Measuring welfare in pigs

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What is animal welfare?

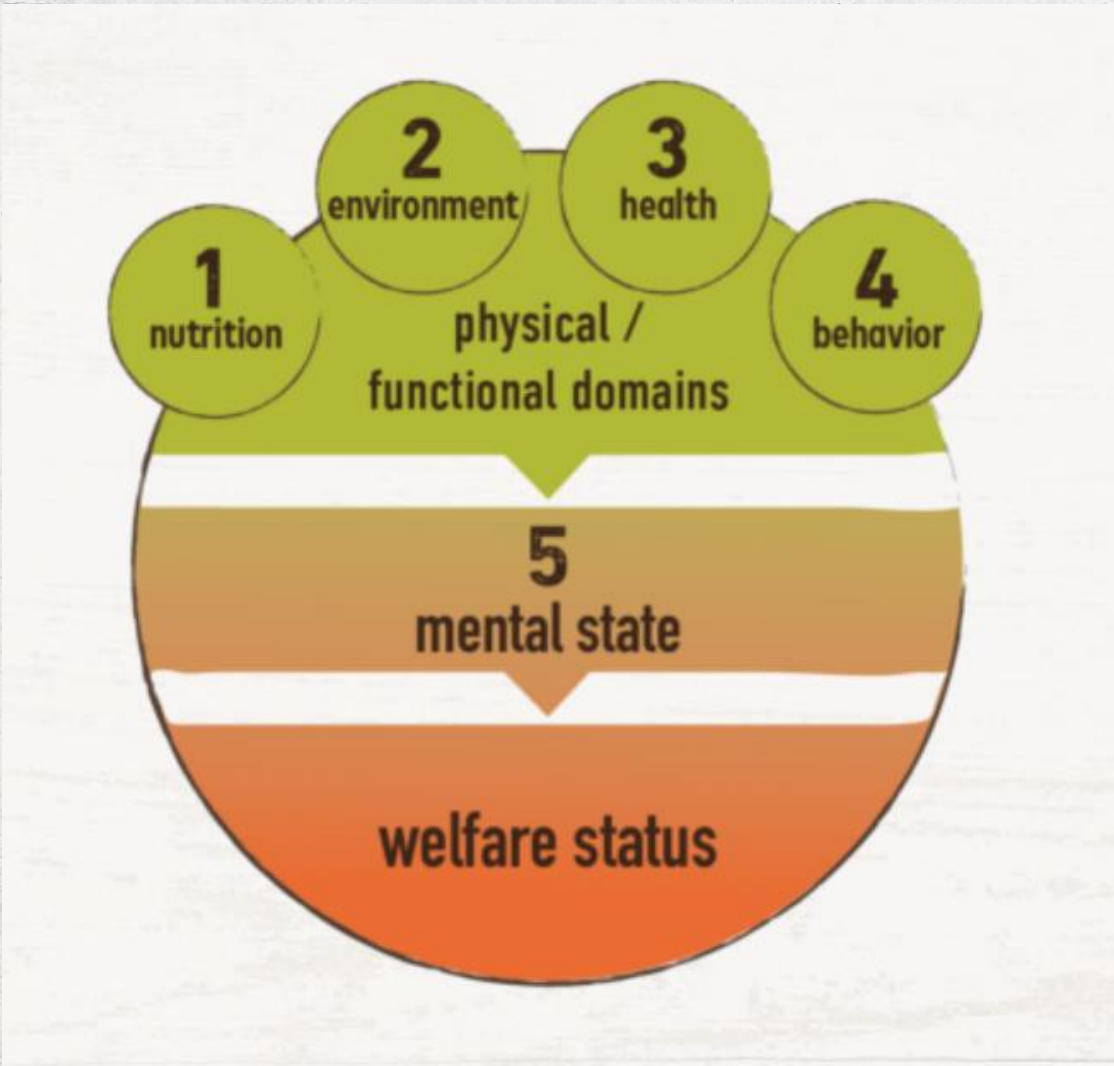
- Animal welfare refers to the well-being of animals, encompassing their physical and psychological health, comfort and ability to express natural behaviours
- In livestock farming it is crucial because
  - ensures ethical treatment of animals
  - meets regulatory requirements
  - improves product quality
  - aligns with consumer demands
  - supports sustainable farming practices
  - enhances farm profitability

