

Jude Capper, PhD

@bovidiva



Sustainability
in action – how
do we “meat”
demand
without
“milking” the
environment?

7th September 2022

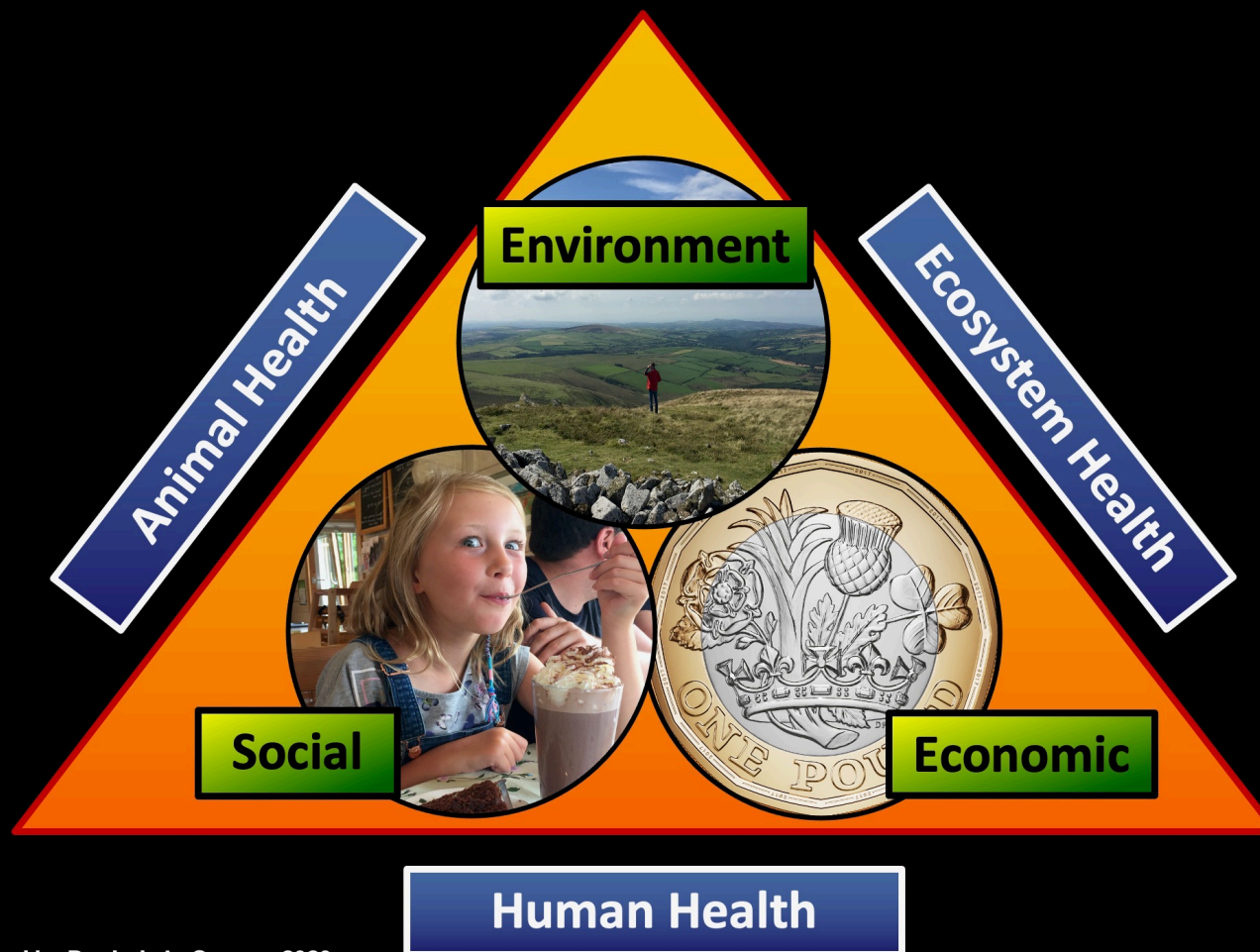
Source: Dr. Jude L. Capper, 2022

World Buiatrics Congress 2022



S

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



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

Jude Capper, PhD
@bovidiva

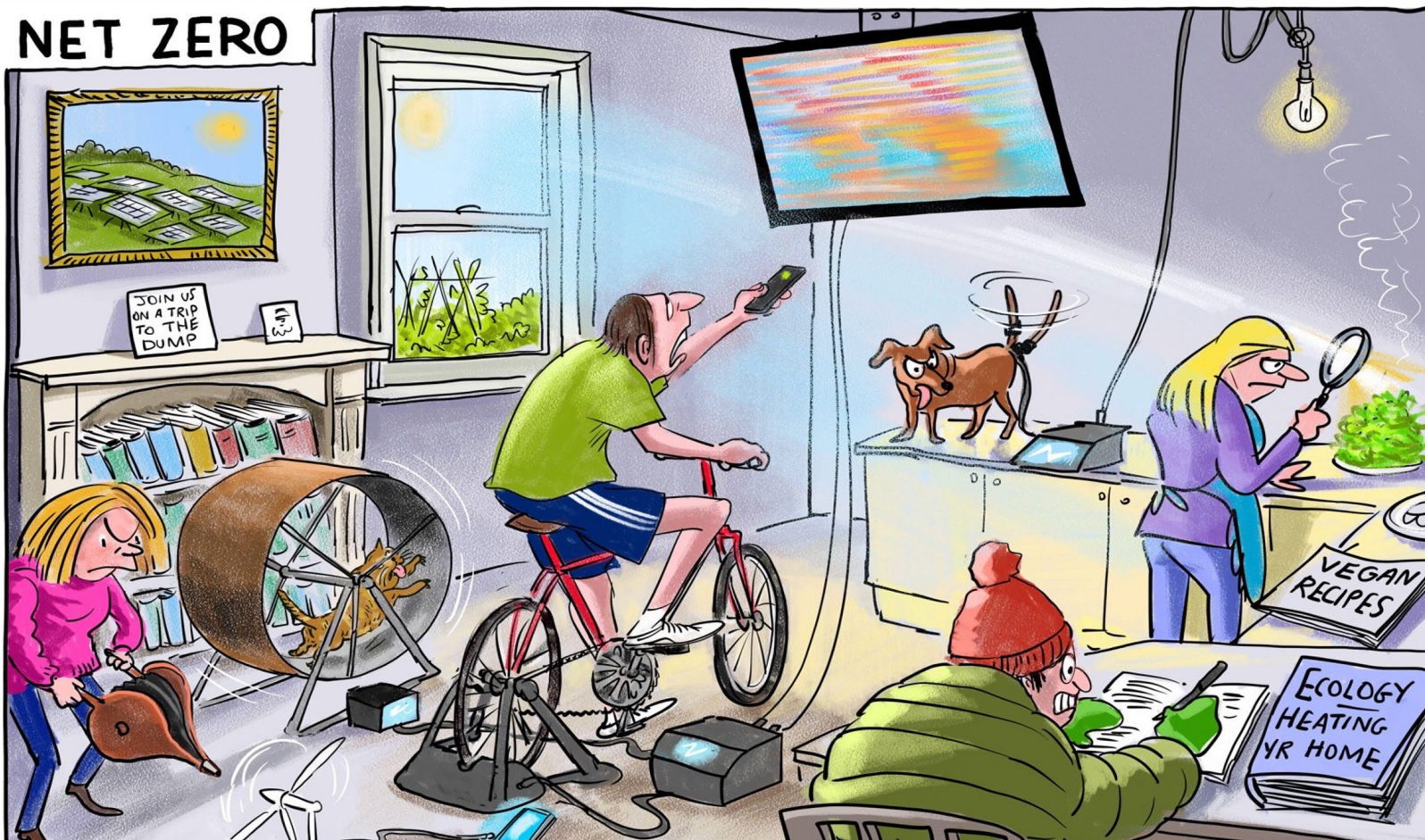


World Buiatrics Congress 2022



S

Net Zero is a clear priority



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

Jude Capper, PhD
@bovidiva



World Buiatrics Congress 2022



Jude Capper, PhD

@bovidiva



S

