UNIVERSITY OF COPENHAGEN

ELSEVIER

animal
Volume 16, Issue 9, September 2022, 100622

OPEN ACCESS!

Dairy vs beef production

expert views on welfare of cattle in common food production systems

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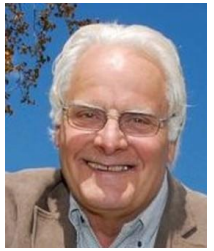

John Webster
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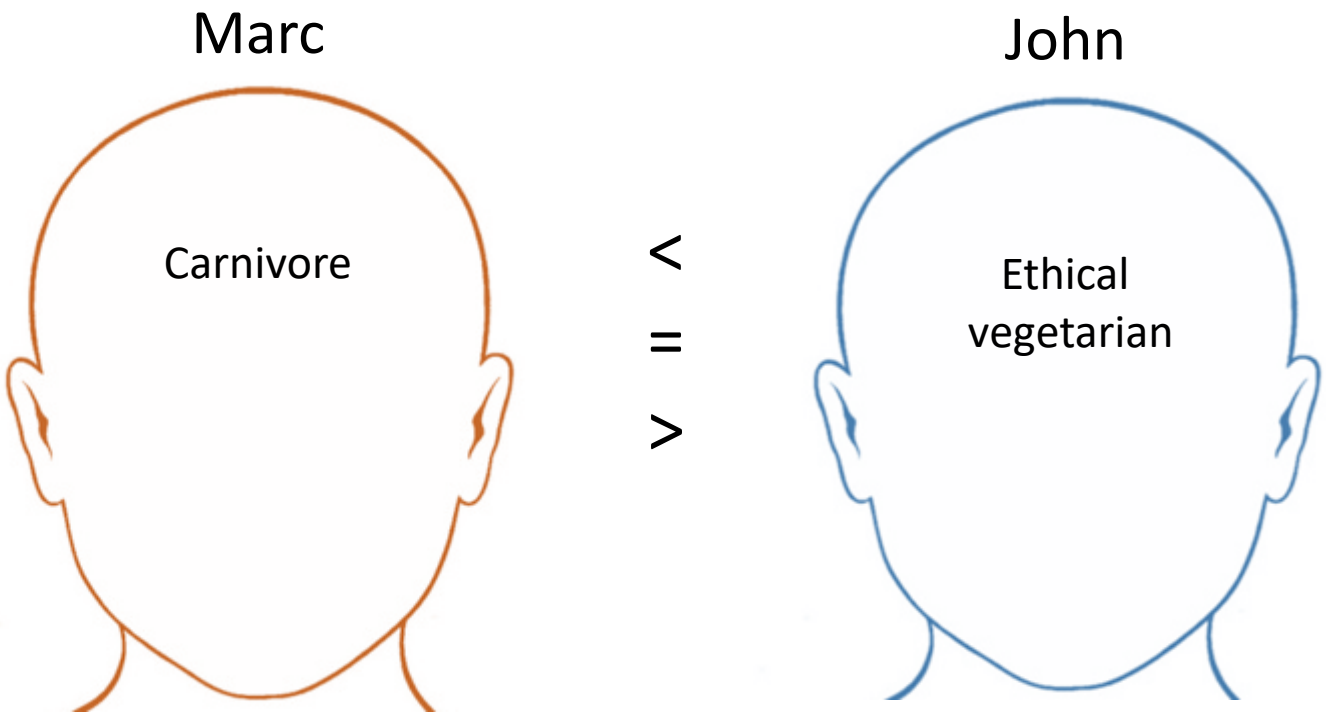
Empathy towards animals



Aim: compare between welfare of beef and dairy cattle in common production

Method: Expert evaluation / rating

Prediction: Dairy cattle are at a higher welfare risk than beef cattle

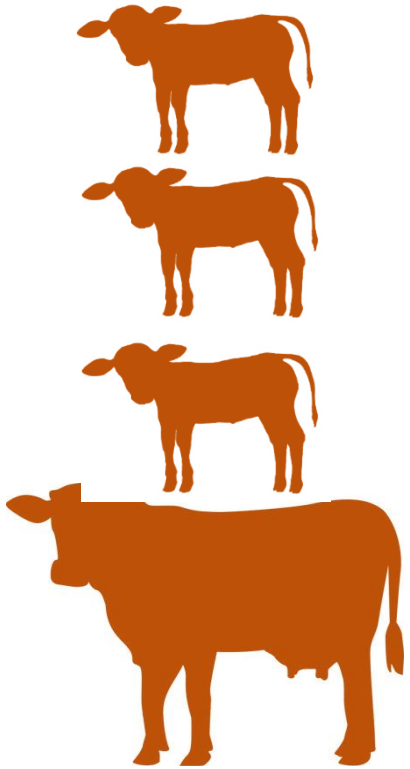
Logic: More intervention in dairy vs. beef cattle (milk+meat vs. meat only)

