



# Investing in cattle health to improve sustainability

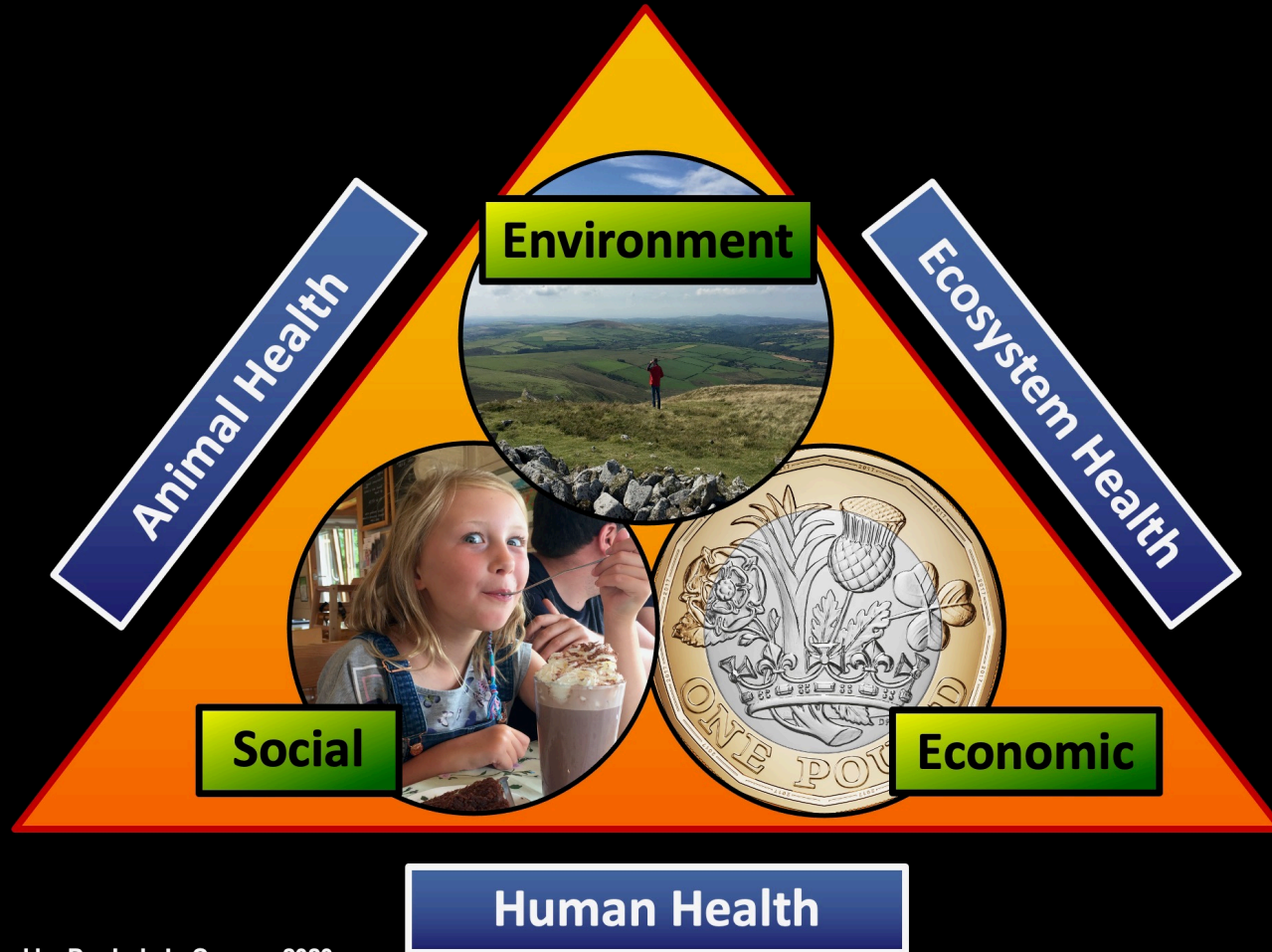
*15<sup>th</sup> November 2023*

Source: Jude L. Capper, 2023



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



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# Impacts of disease on maintaining livestock production

Reduced milk/meat yield = need more animals

Increased mortality = need more animals

Failure to wean = need more animals

Failure to conceive = need more time

Reduced growth rates = need more time

Greater resource use  
Higher economic cost

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# How much data is in the literature relating livestock health to sustainability?

