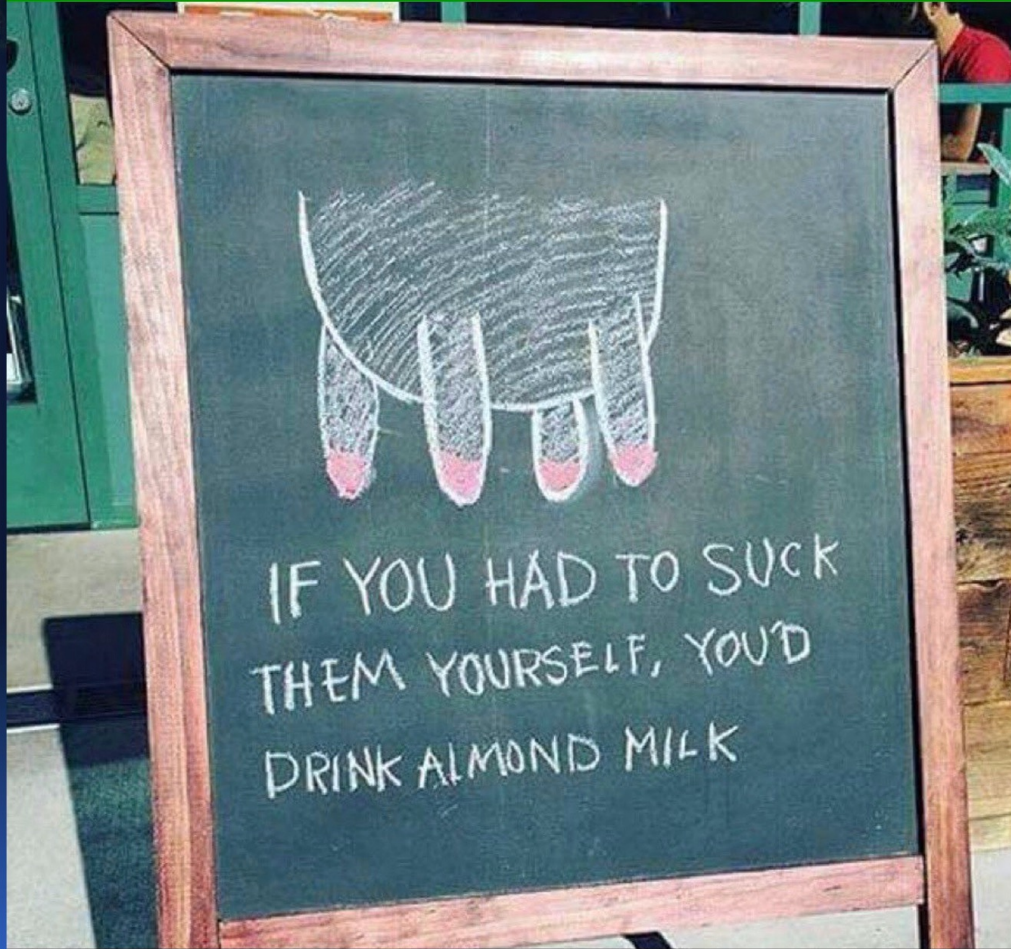
CAVI Conference 2021





D

# Are provocative messages influencing consumers?



**Alternative beverages are gaining market share – but does this represent a shift to vegetarian and vegan diets?**

**CAVI Conference 2021**

**Dr. Jude Capper**  
**@bovidiva**



Source: Created by Dr. Jude L. Capper, 2020. Photo from: <https://pbs.twimg.com/media/C1LXdDoUUA2KH.jpg>





D  
Is the rise in plant-based food sales related to consumer demand?

Dr. Jude Capper  
@bovidiva



Lockdown preparations in local food hall indicate that dairy may be a priority for many panic-buyers

CAVI Conference 2021

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



COM

Do 402,206 Veganuary participants amount to more than a hill of beans?

**JOIN THE  
NEW YEAR'S  
REVOLUTION**



- Slightly greater than the population of Coventry
- If all participants were UK-based they would comprise <1% of the UK population
- Average of 2,095 per participating country
- 62% of participants already vegan, vegetarian or pescatarian

Source: Created by Dr. Jude L. Capper, 2020. Information from: <https://veganuary.com/veganuary-2020-official-survey-results/>