Retailers face challenge of meeting net zero commitments

50% reduction in food-related GHG emissions by 2030 is possible, but only if we take

URGENT ACTION

wrap.org.uk/GHGPathway



wrap



Source: Created by Dr. Jude L. Capper, 2021. Infographic from: https://wrap.org.uk/sites/default/files/2021-10/WRAP_UK_food%20systems_GHG_Report_TWITTER_Urgent%20action.jpg?itok=8txblEnz

World Buiatrics Congress 2022



Jude Capper, PhD
@bovidiva



B

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/

World Buiatrics Congress 2022



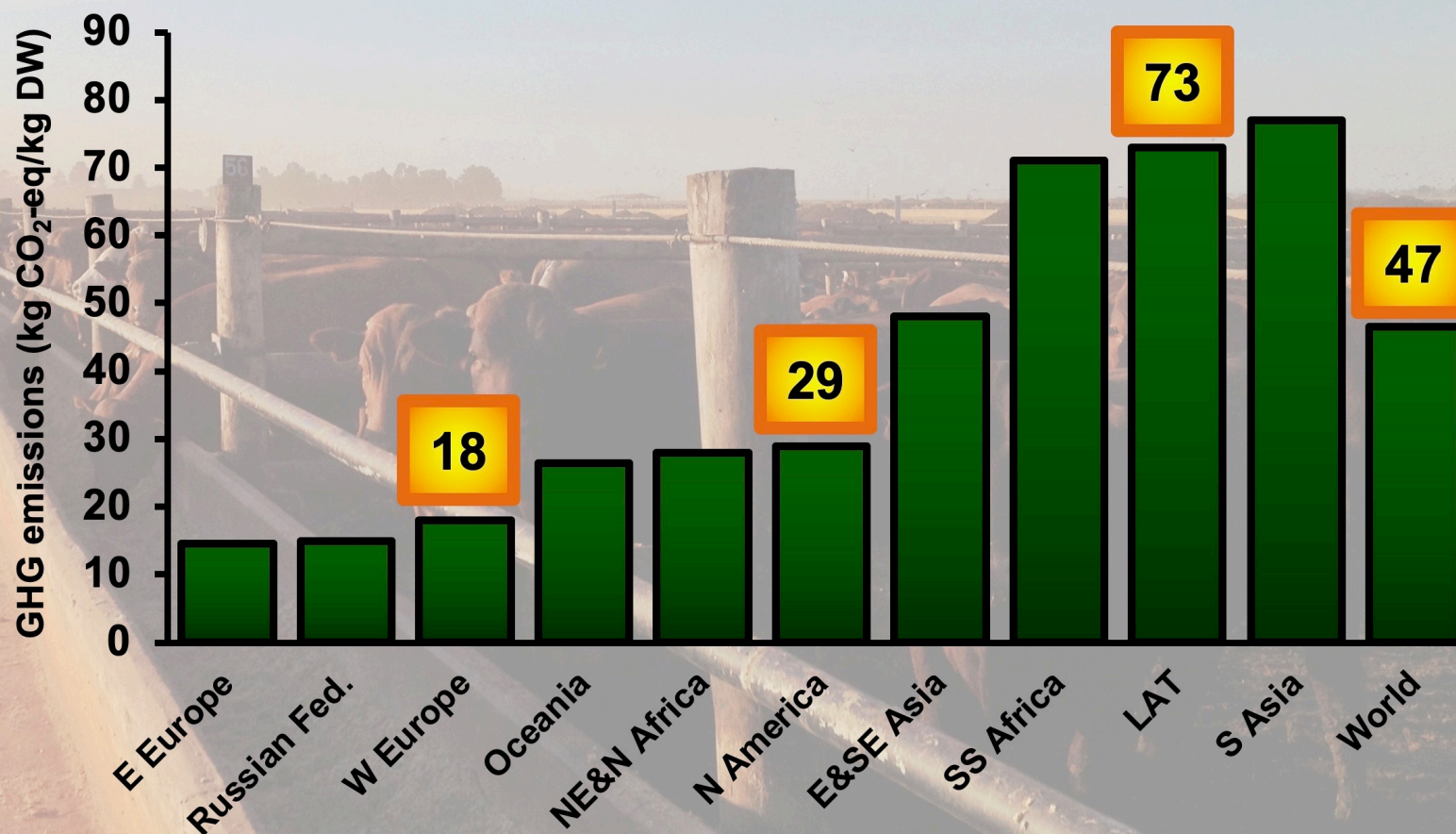
Jude Capper, PhD

@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.