The Veterinary Journal 296-297 (2023) 105988



Contents lists available at [ScienceDirect](#)

## The Veterinary Journal

journal homepage: [www.elsevier.com/locate/tvj](http://www.elsevier.com/locate/tvj)



Invited review

## Investing in health to improve the sustainability of cattle production in the United Kingdom: A narrative review



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### ARTICLE INFO

#### Keywords:

Disease  
Greenhouse gas emissions  
Health  
Technologies  
Vaccines

### ABSTRACT

Livestock health is a key concern for all food system stakeholders and has considerable impacts upon sustainable food production. Improving productivity means that a set quantity of milk or meat may be produced at a lower economic cost, using fewer resources and with reduced greenhouse gas emissions (GHGe); however, diseases that reduce yield, growth or fertility have the opposite effect. The purpose of this narrative review was to assess the breadth of economic and environmental sustainability information relating to cattle health within the literature and to discuss related knowledge gaps within the literature. The mechanisms by which improved awareness and

Source: Created by Jude L. Capper, 2023. Data from: Capper & Williams (2023) <https://doi.org/10.1016/j.tvj.2023.105988>



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# What is missing?



**Data – particularly on beef and sheep**



**Interactions between diseases/syndromes**



**Impacts of subclinical disease**



**Broader productivity impacts**



**Broader sustainability impacts**



**Economic impacts – data variable and dated**

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# Significant lack of current, UK-based ruminant health and GHGe data



Research article

## The effect of lameness on the environmental performance of milk production by rotational grazing



Wenhao Chen\*, Eoin White, Nicholas M. Holden

UCD School of Biosystems and Food Engineering, University College Dublin, Belfield, Dublin 4, Ireland

**Lameness:  
7-9% increase in  
farm GHGe**

### ARTICLE INFO

### ABSTRACT

#### Article history:

Received 29 November 2015  
Received in revised form  
16 February 2016

Dairy production leads to significant environmental impacts and is not feasible if the environmental performance at farm level permits a sustainable milk supply. Lameness is believed to become more prevalent and severe as herd sizes increase, and can significantly reduce milk

ORIGINAL RESEARCH | Open Access |

## Estimated differences in economic and environmental performance of forage-based dairy herds across the UK

Matthew J. Bell Paul Wilson

First published: 22 January 2018 | <https://doi.org/10.1002/fes3.127> | Citations: 12

SECTIONS

**Mastitis:  
small increase in  
GHGe intensity,  
clear economic  
correlation**



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# Impacts of concurrent disease on GHGe are entirely lacking in the literature



**Liver fluke appears to be a risk factor for pregnancy toxaemia.**

**Are combined effects on GHGe less, the same, more?**

**Which should be the priority?**

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Source: Created by Jude L. Capper, 2023. Data from: Crilly et al. (2021) <https://bvajournals.onlinelibrary.wiley.com/doi/full/10.1002/inpr.17> and Capper & Williams (2023) <https://doi.org/10.1016/j.tvjl.2023.105988>



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# What are the wider productivity impacts?



If calf pneumonia is high on a dairy farm, what are the knock-on effects on dairy beef production?

What about suckler production?

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# What are the wider environmental impacts?



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## “Real life” application – African swine fever

The recent African swine fever outbreak, in which 100-150 million pigs died, led to:



17-38% increase  
in global pork  
prices

Pigmeat losses  
would have fed  
550-824 million  
people

Greenhouse  
gases invested in  
animals that died  
or were culled  
were equal to  
annual emissions  
of 16.7-25.1  
million cars

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# 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