**Dr. Jude Capper**

**@bovidiva**



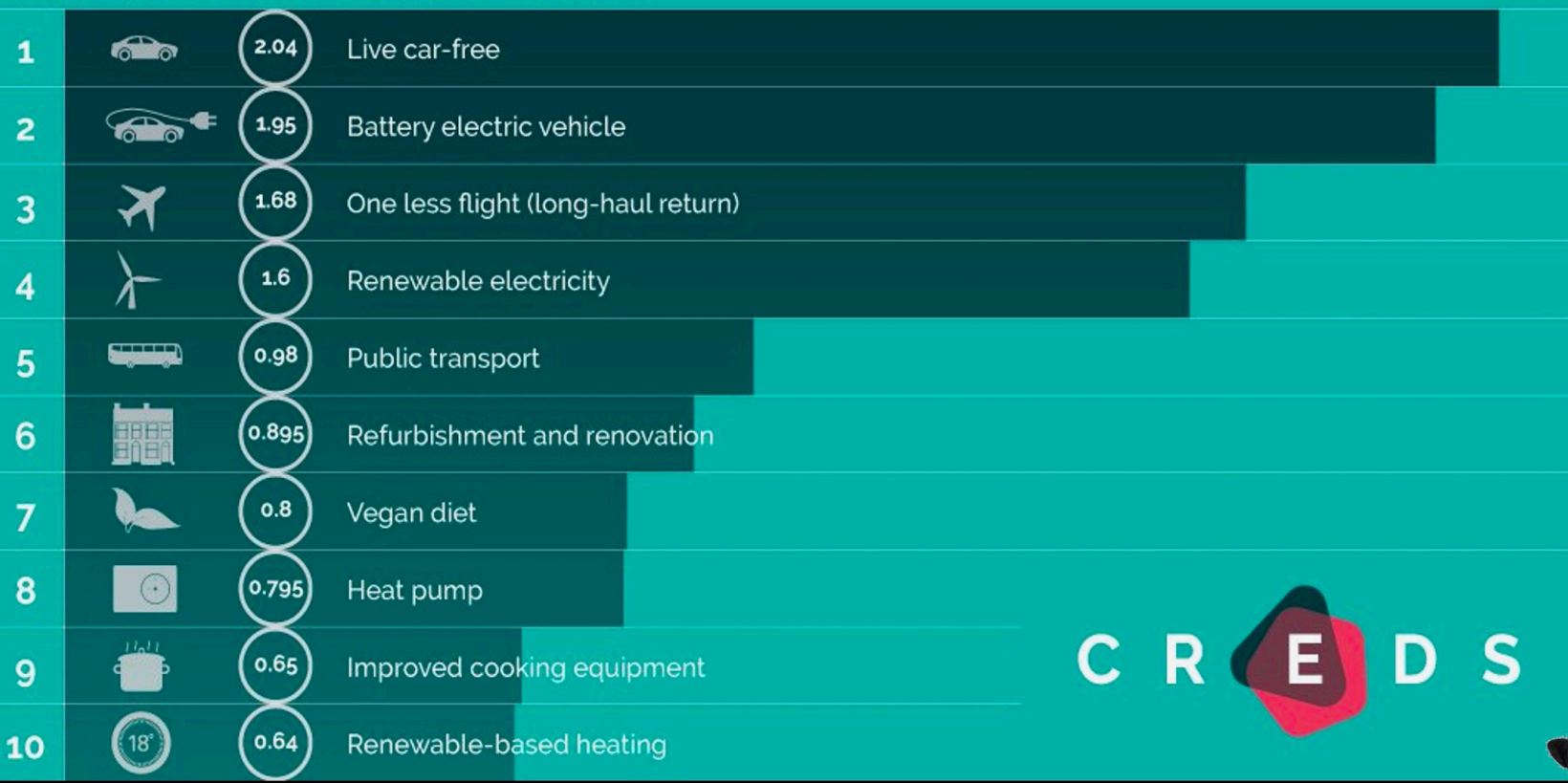
**CAVI Conference 2021**



CV

# New CREDS report puts transport, energy and food choices into context

## Top 10 options for reducing your carbon footprint



Dr. Jude Capper  
@bovidiva



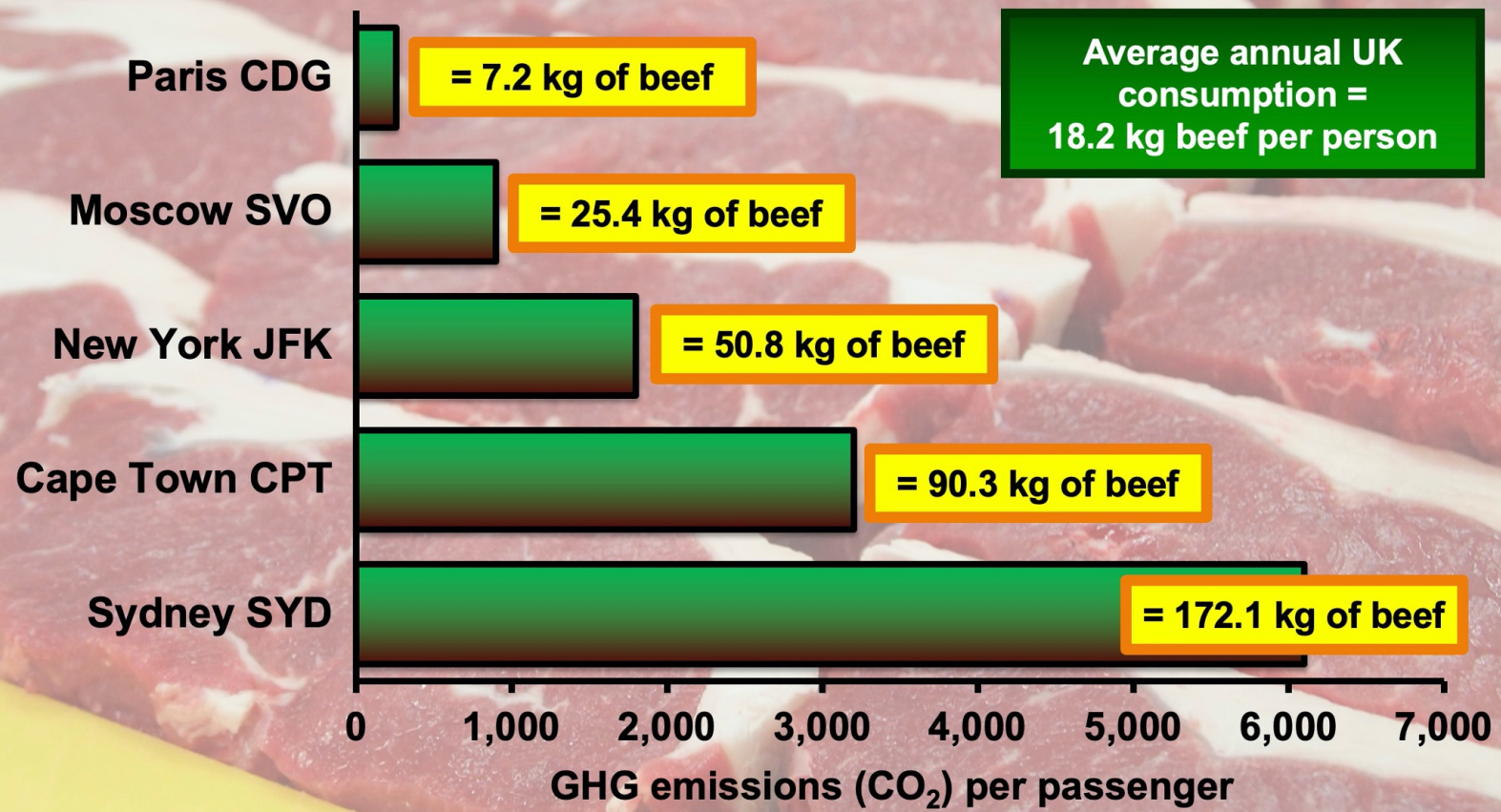
CAVI Conference 2021

Source: Created by Dr. Jude L. Capper, 2020. . Infographic adapted from Centre for Research into Energy Demand Solutions (2020). Available at: [https://twitter.com/CREDS\\_UK/status/1262984570175176704?s=20](https://twitter.com/CREDS_UK/status/1262984570175176704?s=20)