The Five Freedoms

- The first widely accepted evidence-based framework to capture key aspects of animal welfare in one model
- Originally developed by the UK Farm Animal Welfare Council

The Five Domains

- The Five Domains model is an advanced framework used to assess and promote animal welfare.
- Developed by Professor David Mellor and colleagues at Massey University in NZ



Opinion

Updating Animal Welfare Thinking: Moving beyond the "Five Freedoms" towards "A Life Worth Living"

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Mental State

Free farrowing accommodation improvement in mental state

		Domain 4	Domain 5
		Behavioural interaction	Mental state
Domain 1	Nutrition	Less feed wastage	Lower frustration
Domain 2	Environment	Ability to turn around and observe	Reduced anxiety
		Improved nesting	Calmness
		Increased piglet contact	Affectionate
Domain 3	Health	Less pain at farrowing	Comfort
		Lower udder damage at weaning	Maternal reward

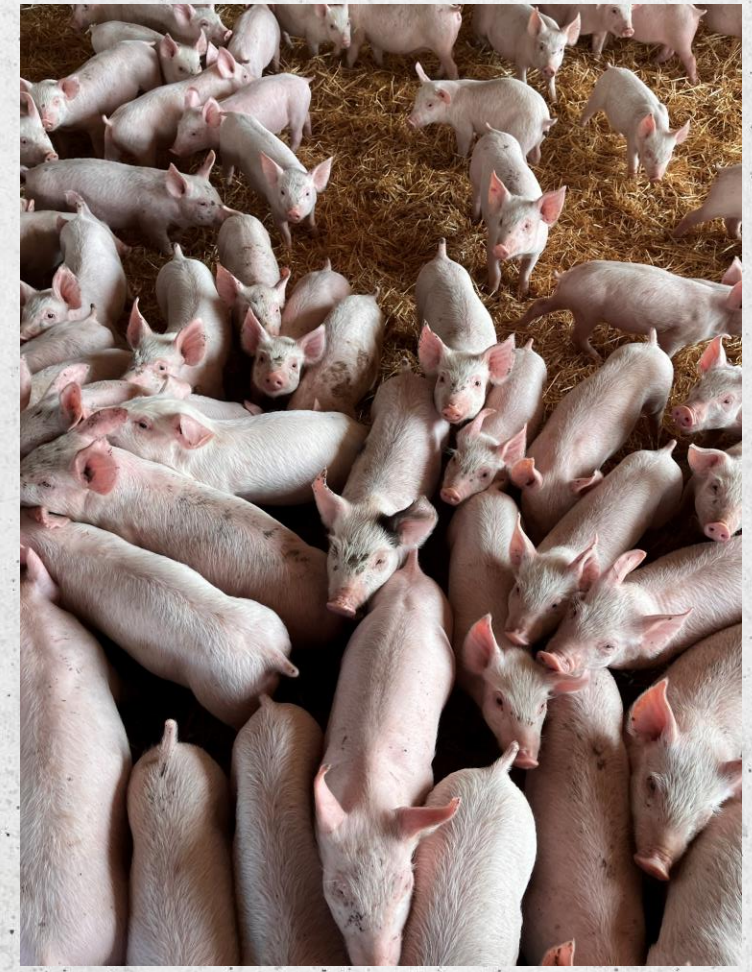
Five Domains

- Importance of the Five Domains in Animal Welfare
  - Holistic approach
  - Focus on mental well-being
  - Practical application
  - Guidance for improvement

- Overall, the Five Domains model offers a comprehensive framework for understanding and improving the welfare of animals, recognising the complex relationship between physical and mental well-being