World Buiatrics Congress 2022

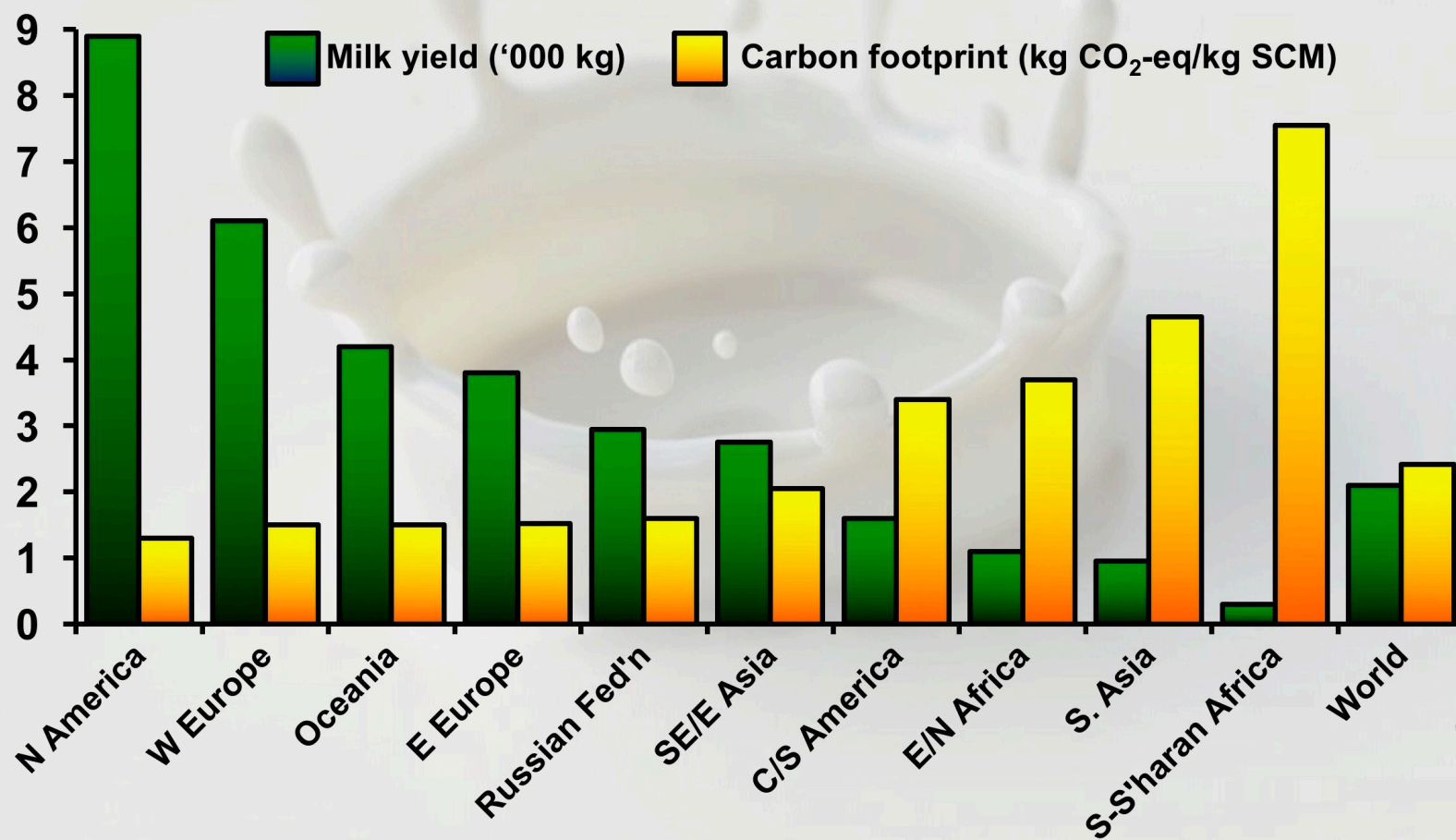


Jude Capper, PhD
@bovidiva



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.

World Buiatrics Congress 2022



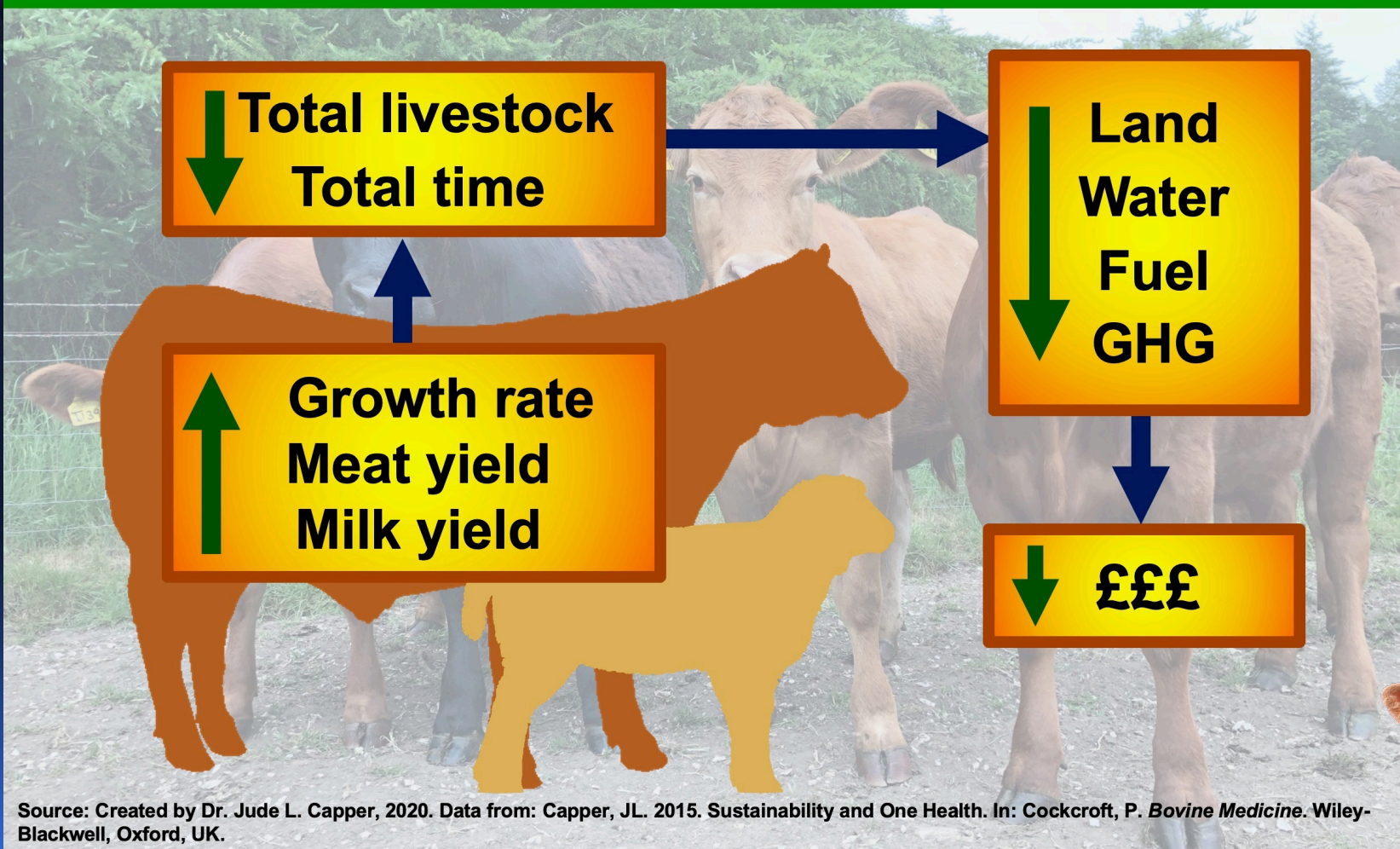
Jude Capper, PhD

@bovidiva



B

Improving animal productivity reduces the environmental impact of milk and meat



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

World Buiatrics Congress 2022



Jude Capper, PhD
@bovidiva



S

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.*

World Buiatrics Congress 2022



Jude Capper, PhD

@bovidiva



D

U.S. dairy producers cut greenhouse gas emissions by 19% between 2007-2017



Source: Created by Dr. Jude L. Capper, 2021. Data from: Capper, J. L. and Cady, R. A. 2019. The effects of improved performance in the U.S. dairy cattle industry on environmental impacts between 2007 and 2017. *Journal of Animal Science*. <https://doi.org/10.1093/jas/skz291>