CV

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



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

Dr. Jude Capper  
@bovidiva



CAVI Conference 2021

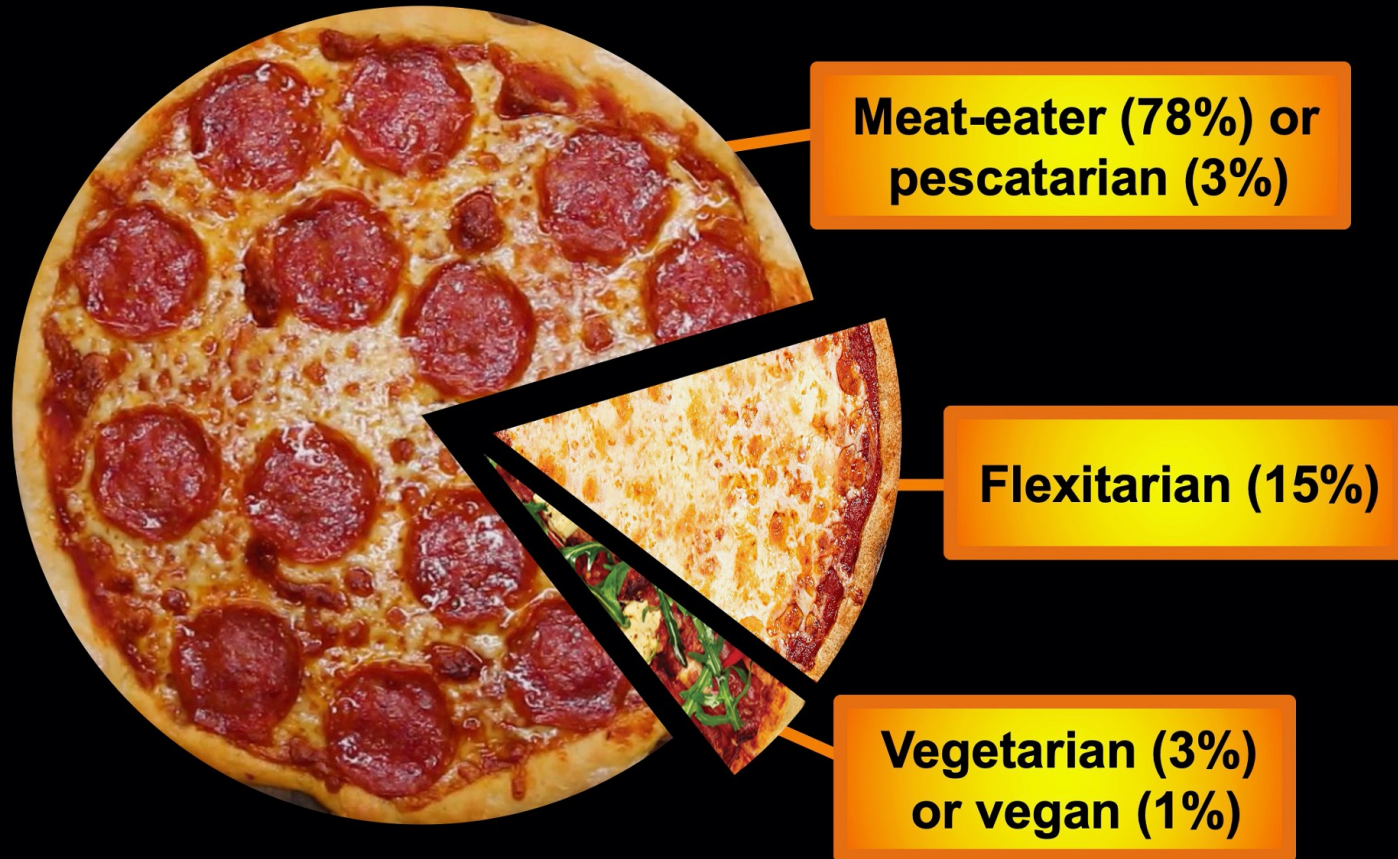


Dr. Jude Capper  
@bovidiva



B

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



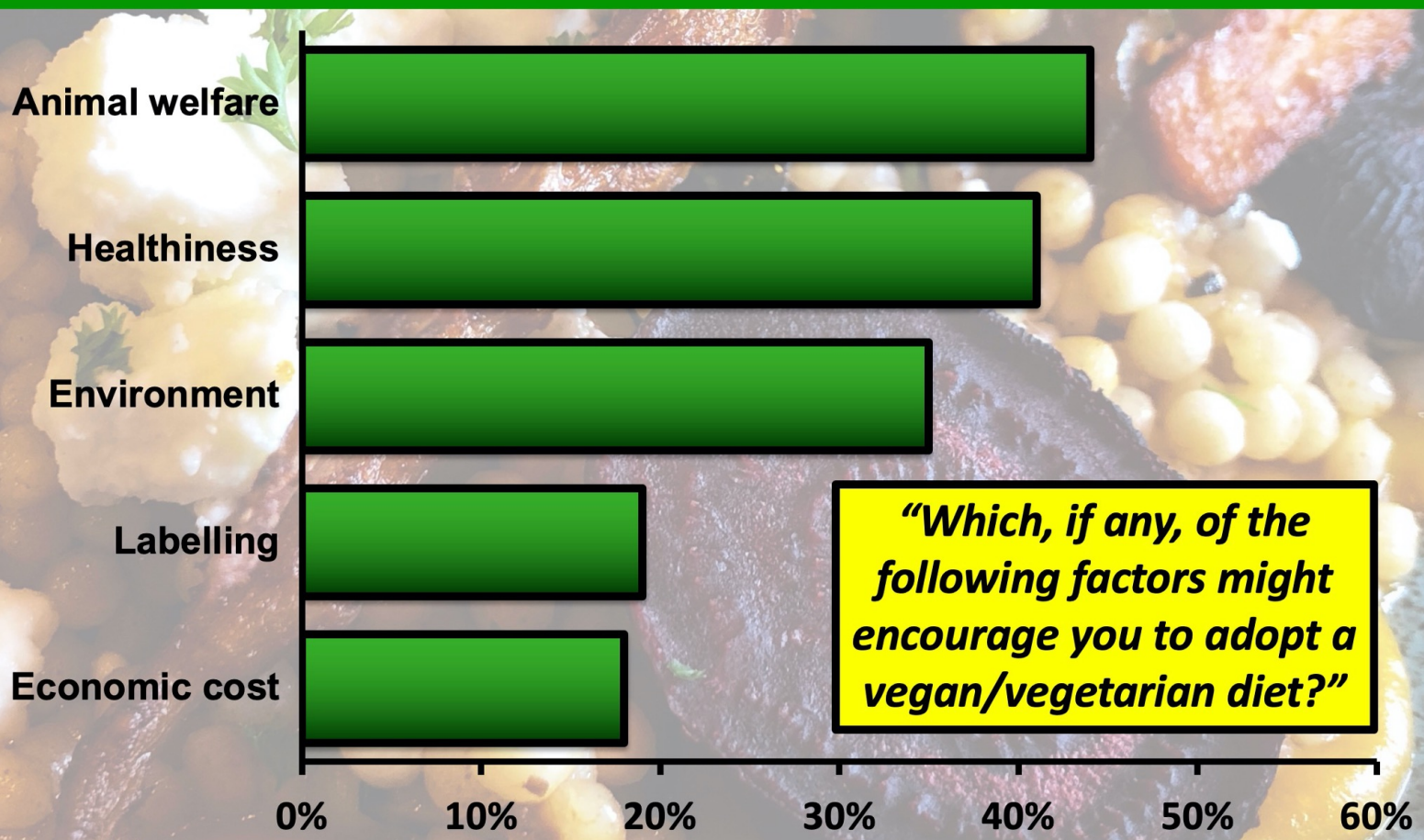
Source: Created by Dr. Jude L. Capper, 2020. Data from: YouGov (2019) Is the future of food flexitarian?  
<https://yougov.co.uk/topics/resources/articles-reports/2019/03/18/future-food-flexitarian> Question: "Which, if any, of these best describes your usual eating habits?" Results adjusted for people who answered "don't know" (3%) or "other" (3%).