Experts

- 70 academic experts completed the survey, 23 countries.
- Europe (35), North America (17), South America (8), Australia (5) and other regions of the world (5).
- Median experience 15 years
- H index 10 and above

Experts compared between:

Beef cattle



Own Country

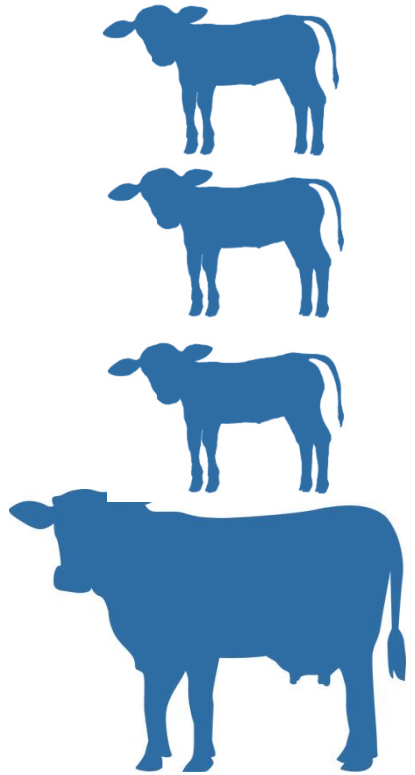
Red meat

Veal