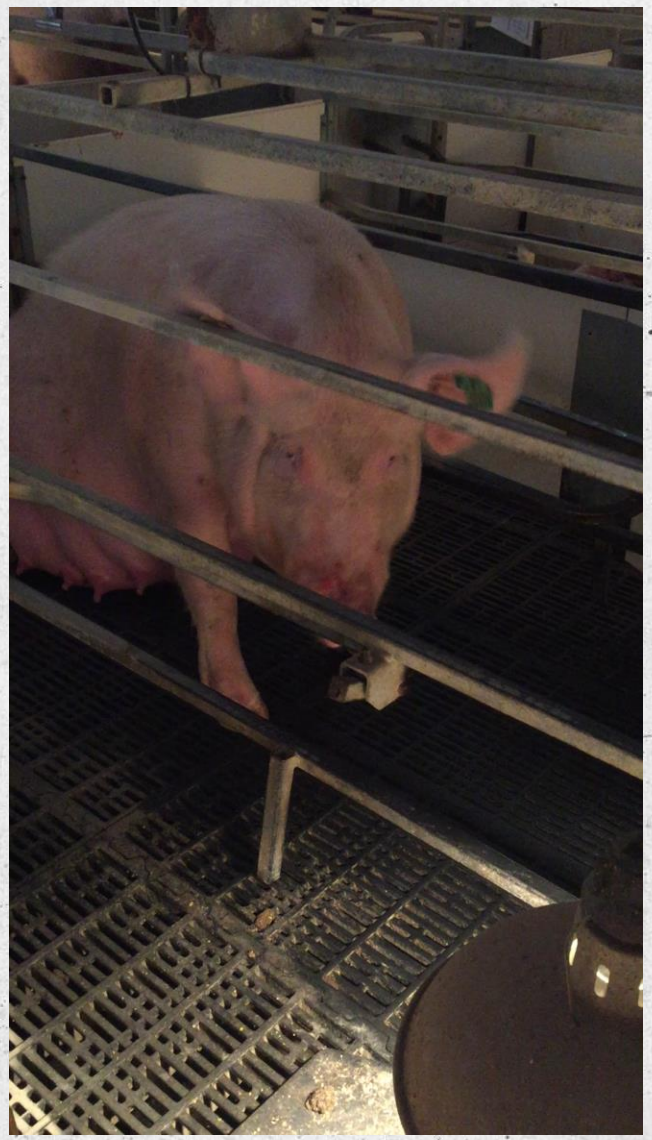
Behavioural indicators of welfare

- Natural behaviour
  - Signs of good welfare through positive behaviours
    - Exploratory behaviours
    - Social interactions
      - Play behaviour
      - Social grooming
      - Positive social hierarchies