CAVI Conference 2021



COM

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



*“Which, if any, of the following factors might encourage you to adopt a vegan/vegetarian diet?”*

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>

**Dr. Jude Capper**  
**@bovidiva**



**CAVI Conference 2021**



COM

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

Dr. Jude Capper  
@bovidiva



*"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%

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>

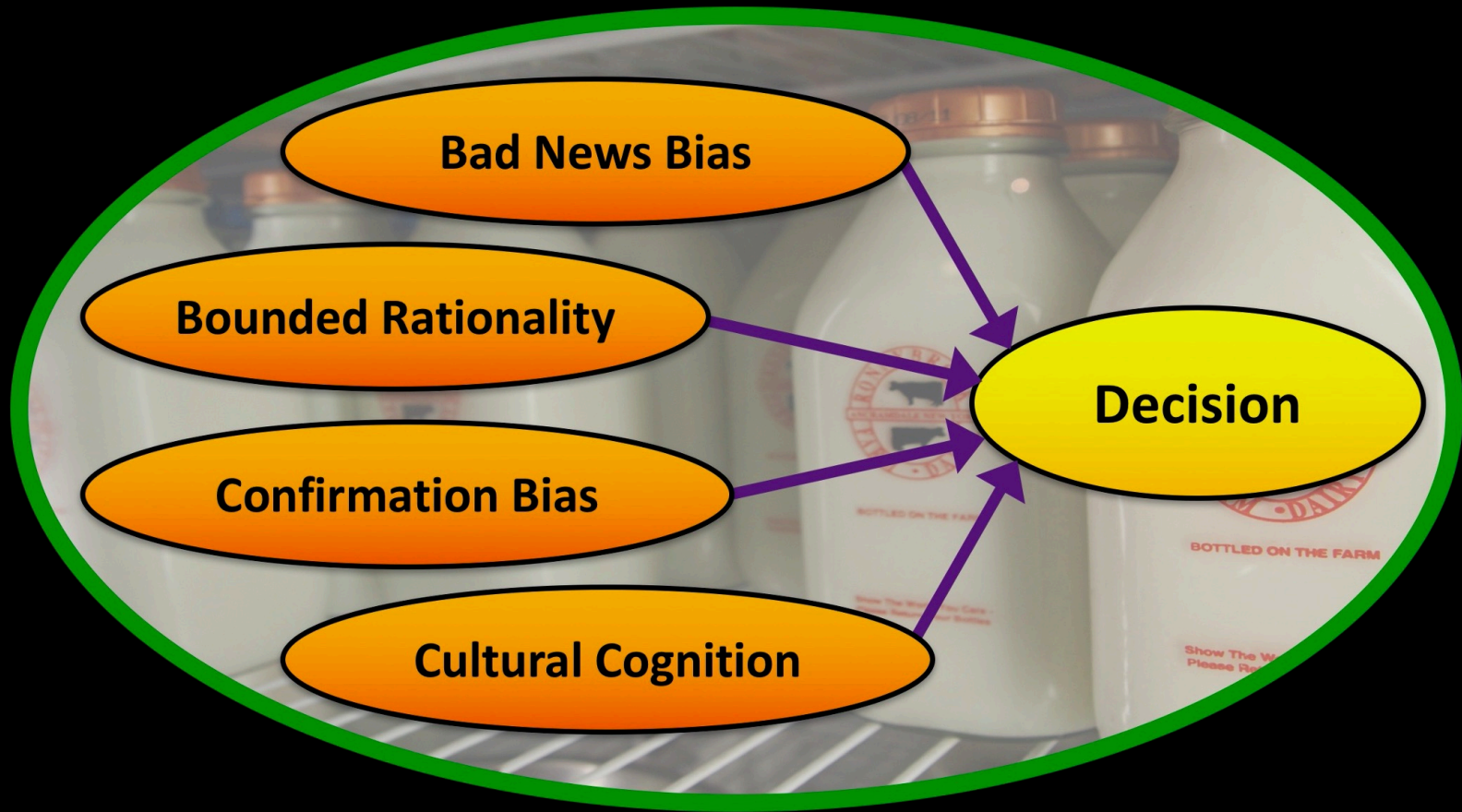
CAVI Conference 2021





COM

# Four major processes influence consumer decision-making



Dr. Jude Capper  
@bovidiva



CAVI Conference 2021

Source: Created by Dr. Jude L. Capper, 2017. Information from: Capper and Yancey (2015). Communicating Animal Science to the General Public. *Animal Frontiers*.

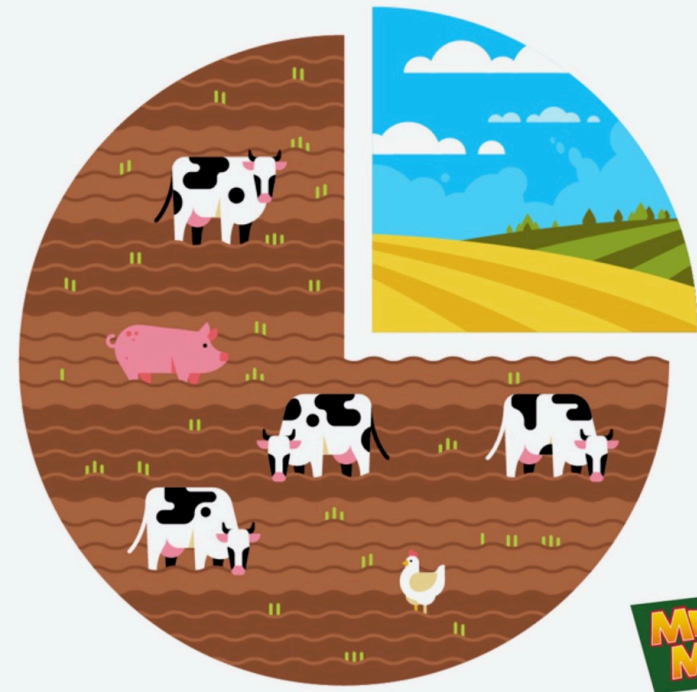


COM

Bad news bias – need five positive stories to cancel out each negative

We are programmed to believe bad news stories. Tidal wave of factual information needed to overcome them.