Replacement

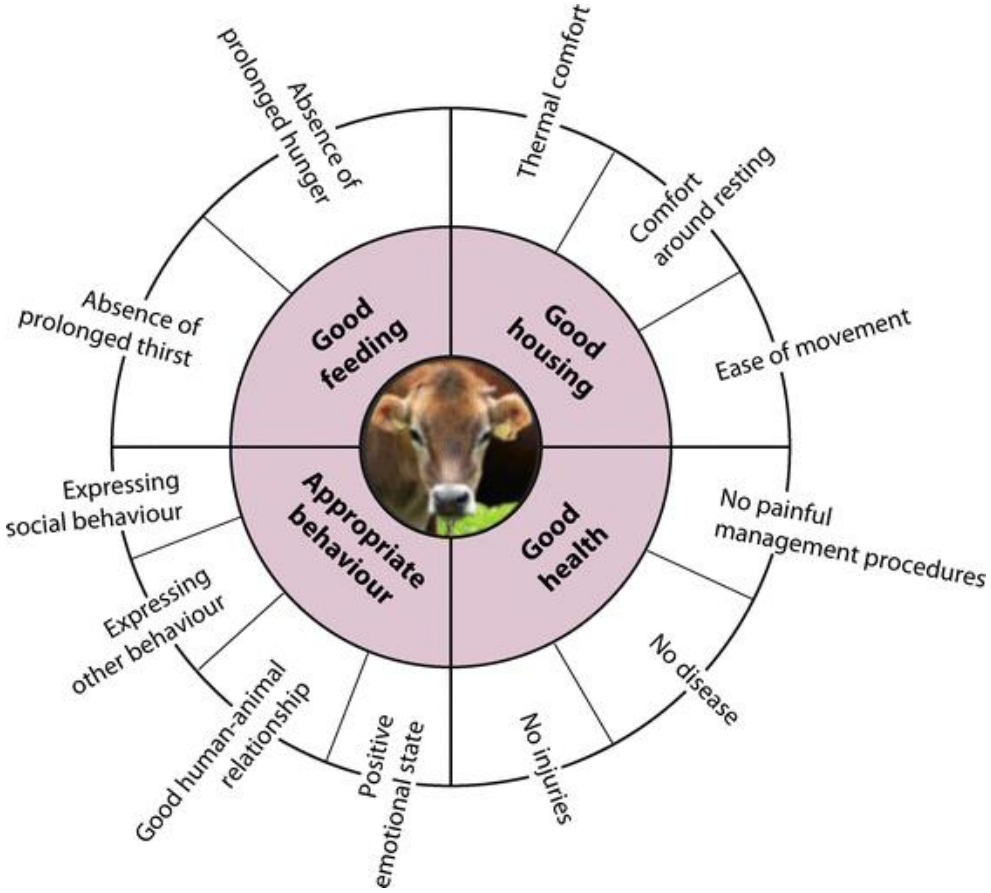
Calves/milk

Dairy cattle



Evaluation

1. Characterisation
2. Twelve criteria (Welfare Quality Protocol™)
3. Likelihood (1-7)
4. Negative framing
5. Confidence (★)



Keeling et al., 2013

How did it look like? (Likelihood rating)

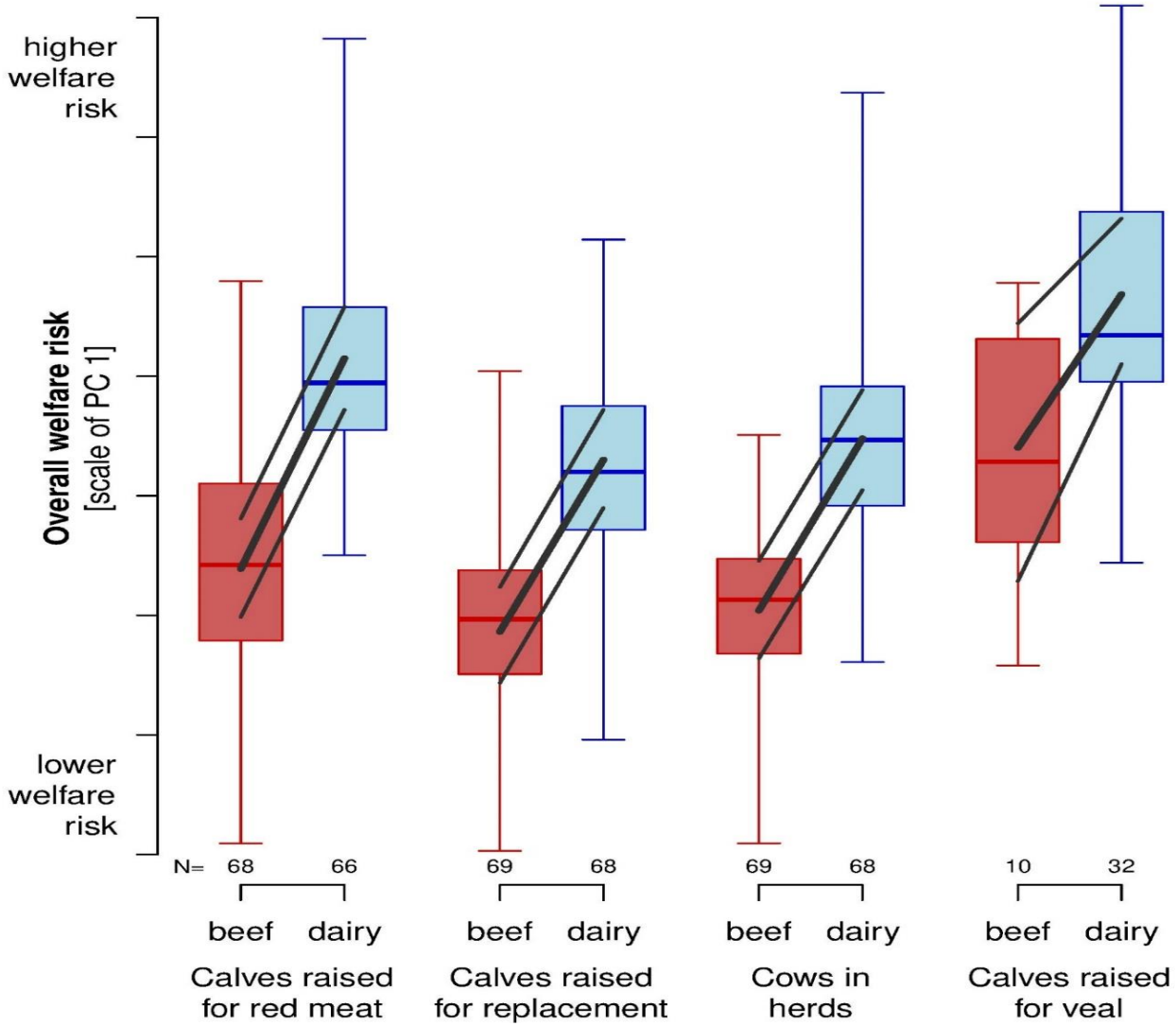
Independence?