World Buiatrics Congress 2022



Jude Capper, PhD

@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/>

World Buiatrics Congress 2022

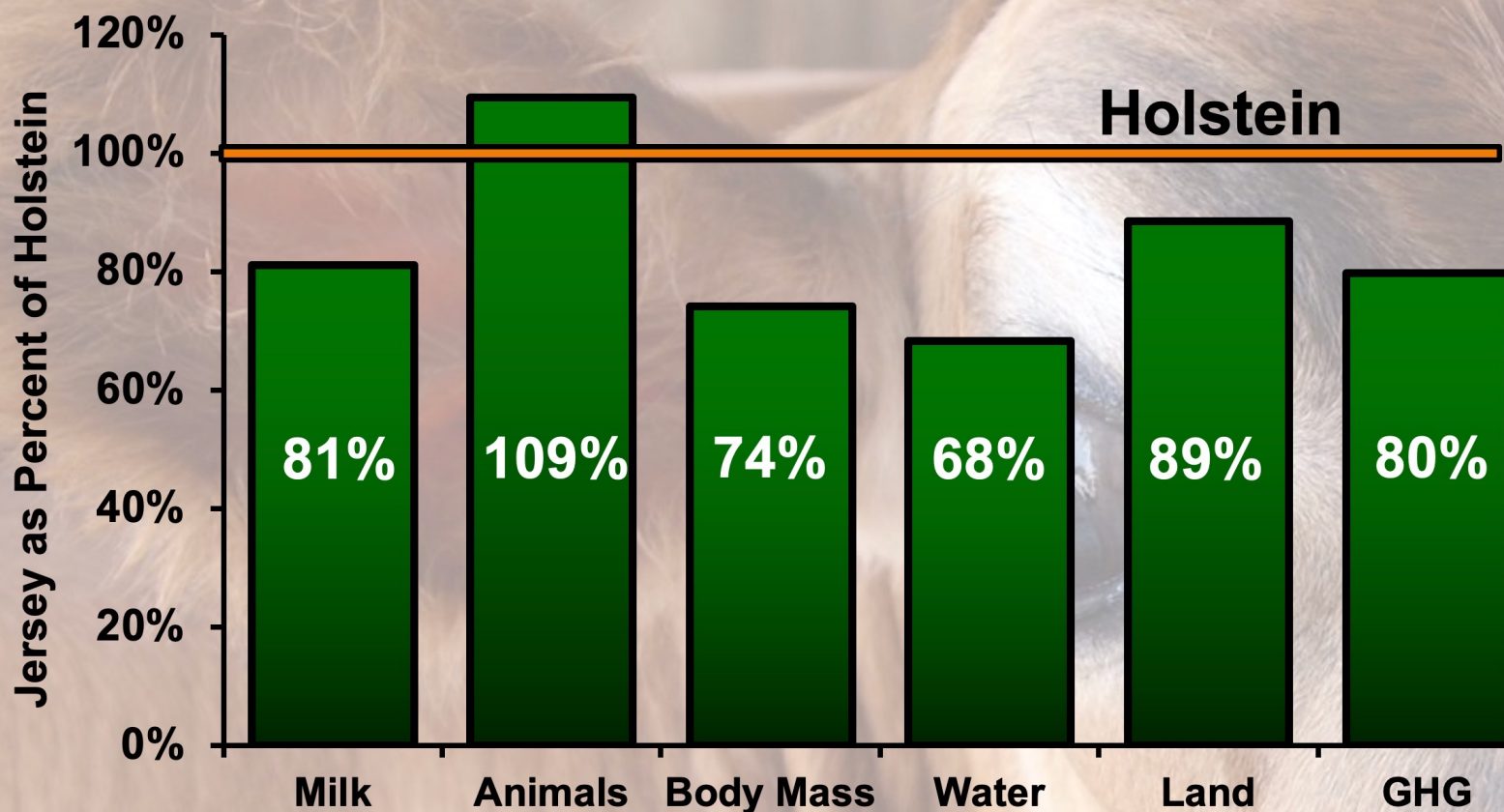
Jude Capper, PhD

@bovidiva



D

Jersey vs. Holstein: smaller cows have environmental advantage for cheese production



Source: Created by Dr. Jude L. Capper, 2020. Data from: Capper and Cady (2012) A comparison of the environmental impact of Jersey vs. Holstein milk for cheese production. *J. Dairy Sci.*

World Buiatrics Congress 2022



Jude Capper, PhD

@bovidiva



D

What about smallholders?



Source: Created by Dr. Jude L. Capper, 2021. Photo attribution: Mullookkaaran, CC BY-SA 3.0 <<https://creativecommons.org/licenses/by-sa/3.0/>>, via Wikimedia Commons