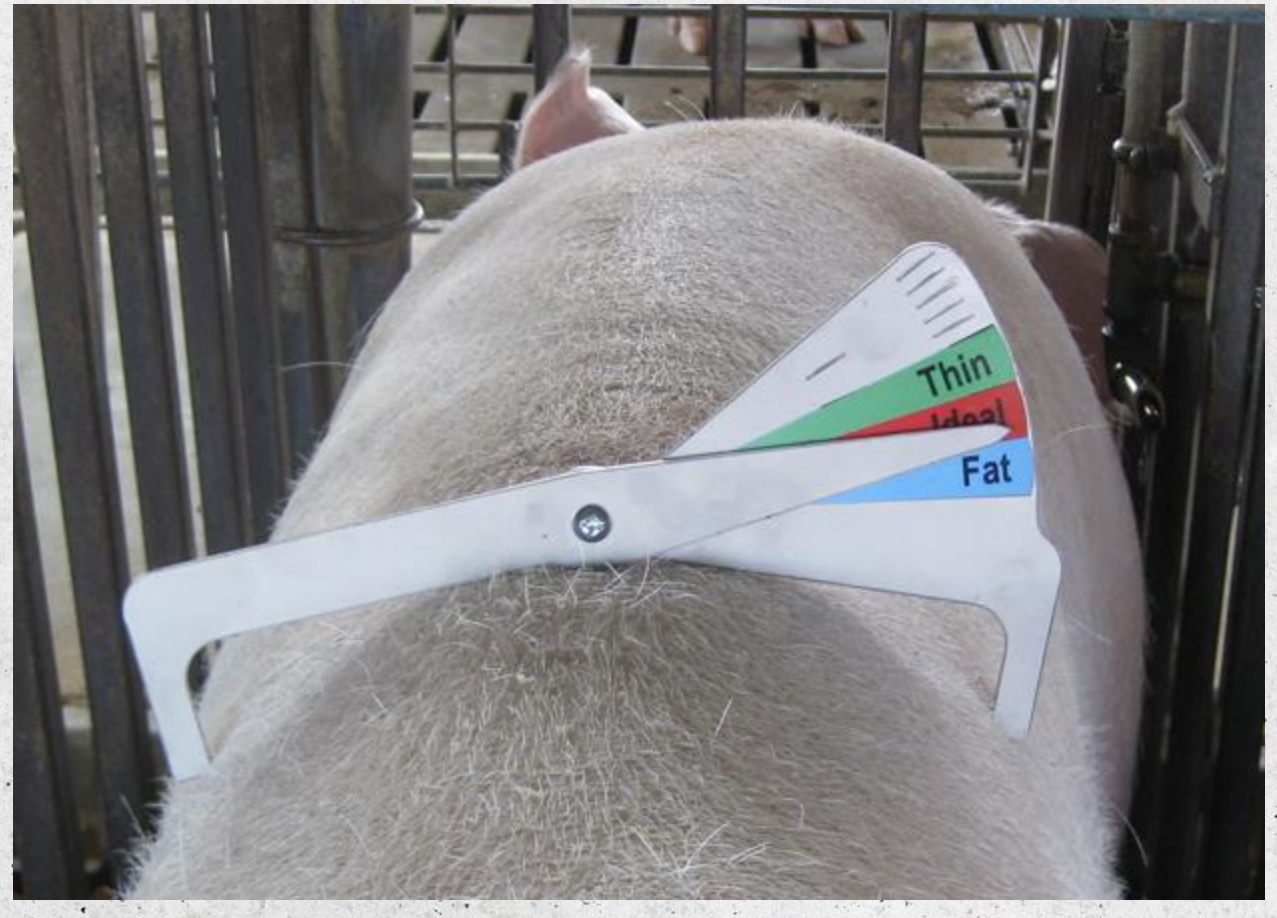
Behavioural indicators of welfare

- Abnormal behaviours
  - Stereotypies
    - *Cause*: often develop in response to inadequate environments that limit their ability to perform natural behaviours
    - *Consequence*: can exacerbate welfare issues by leading to physical harm
  - Aggression
    - *Cause*: often a sign of social stress, inadequate resources or poor management practices
    - *Consequence*: can lead to injuries, increased stress, and a general decline in welfare for all pigs involved



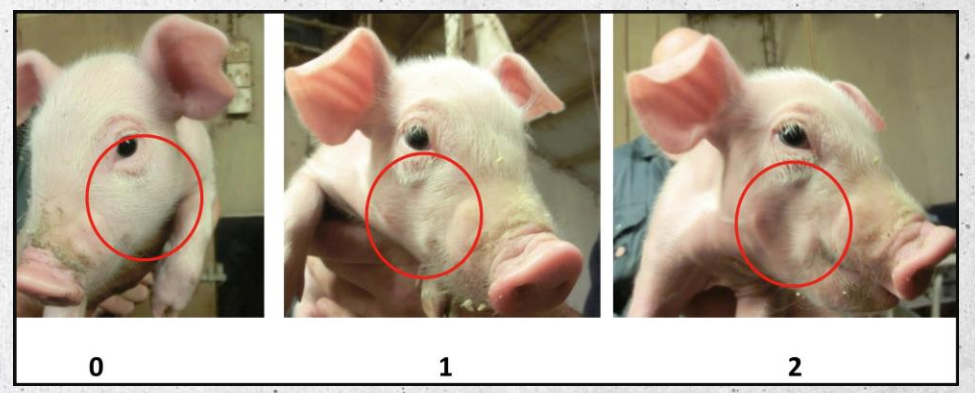
Assessment tools

- Observation and scoring of behaviours
  - Observation
    - Body condition score
    - Caliper score
    - P2 backfat
    - Lameness
    - Injury score



Assessment tools

- Observation and scoring of behaviours
  - Behaviour
    - Behavioural ethograms
    - Grimace score



Lonardi *et al.* (2013)

	A	B	C	D
1	**Sow Behvaiour Ethogram**			
2				
3	**Behaviour**	**Definition**	**State**	**Event**
4	***Maintenance***			
5	Eating	Sow pulls feed from feeder and eats	✓	
6	Drinking	Sow drinks from sow or piglets nipple	✓	
7	***Posture***			
8	Sitting	Front legs straight and back end on the floor	✓	
9	Standing	Upright, with all feet on the floor	✓	
10	Lying ventrally	Sow lies on belly	✓	
11	Lying laterally	Sow lies on side	✓	
13	Posture change	Sow changes position		✓
14	***Nesting/stereotypies***			
15	Nesting - Hessian	Sow interacts with hessian	✓	✓
16	Nosing crate fixture	Back and forth movements with nose or face on ground, bars, drinker and feeder but no drinking or feeding	✓	✓
17	Bar biting	Biting bars with mouth		✓
18	Feed wasting	Sow moves head back and forth over the lip of the feeder, but isnt eating. Feed falls into the bowl but is not being eaten. *May be difficult to separate from feeding.*		
19	Champing	Animal opens and closes mouth in air, often has foamy mouth	✓	✓