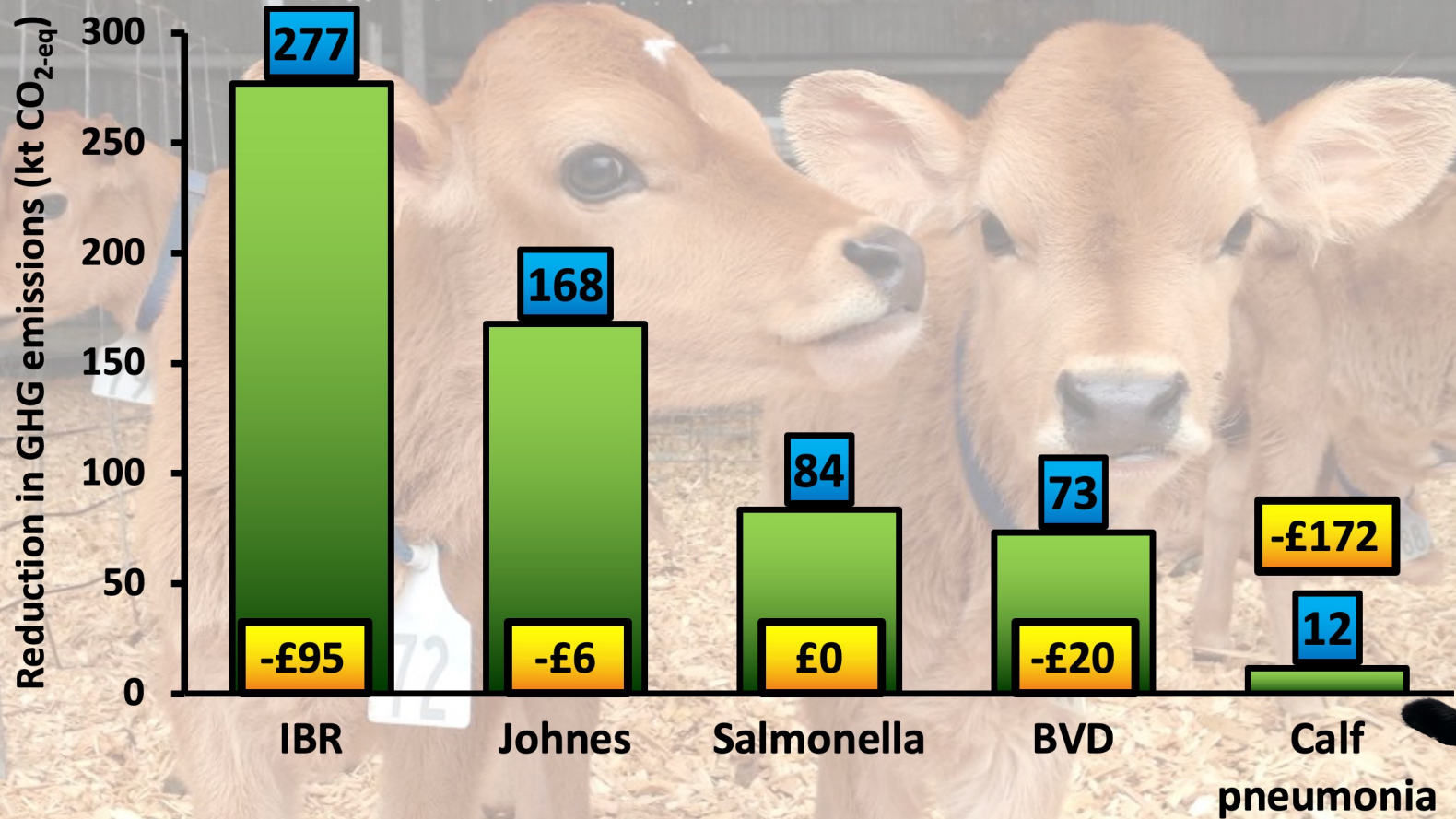
Extra GHG emissions  
**3,751**  
kg CO<sub>2</sub>e

Source: Created by Jude L. Capper, 2023. 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 CO<sub>2</sub>e GHG emissions per heifer/yr.



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# 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.



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# What do we need – and how do we get it?