LIVESTOCK PRODUCTION USES 75% OF THE EARTH'S AGRICULTURAL LAND.



MEATLESS MONDAY

CAVI Conference 2021

Dr. Jude Capper @bovidiva



Source: Created by Dr. Jude L. Capper, 2020. Infographic from: <https://www.pinterest.co.uk/pin/254383078939543245/>



s

65% of UK land is not suitable for growing arable crops



Dr. Jude Capper @bovidiva



Source: Created by Dr. Jude L. Capper, 2020. Grazing land includes temporary grass on arable land (6% of total), land used for outdoor pigs or non-agricultural purposes not shown (1.7% of total). Data from DEFRA. 2019. Farming statistics - provisional crop areas, yields and livestock populations at 1 June 2019 – United Kingdom.

[https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/837834/structure-jun2019prov-UK-10oct19.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/837834/structure-jun2019prov-UK-10oct19.pdf)

CAVI Conference 2021

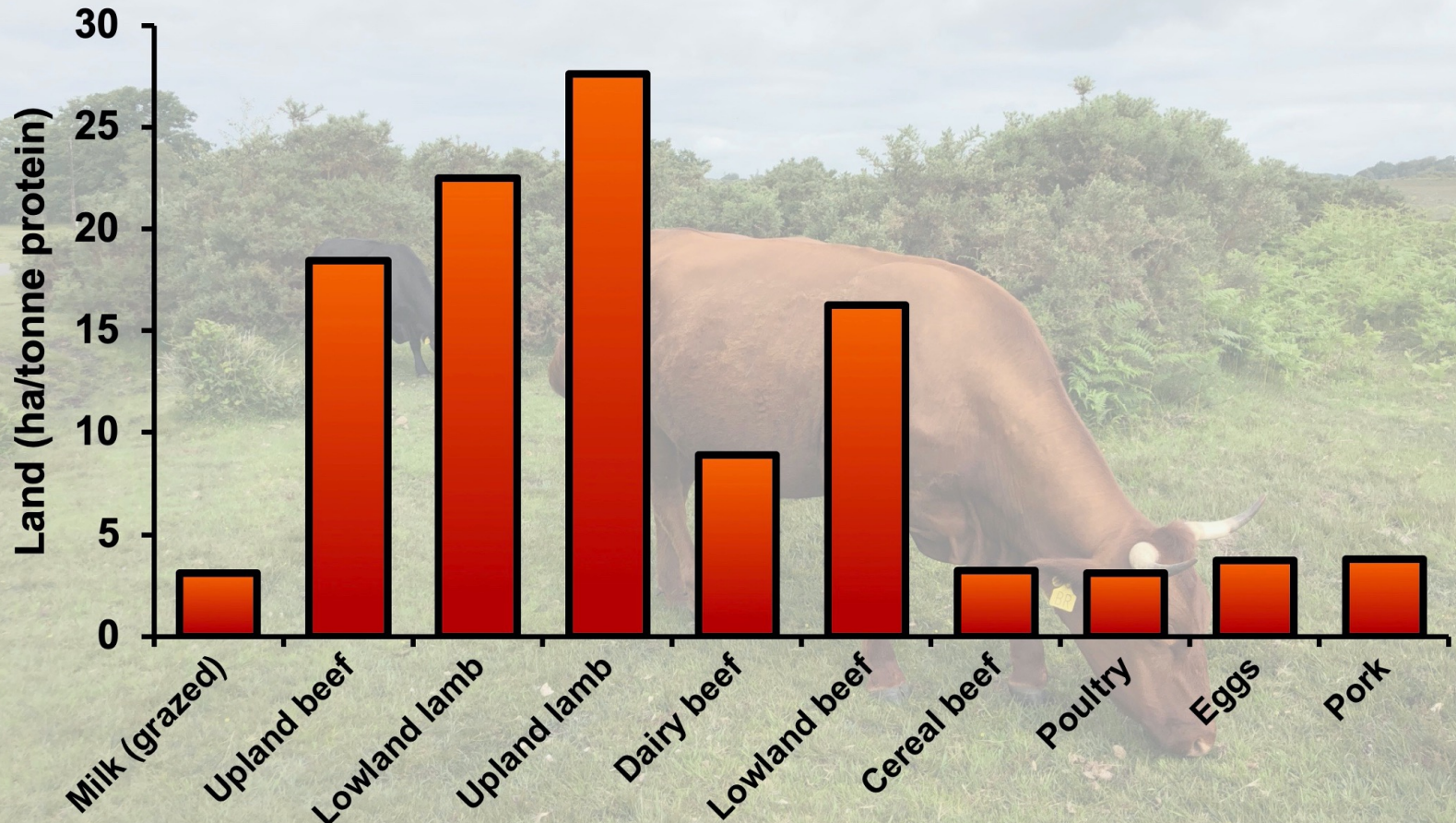


Dr. Jude Capper  
@bovidiva



s

# Livestock systems vary widely in land 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*.

CAVI Conference 2021



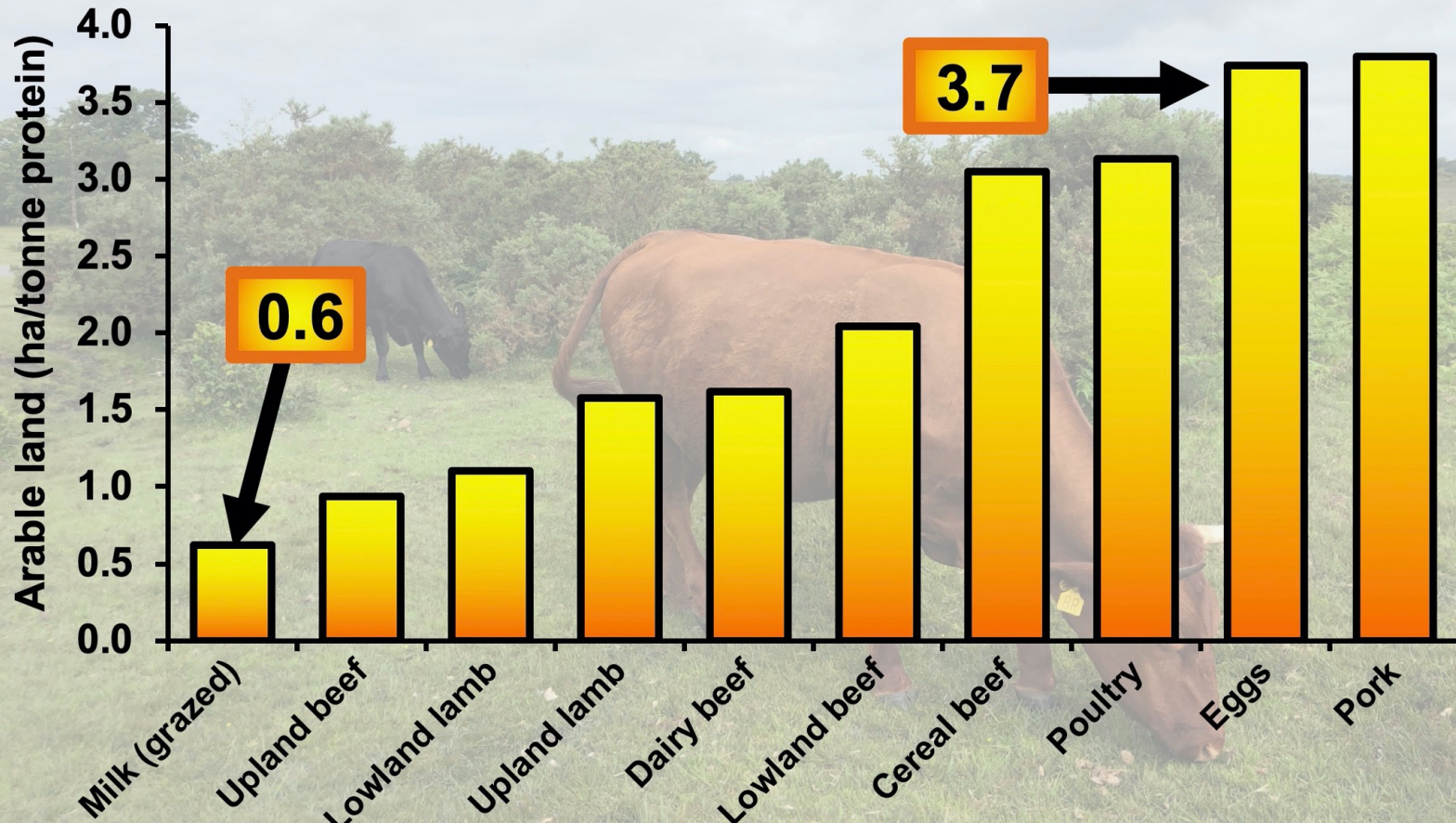
Dr. Jude Capper

@bovidiva



s

# Livestock systems vary widely in arable land 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.

CAVI Conference 2021



S