Assessment tools

- Observation and scoring of behaviours
  - Mental State
    - Startle test
    - Anticipatory behaviour
    - Novel object
    - Cognitive bias test

Assessment tools

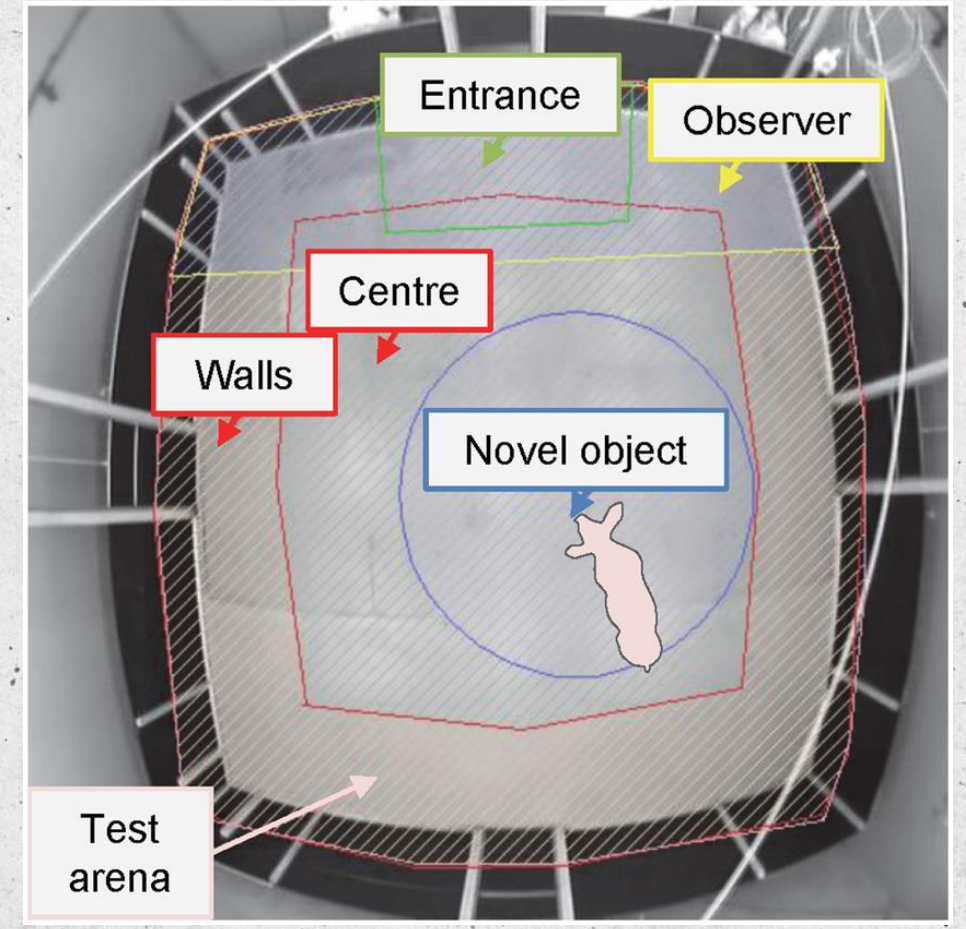
- Startle test
  - The startle response is the reflexive movement of an animal to the sudden exposure of an unexpected stimulus, such as loud noise
  - The Defense Cascade which is an adaptive suit of responses evolved to ensure appropriate detection, evaluation and response to altering stimuli
    - Components of the Defense Cascade response are modulated by affective state, making them valuable indicators of these states.
  - Easily applicable on farm

Assessment tools

- Anticipatory behaviour
  - Animals are able to anticipate future events and can be trained to recognize cues that signal the arrival of pleasant of aversive experiences.
  - This anticipation can be measured and animals will show:
    - Withdrawal and reduced activity when anticipating an aversive experience
    - Increased activity and investigative behaviour when anticipating a pleasant experience
  - The value of the anticipated resource is dependent on the internal state of the animal
    - Thus, the amount of anticipatory behaviour shown has been proposed as an indicator of positive affect in animals