Composite score
(PCA analysis)

LME
(Linear mixed-effects)

For a calf raised for red-meat to:	BEEF	DAIRY
Receive inappropriate/inadequate diet (e.g. quantity of milk/feed, number of feeding bouts, quality of feed, digestibility etc.).		
Have inadequate water supply (e.g. quantity, quality, accessibility, high competition over access to water).		
Experience discomfort when resting (e.g. when lying down, standing up etc.).		
Experience thermal discomfort (i.e. being too warm (e.g. heat load) or too cold).		
Experience restricted movement (e.g. limited ability to move around freely, e.g. being tied, kept in high stocking density).		
Suffer from injuries (e.g. lameness, skin lesions etc.).		
Suffer from disease.		
Suffer from pain induced by management, handling, or surgical procedures.		
Have limited opportunities to express normal, non-harmful, social behaviours (e.g. limited allo-grooming, limited social play etc.).		
Have limited opportunities to express other normal behaviours (i.e. limited/restricted from opportunity to forage/graze).		
Experience negative affective states (e.g. fear, distress, frustration or apathy; due to negative human-animal relationships, husbandry / management or the environment in which the animal is kept).		
Have limited opportunities to experience positive emotions (e.g. limited opportunities to engage in rewarding activities).		
Confidence rating		

Main result



First principal component reflecting the overall welfare risk (likelihood of 12 welfare concerns, as assessed by the experts as a function of the different **origins** and animal **production goals**.

N = Number of experts that reported an assessment on all 12 areas of welfare concern.

Boxplots show minimum, lower quartile, median, upper quartile and maximum values. Black lines: model estimates with 95% upper and lower confidence intervals.

By region (appendix…)