World Buiatrics Congress 2022



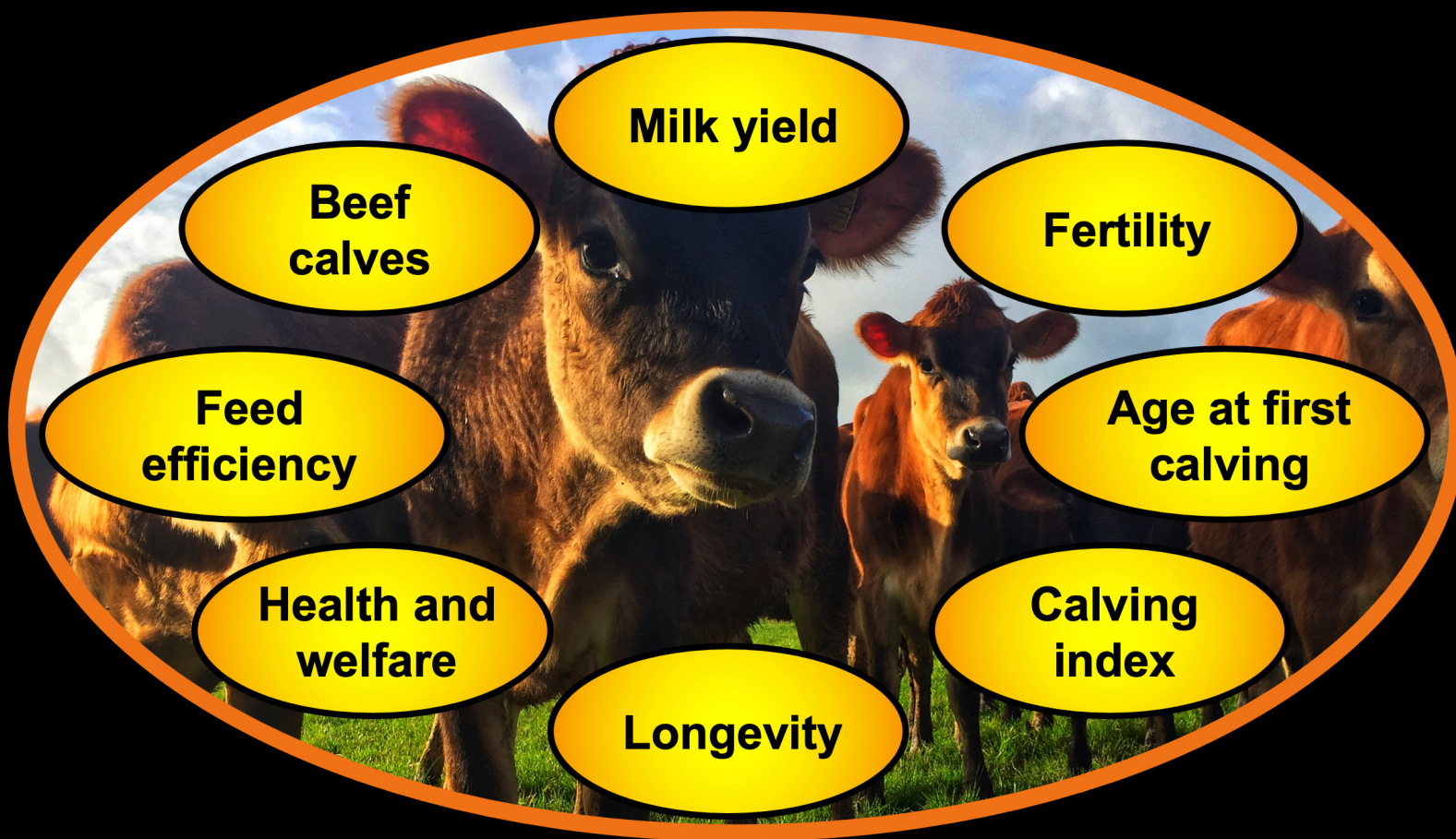
Jude Capper, PhD

@bovidiva



D

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



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

World Buiatrics Congress 2022



Jude Capper, PhD
@bovidiva



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)

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>

World Buiatrics Congress 2022



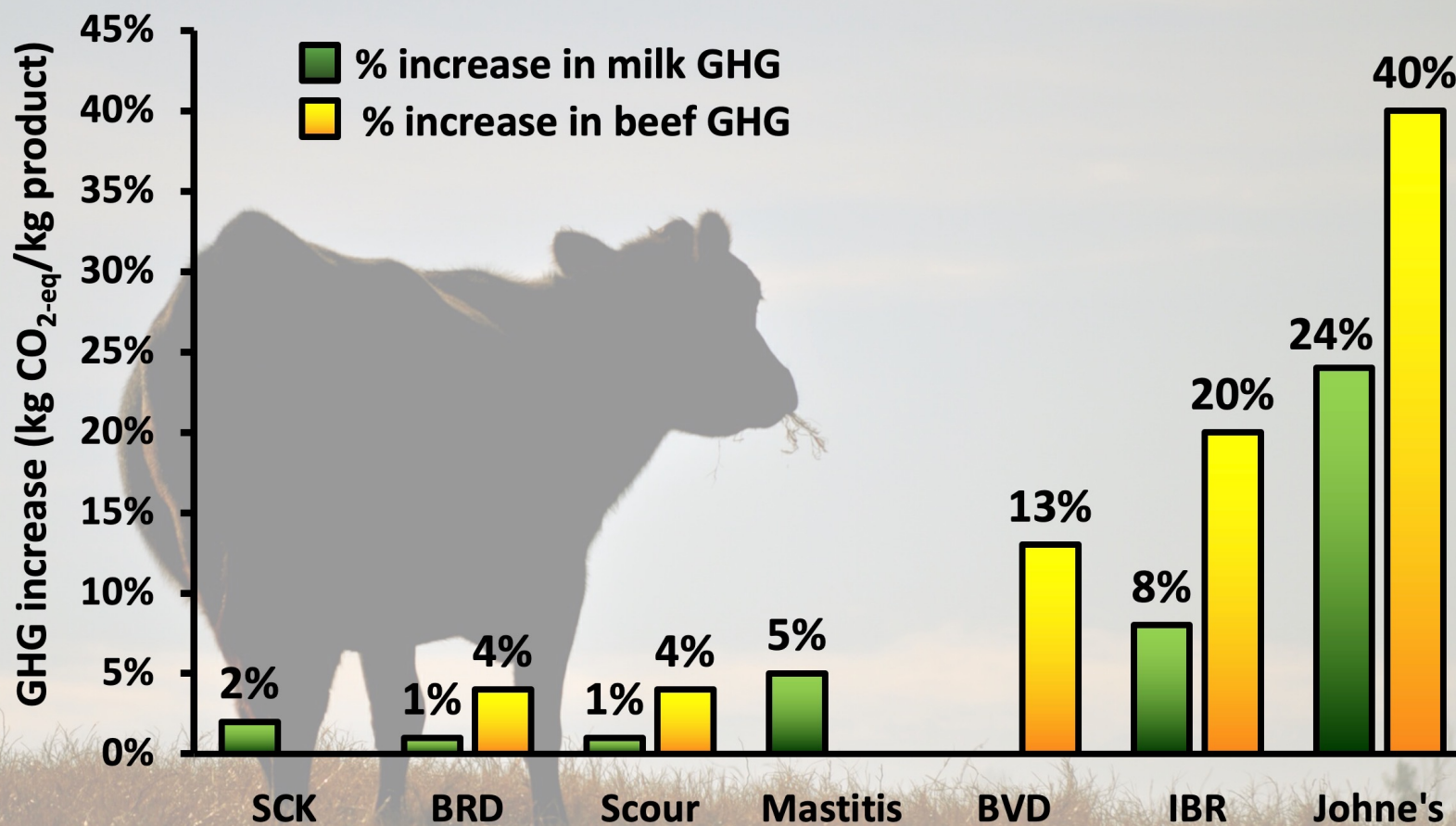
Jude Capper, PhD

@bovidiva



AH

Impacts of disease on greenhouse gas emissions per unit of beef or milk



Source: Created by Dr. Jude L. Capper, 2020. More information available at: <https://www.msd-animal-health-hub.co.uk/TimeToVaccinate>