Easy disease measuring and monitoring



Subclinical and concurrent disease impacts



Disease/GHGe relationship



Disease/economics relationship



Focus on prevention

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# Precision livestock technologies may provide insights



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# On-farm disease impacts vary – large datasets may help to unpick relationships



## Agrecalc Report - Sheep

Sector: Sheep  
 Enterprise type: Crossbred ewe flock  
 System: Store/finisher  
 Group:  
 Producer:  
 Farm:

Region: [REDACTED]  
 Year calc relates: [REDACTED]  
 Reporting date: [REDACTED]  
 Report reference:  
 Compared to: Sheep Enterprises (system specific) 2019 to 2023 (1541) reports

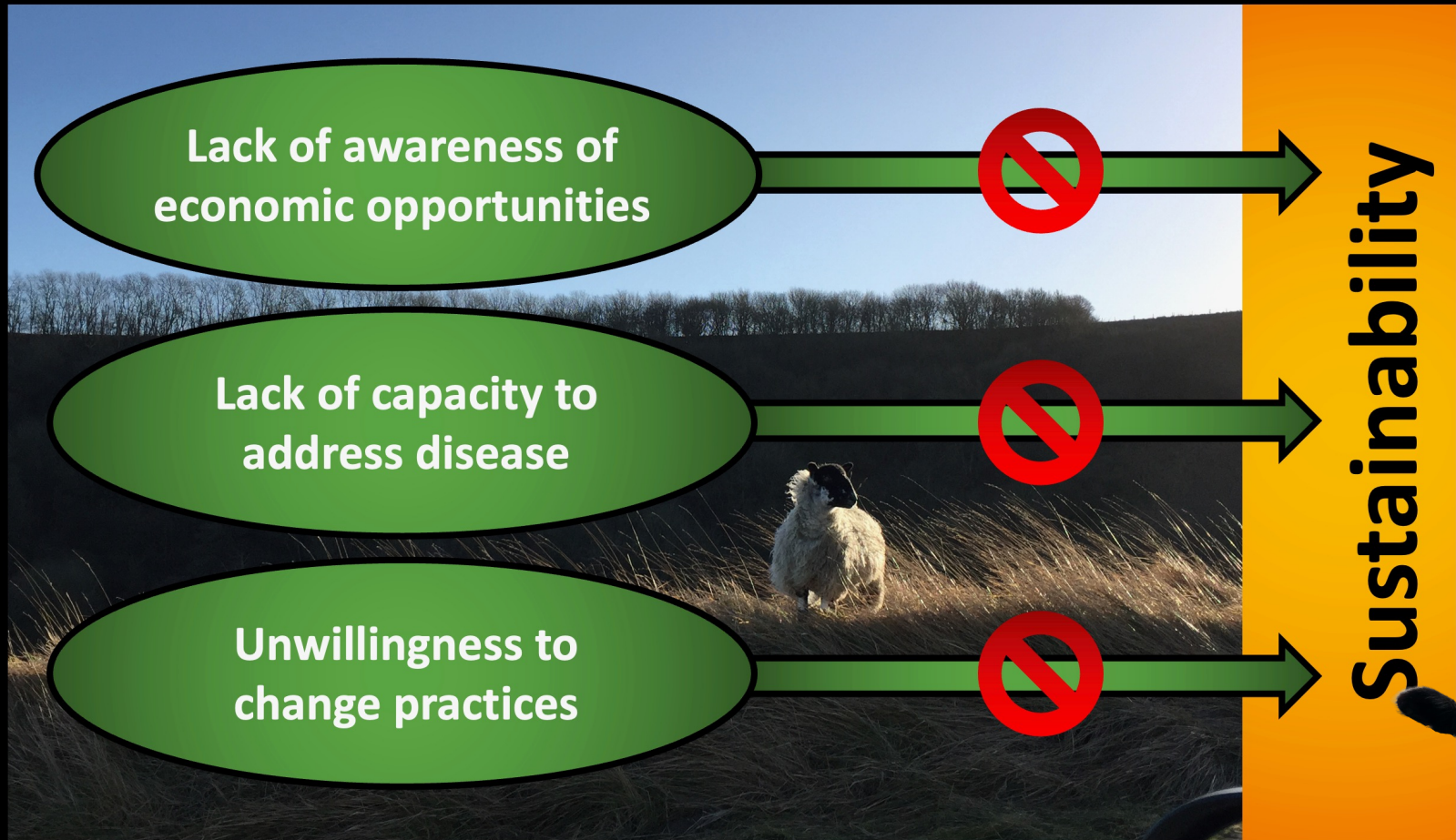
Quick glance enterprise emissions				Physical performance of enterprise		
	* kg CO <sub>2</sub> e/ kg dwt	Opportunity Level	Comparison		Value	Comparison
Enteric fermentation	11.87	Low	16.22	Area of land utilised (ha)	27	108
Manure management	4.07	Low	5.63	Female breeding stock (no)	385	445
Fertiliser	0.02	Low	3.78	Lamb sale weight (kg lwt/head)	47.00	41.82
Purchased feed	1.02	Low	1.69	Lamb sale weight (kg dwt/head)	20.21	19.05
Purchased bedding	0	Low	0.12	Wool sales (kg)	800	1,098
Fuel	0.40	Low	0.92	Purchased feed use (kg/ewe)	135	77
Electricity	0.01	Low	0.05	Homegrown feed use (kg/ewe)	300	876
Other	0.11	Low	0.88	Mortality (%)	9	6
<b>Total emissions **</b>	<b>17.50</b>	<b>Low</b>	<b>29.21</b>	Lambing percentage (%)	182	161
				Ewe cull rate (%)	28	32