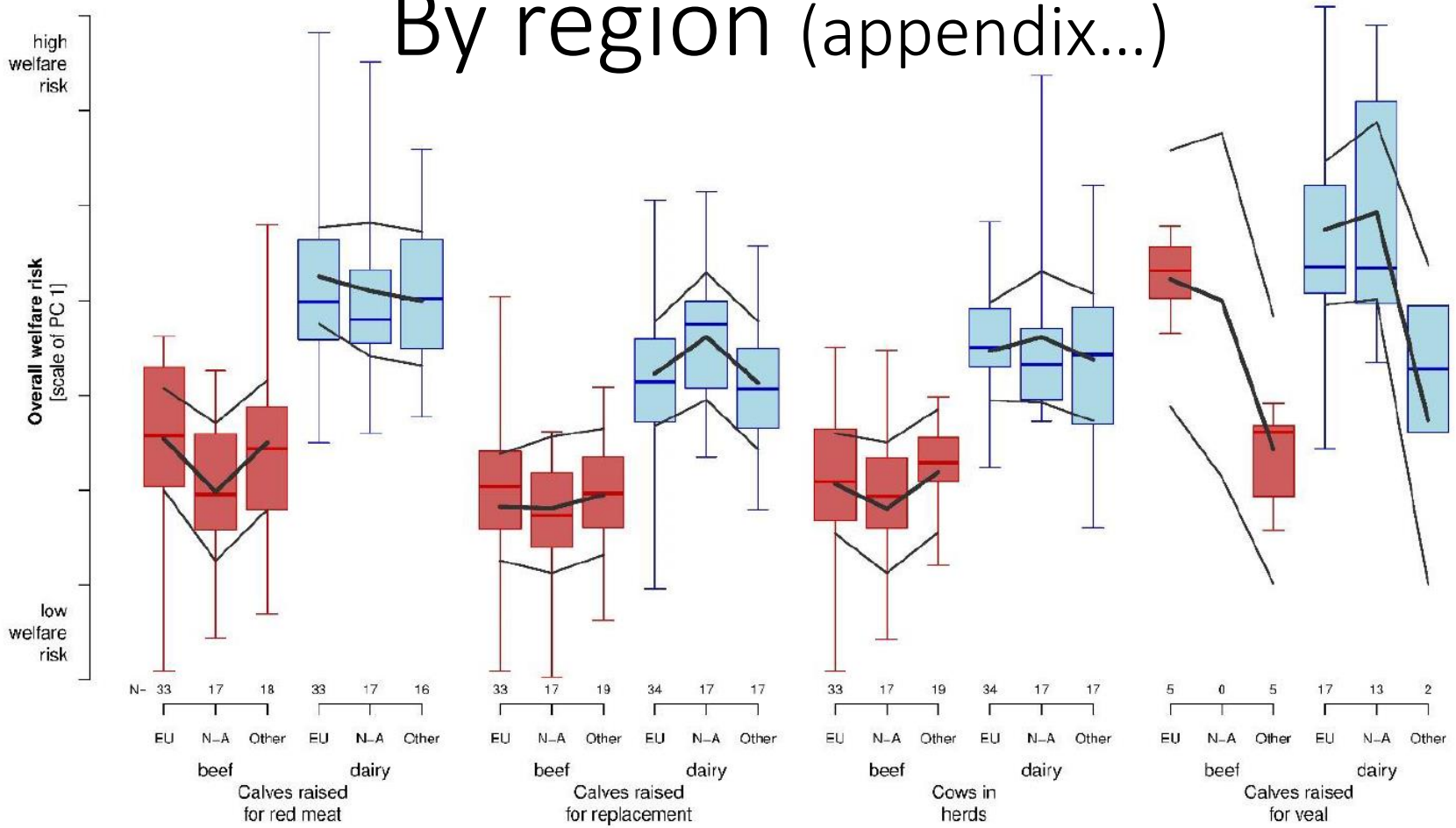


Figure S6. First principal component reflecting the overall welfare risk (likelihood of 12 welfare concerns for cattle) as assessed by the experts as a function of the different origins (beef/dairy), animal categories (production goals) and experts' region (EU; N-A, i.e. North America; Other, i.e. rest of the world). N = Number of experts that reported an assessment on all 12 areas of welfare concern. Boxplots: show minimum, lower quartile, median, upper quartile and maximum values. Black lines: model estimates with 95% upper and lower confidence intervals.

Some raw numbers

Likelihood ratings:

Dairy < Beef

Dairy > Beef

Dairy = Beef

(Higher score -> higher risk)

Table 1
Likelihood and confidence ratings for the 12 statements in the four beef and dairy cattle animal categories. Raw data: Mean (SD) and median [min – max].