World Buiatrics Congress 2022



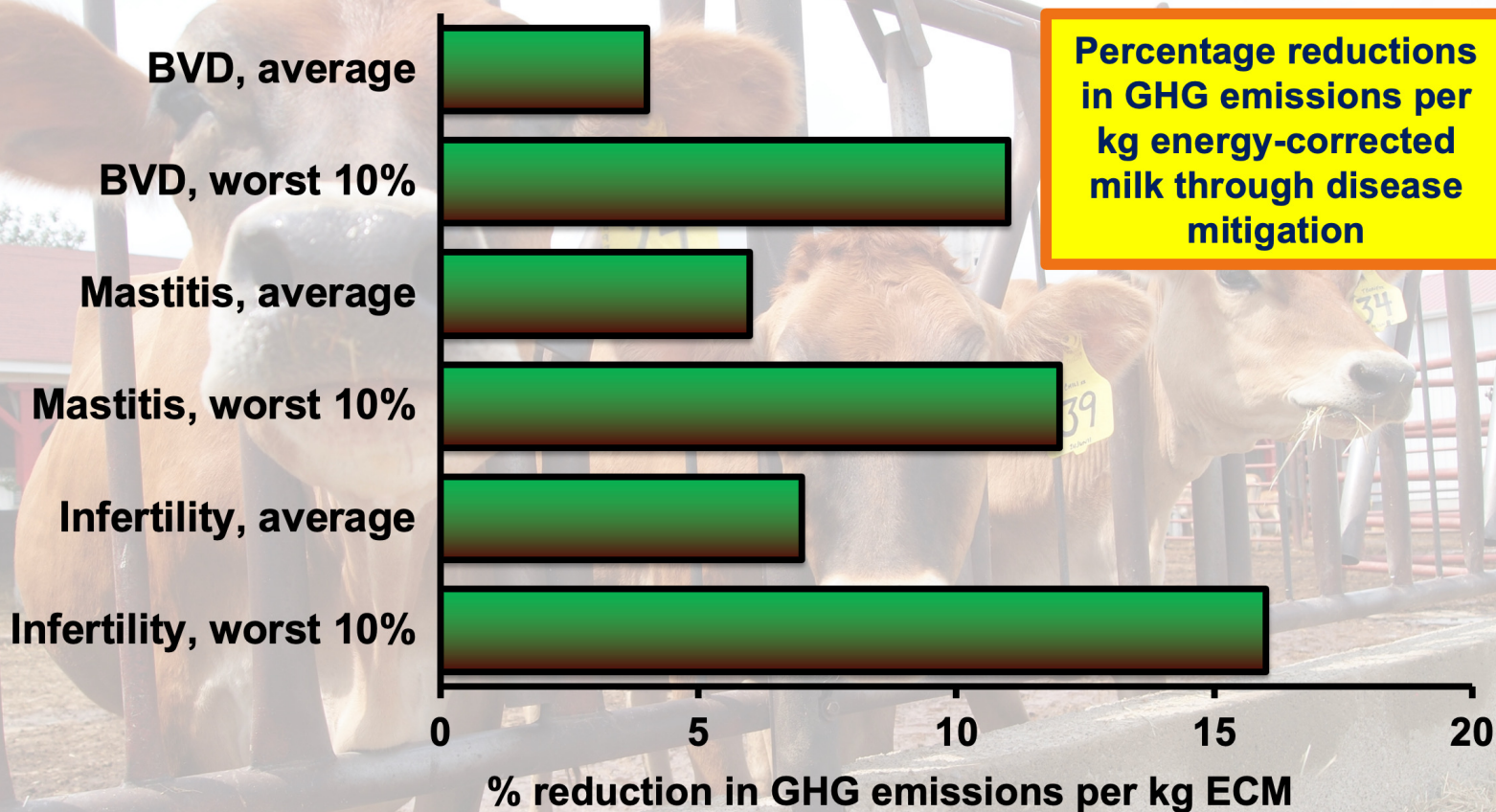
Jude Capper, PhD

@bovidiva



DS

GHG emissions could be cut significantly by mitigating dairy diseases - UK



Source: Created by Dr. Jude L. Capper, 2021. Data from: Statham et al. 2021. Dairy Cattle Health and Greenhouse Gas Emissions Pilot Study: Chile, Kenya and the UK. Available from: <https://dairysustainabilityframework.org/wp-content/uploads/2020/10/Dairy-Cattle-Health-and-GHG-Emissions-Pilot-Study-Report.pdf>