# What do these industries have in common? They all provide by-products fed to animals



Source: Created by Dr. Jude L. Capper, 2013

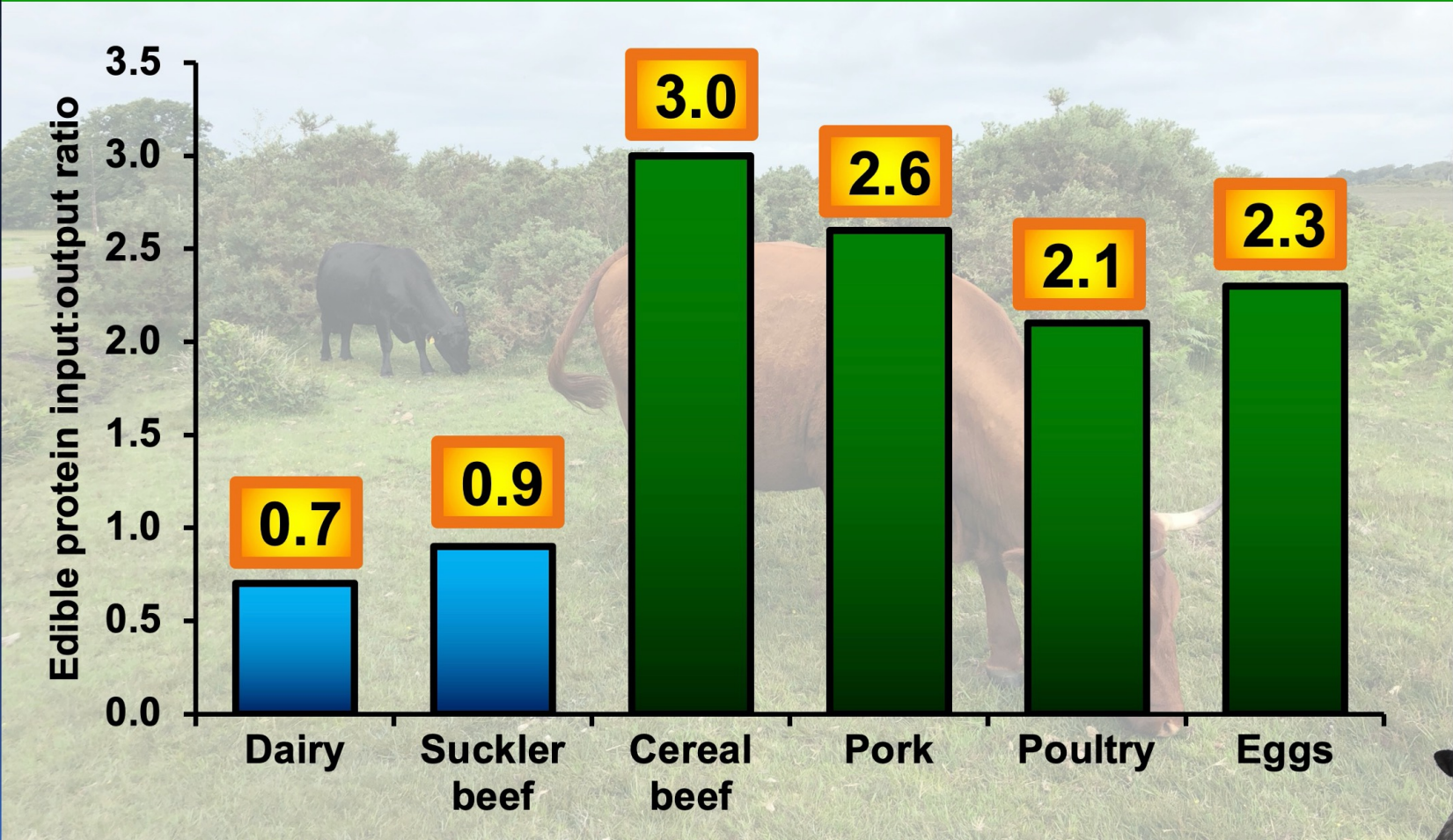
Dr. Jude Capper  
@bovidiva



CAVI Conference 2021



<sup>s</sup> Grazing cattle systems produce more human-edible protein than they consume



Source: Created by Dr. Jude L. Capper, 2020; data from Wilkinson (2011) Re-defining efficiency of feed use by livestock. *Animal*.

Dr. Jude Capper  
@bovidiva



CAVI Conference 2021



COM

# Bounded rationality - we don't have time to research, so need quick, simple explanations

Based on the average UK diet

# 30%

of our protein intake comes from red meat...

...which is vital for our body's growth, maintenance and muscle recovery!



**Dr. Jude Capper**  
**@bovidiva**



**CAVI Conference 2021**

Source: Created by Dr. Jude L. Capper, 2020. Infographic from HCC (2020): <https://meatpromotion.wales/en/news-industry-info/download>



COM

# Confirmation bias – tapping into consumers' inherent beliefs to improve trust

Consumers may interpret bottle-feeding a calf as caring or cruel, depending on pre-conceived ideas

CAVI Conference 2021

Dr. Jude Capper

@bovidiva

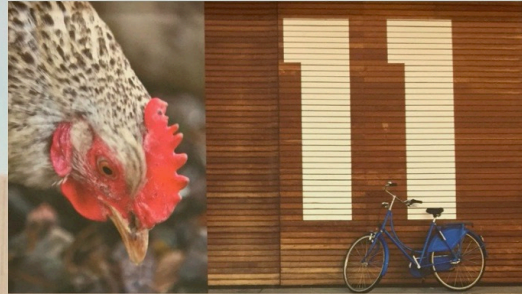


Source: Created by Dr. Jude L. Capper, 2020.



COM

We need transparency not bucolic imagery



TRACED FROM FARM TO KITCHEN

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

Dr. Jude Capper  
@bovidiva



CAVI Conference 2021



COM

Cultural cognition – we trust people with whom we share values and wish to emulate

Dr. Jude Capper @bovidiva



England rugby player credited <3 week recovery from broken leg to drinking 2 pints of milk per day

Source: Created by Dr. Jude L. Capper, 2019. Screenshot from: <http://www.telegraph.co.uk/rugby-union/2017/02/02/england-prop-joe-marler-reveals-secret-behind-hisremarkable/>

The Telegraph

HOME | NEWS

# Sport | Rugby Union

Rugby Union | Fixtures | Results | Tables | Lions | Aviva Premiership | Brian Moore

Home > Sport > Rugby Union

## England prop Joe Marler reveals the secret behind his remarkable recovery in time for Six Nations



CAVI Conference 2021

COM

## 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**

**Dr. Jude Capper**

**@bovidiva**



**CAVI Conference 2021**



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



B  
**Thank you!**

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

**Dr. Jude Capper**  
**@bovidiva**



**Questions?**



**CAVI Conference 2021**

Source: Created by Dr. Jude L. Capper, 2020. Cartoon from: <http://RubesCartoons.com>