Source: Created by Jude L. Capper, 2023. Data from: Report from Agrecalc (2023) <https://www.agrecalc.com/> and Capper & Williams (2023) <https://doi.org/10.1016/j.tvjl.2023.105988>



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# Producer challenges to investing in livestock health



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# Liver fluke may increase sheep GHGe by 1.5% - so what?

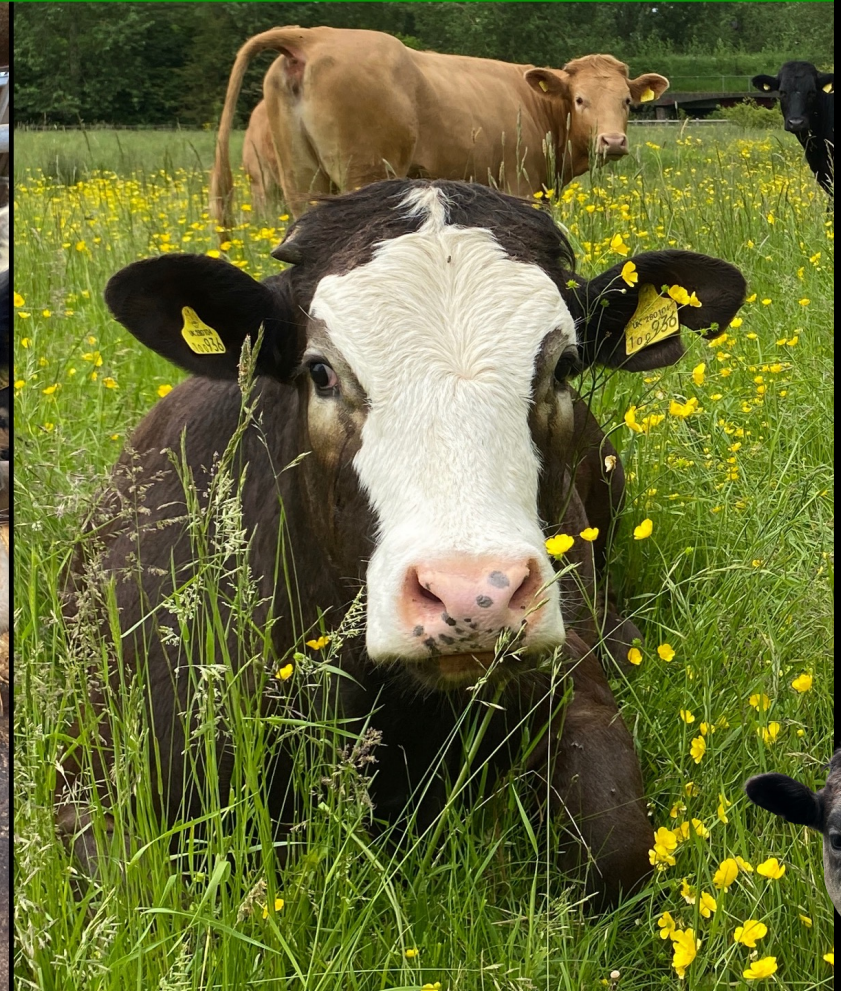


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# Is there always a trade-off between low carbon and high welfare?



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# Thank you!

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# Questions?