World Buiatrics Congress 2022



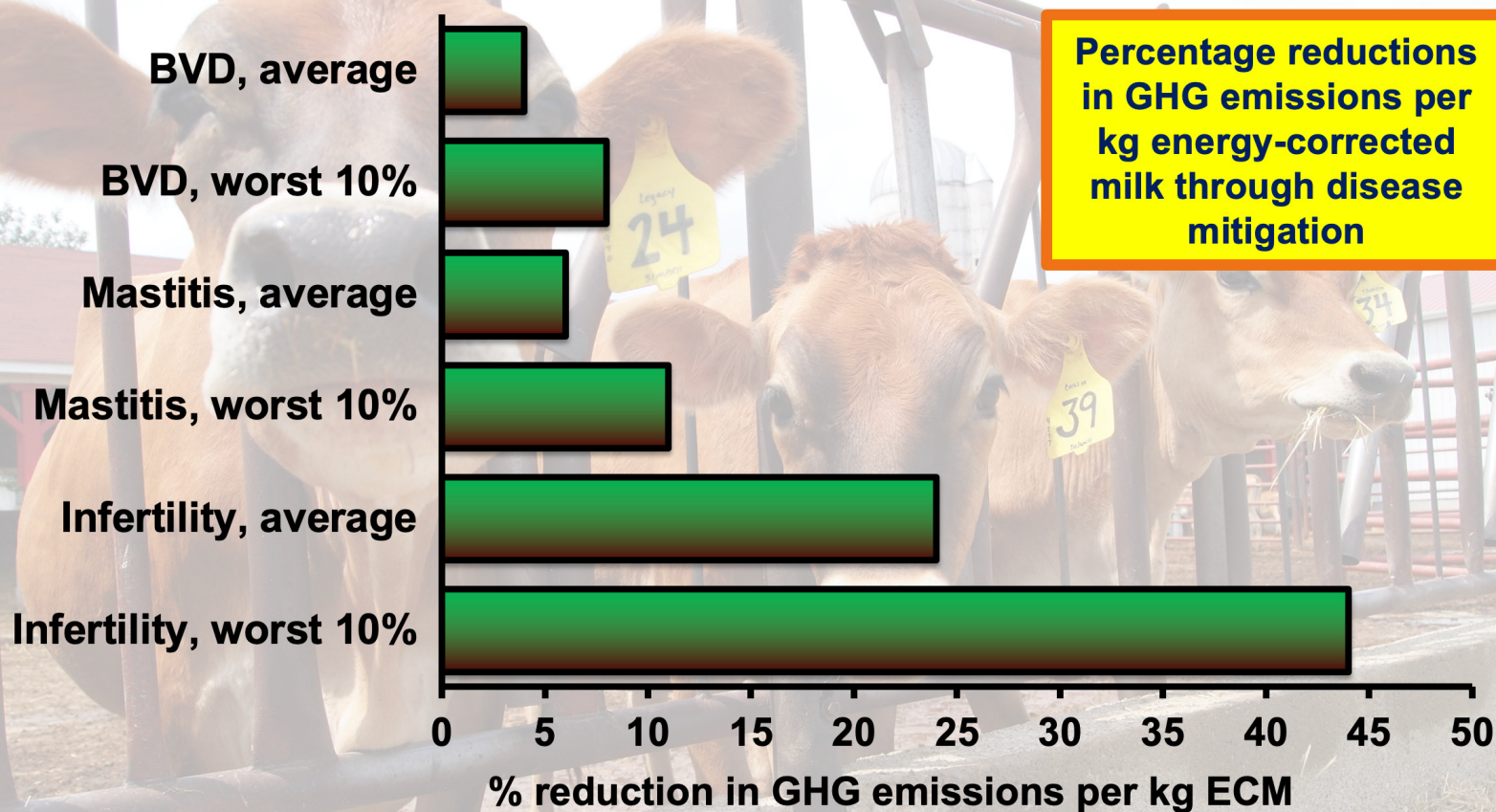
Jude Capper, PhD

@bovidiva



DS

GHG emissions could be cut significantly by mitigating dairy diseases - Kenya



Source: Created by Dr. Jude L. Capper, 2021. Data from: Statham et al. 2021. Dairy Cattle Health and Greenhouse Gas Emissions Pilot Study: Chile, Kenya and the UK. Available from: <https://dairysustainabilityframework.org/wp-content/uploads/2020/10/Dairy-Cattle-Health-and-GHG-Emissions-Pilot-Study-Report.pdf>

World Buiatrics Congress 2022

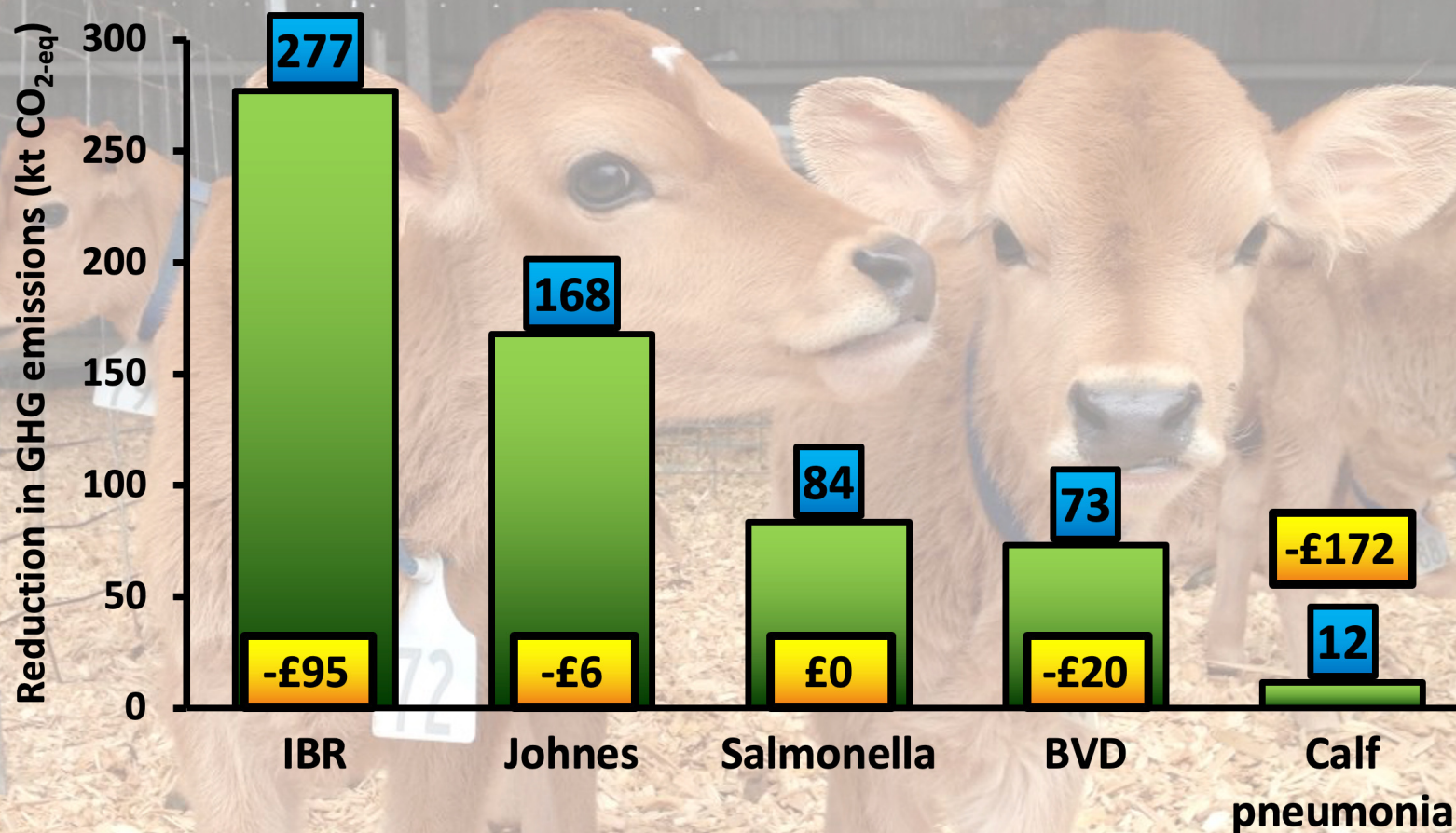


Jude Capper, PhD
@bovidiva



AH

Vaccination against endemic disease reduces GHG emissions and is cost-effective



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.

World Buiatrics Congress 2022



Jude Capper, PhD

@bovidiva



D

What are the milk, meat and greenhouse gas implications of global dairy cow mortality?