	Animal category							
	Red meat		Replacement calves		Cows		Veal	
Animal origin (herd)	Beef	Dairy	Beef	Dairy	Beef	Dairy	Beef	Dairy
Q1: Receive inappropriate/inadequate diet (e.g. quantity of feed, number of feeding bouts, quality of feed, digestibility etc.).	2.4 (1.4) 2 [1–7]	4.2 (1.9) 4 [1–7]	2.2 (1.4) 2 [1–7]	3.4 (1.7) 3 [1–7]	2.8 (1.3) 3 [1–7]	2.7 (1.6) 2 [1–7]	3.5 (2.0) 4 [1–7]	4.7 (1.9) 5 [1–7]
Q2: Have inadequate water supply (e.g. quantity, quality, accessibility, high competition over access to water).	2.2 (1.3) 2 [1–7]	2.6 (1.5) 2 [1–7]	2.0 (1.2) 2 [1–7]	2.4 (1.5) 2 [1–7]	2.4 (1.3) 2 [1–7]	2.3 (1.4) 2 [1–7]	3.3 (2.3) 3 [1–7]	3.4 (1.8) 4 [1–7]
Q3: Experience discomfort when resting (e.g. when lying down, standing up etc.).	2.4 (1.6) 2 [1–7]	3.8 (1.7) 4 [1–7]	2.1 (1.3) 2 [1–7]	3.1 (1.5) 3 [1–7]	2.2 (1.3) 2 [1–6]	3.7 (1.5) 4 [1–7]	3.6 (2.3) 4 [1–7]	4.5 (1.6) 5 [1–7]
Q4: Experience thermal discomfort (i.e. being too warm (e.g. heat load) or too cold).	3.3 (1.4) 3 [1–7]	3.3 (1.6) 3 [1–7]	3.0 (1.4) 3 [1–6]	3.1 (1.4) 3 [1–6]	3.2 (1.4) 3 [1–6]	3.3 (1.5) 3 [1–7]	3.7 (1.6) 4 [2–6]	3.9 (1.5) 4 [1–6]
Q5: Experience restricted movement (e.g. limited ability to move around freely, e.g. being tied, kept in high stocking density).	2.4 (1.6) 2 [1–7]	4.3 (1.7) 4 [1–7]	2.0 (1.3) 2 [1–7]	3.6 (1.5) 3 [1–7]	2.0 (1.2) 2 [1–7]	3.6 (1.7) 4 [1–7]	3.5 (2.1) 4 [1–7]	5.0 (1.5) 5 [2–7]
Q6: Suffer from injuries (e.g. lameness, skin lesions etc.).	2.6 (1.4) 2 [1–7]	3.4 (1.5) 3 [1–7]	2.2 (1.1) 2 [1–7]	2.9 (1.3) 3 [1–7]	2.7 (1.3) 3 [1–7]	4.7 (1.4) 5 [2–7]	3.0 (1.8) 3 [1–6]	3.9 (1.5) 4 [1–7]
Q7: Suffer from disease	3.1 (1.4) 3 [1–6]	4.2 (1.6) 4 [1–7]	2.6 (1.1) 2 [1–7]	3.6 (1.4) 4 [1–7]	2.7 (1.1) 3 [1–6]	4.2 (1.6) 4 [1–7]	3.8 (1.8) 4 [2–6]	5.0 (1.4) 5 [1–7]
Q8: Suffer from pain induced by management, handling, or surgical procedures	4.1 (2.0) 4 [1–7]	4.4 (1.8) 4 [1–7]	3.2 (1.8) 3 [1–7]	4.1 (1.9) 4 [1–7]	2.7 (1.4) 2 [1–7]	3.4 (1.6) 3 [1–7]	3.5 (1.8) 3 [2–7]	3.8 (1.7) 3 [1–7]
Q9: Have limited opportunities to express normal, non-harmful, social behaviours (e.g. limited allo-grooming, limited social play etc.).	2.2 (1.5) 2 [1–7]	4.0 (1.9) 4 [1–7]	2.0 (1.2) 2 [1–7]	3.4 (1.7) 3 [1–7]	1.9 (1.1) 2 [1–6]	3.2 (1.4) 3 [1–6]	3.8 (2.2) 4 [1–7]	5.0 (1.5) 5 [2–7]
Q10: Have limited opportunities to express other normal behaviours (i.e. limited/restricted from opportunity to forage/graze).	2.7 (1.7) 2 [1–7]	4.9 (1.7) 6 [1–7]	1.9 (1.2) 2 [1–6]	3.9 (1.7) 4 [1–7]	1.8 (1.2) 2 [1–7]	3.9 (1.5) 4 [1–7]	4.1 (2.4) 4 [1–7]	6.0 (1.3) 6 [2–7]
Q11: Experience negative affective states (e.g. fear, distress, frustration or apathy; due to negative human-animal relationships, husbandry/management or the environment in which the animal is kept).	3.0 (1.5) 3 [1–7]	4.3 (1.7) 4 [1–7]	2.6 (1.2) 2 [1–7]	3.4 (1.5) 3 [1–7]	2.5 (1.3) 2 [1–7]	3.6 (1.6) 4 [1–7]	4.2 (2.3) 4 [1–7]	4.9 (1.7) 5 [1–7]
Q12: Have limited opportunities to experience positive emotions (e.g. limited opportunities to engage in rewarding activities).	2.7 (1.6) 2 [1–7]	4.5 (1.6) 5 [1–7]	2.2 (1.3) 2 [1–6]	3.6 (1.5) 4 [1–7]	2.2 (1.2) 2 [1–6]	3.6 (1.4) 4 [1–6]	3.6 (2.3) 3 [1–7]	5.1 (1.7) 5 [1–7]
Confidence in ratings	3.9 (0.9) 4 [1–5]	3.8 (0.8) 4 [2–5]	3.8 (1.1) 4 [1–5]	4.1 (0.8) 4 [2–5]	4.0 (1.0) 4 [1–5]	4.3 (0.7) 4 [2–5]	3.9 (1.0) 4 [2–5]	3.8 (1.0) 4 [1–5]

Summary & conclusions

Cattle welfare experts rated dairy cattle as more likely to experience negative welfare than beef cattle in the most common housing systems selected by the experts.