Annual milk yield

4,500
kg

Milk lost if cow dies

8,537
kg

Meat lost if cow dies

430
kg CW

Extra GHG emissions

3,751
kg
CO₂e

Source: Created by Dr. Jude L. Capper, 2021. Calculated as an example based on a 4,500 kg annual milk yield, 26 mo age at first calving, 14 mo calving interval, 248 kg carcass weight, 0.69 live calves born/yr, 0.50 calves reared for beef, and average of 1,731 kg CO₂e GHG emissions per heifer/yr.

World Buiatrics Congress 2022



Jude Capper, PhD
@bovidiva



AH

Improving cattle health may be the ultimate sustainability triple-win



Healthy
cattle

Lower GHG
emissions

Profitable
farms

Happier
consumers

Sustainability

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

World Buiatrics Congress 2022



Jude Capper, PhD

@bovidiva



S

You don't have to be the biggest,
you do need to do your best



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

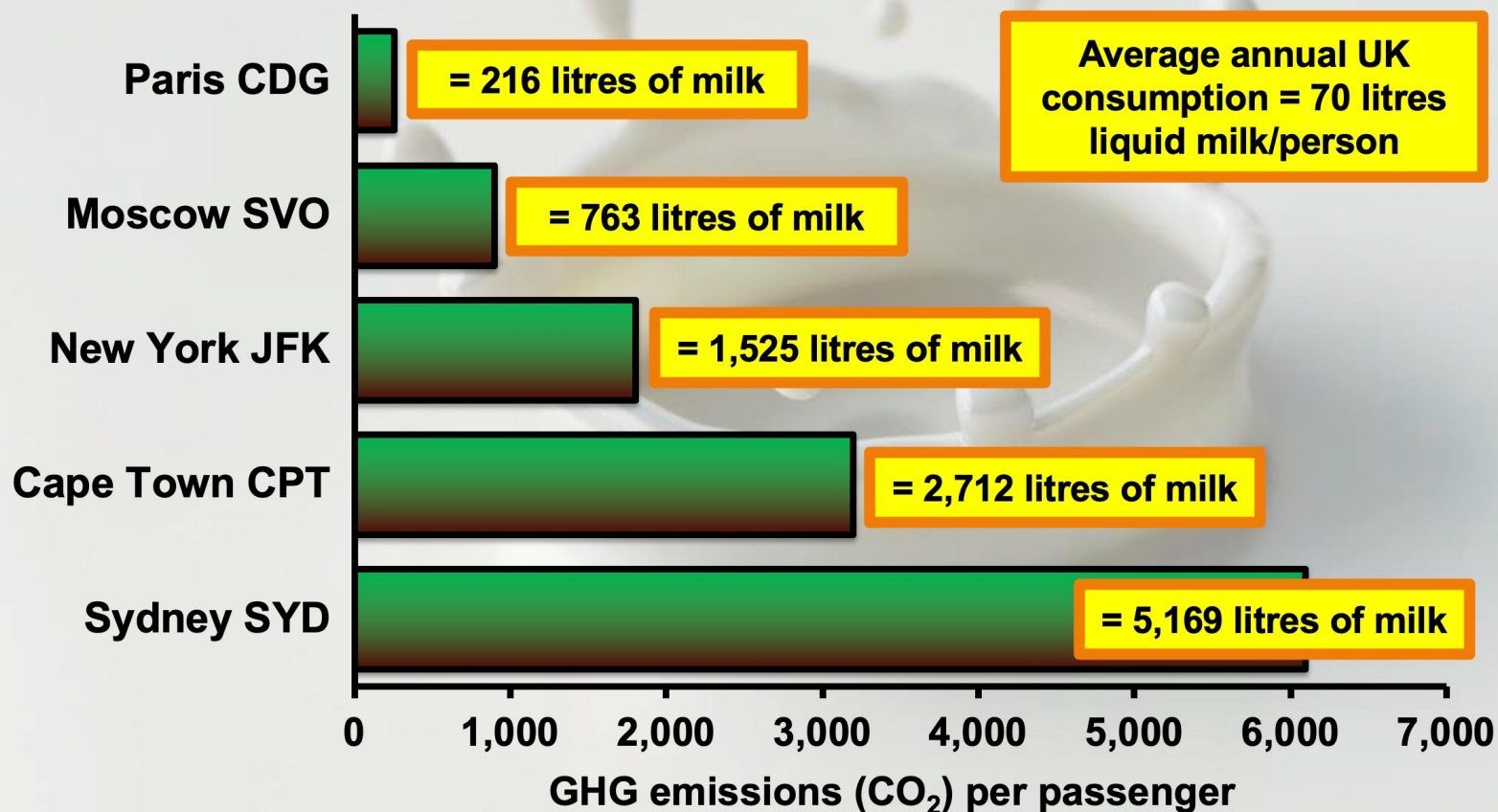
World Buiatrics Congress 2022





CV

International flights emit considerable quantities of carbon compared to dairy 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, and on a carbon footprint per litre of milk of 1.18 kg CO₂-eq (under GWP100) from AHDB: https://dairy.ahdb.org.uk/non_umbraco/download.aspx?media=17338

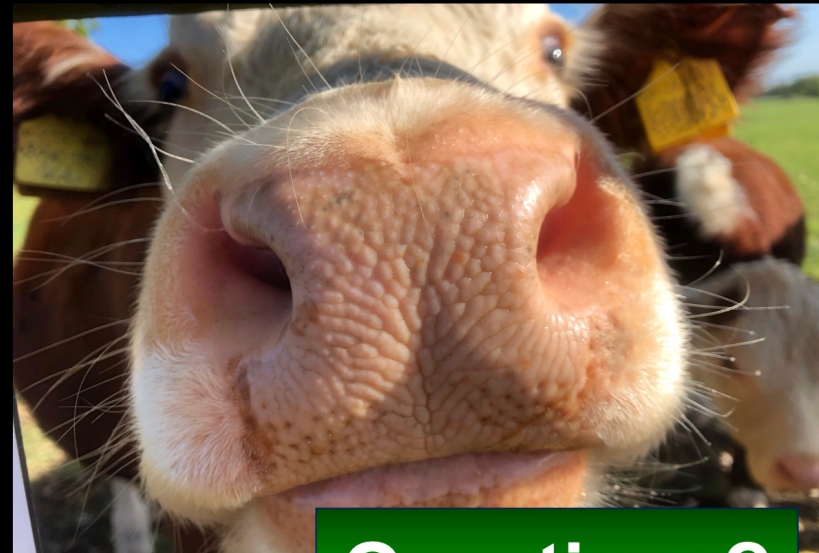


B

Thank you!

jude@livestocksustainability.com

<http://bovidiva.com/presentationlinks>



Questions?

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

Jude Capper, PhD

@bovidiva



World Buiatrics Congress 2022