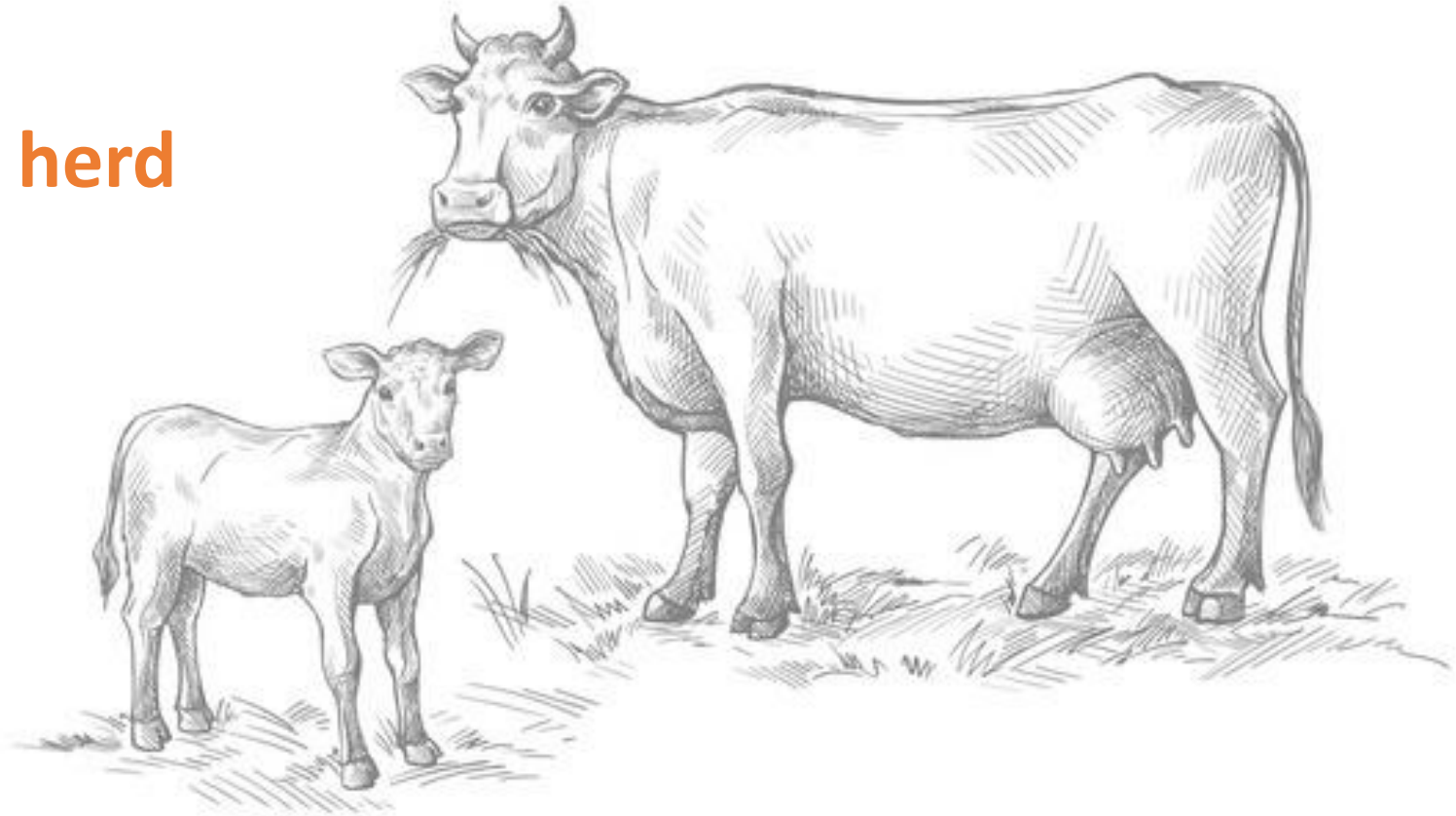
The underpinning reasons for these evaluations were not explored with experts but are proposed to enable testable predictions for future research.

In principle: Similar prediction across production methods: organic, free range etc. (not studied here).

Raising awareness about the linkage between dairy and meat production, and the toll of milk production on the welfare state of animals in the dairy industry, may encourage a more sustainable and responsible food consumption.

In other words?

Beef herd



Dairy herd

Thank you for listening

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