Assessment tools

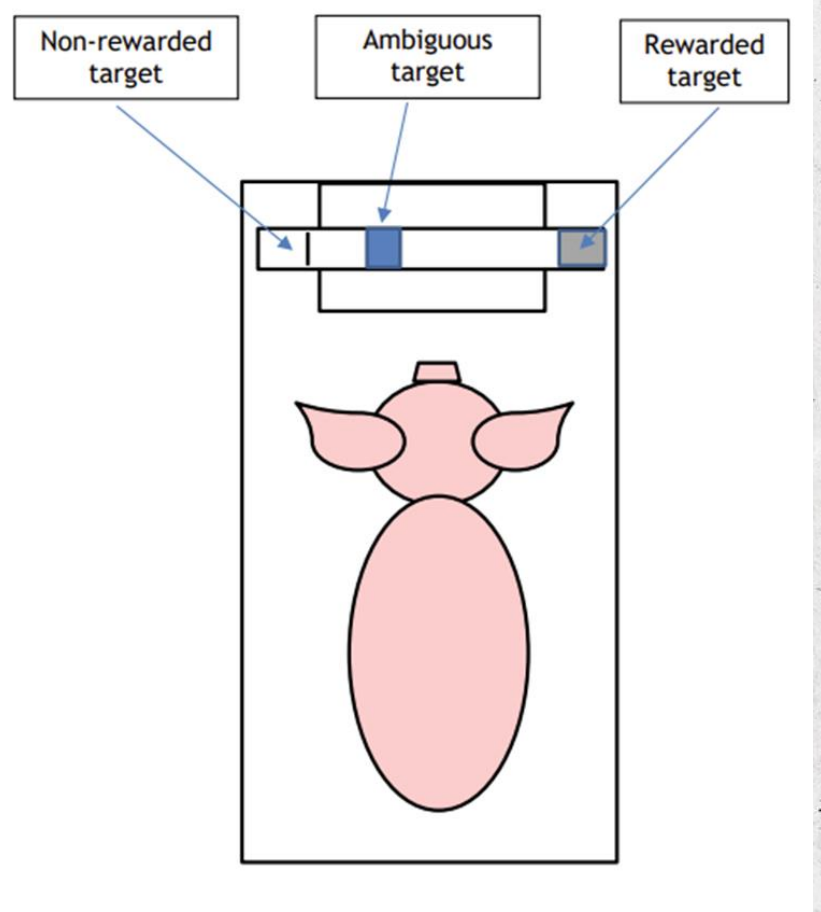
- Novel object test
  - Widely used behavioural assessment to evaluate curiosity, fearfulness and exploratory behaviour when confronted with a novel object
  - Pigs that quickly approach and interact with the object are considered less fearful and more curious, suggesting a positive welfare state



Clouard *et al.* (2016)

Assessment tools

- Cognitive bias test
  - Behavioural assessment used to measure the emotional state of an animal, by evaluating how they interpret and ambiguous stimuli
  - Work by Doyle *et al.* (2018) found that sows touched the positive cue 98% of the time and the average response time was 0.4 ± 0.04s; negative cue 11% touched, average of 3.8 ± 0.04s; ambiguous cue 55% touched, average 2.6 ± 0.13s
  - This differentiation between cues is the critical component showing that the animal has learnt the difference between the two reference cues and judged the ambiguous cue differently



Doyle *et al.* (2018)

Qualitative behavioural assessment

- Qualitative behavioural assessment (QBA)
  - The human scoring of an animal behavioural expression or body language

Question	Descriptor	Scale	Descriptor
How would you classify the sows demeanour?	Agitated, tense, annoyed, frustrated, aggravated, stressed	1 2 3 4 5	Alert, playful, satisfied
How well do you think the sow is able to express her natural behaviour?	Not very well	1 2 3 4 5	Very well

Qualitative behavioural assessment

- How is QBA applied to pigs?
  - QBA is based on the integration of information that would otherwise be lost in quantitative approaches
  - QBA allows for the use of descriptors that have expressive connotations of the animal (i.e. calm, excited, anxious or aggravated)
  - Behavioural assessment focus on *what* the animal does, QBA focusses on *how* the animal performs the action

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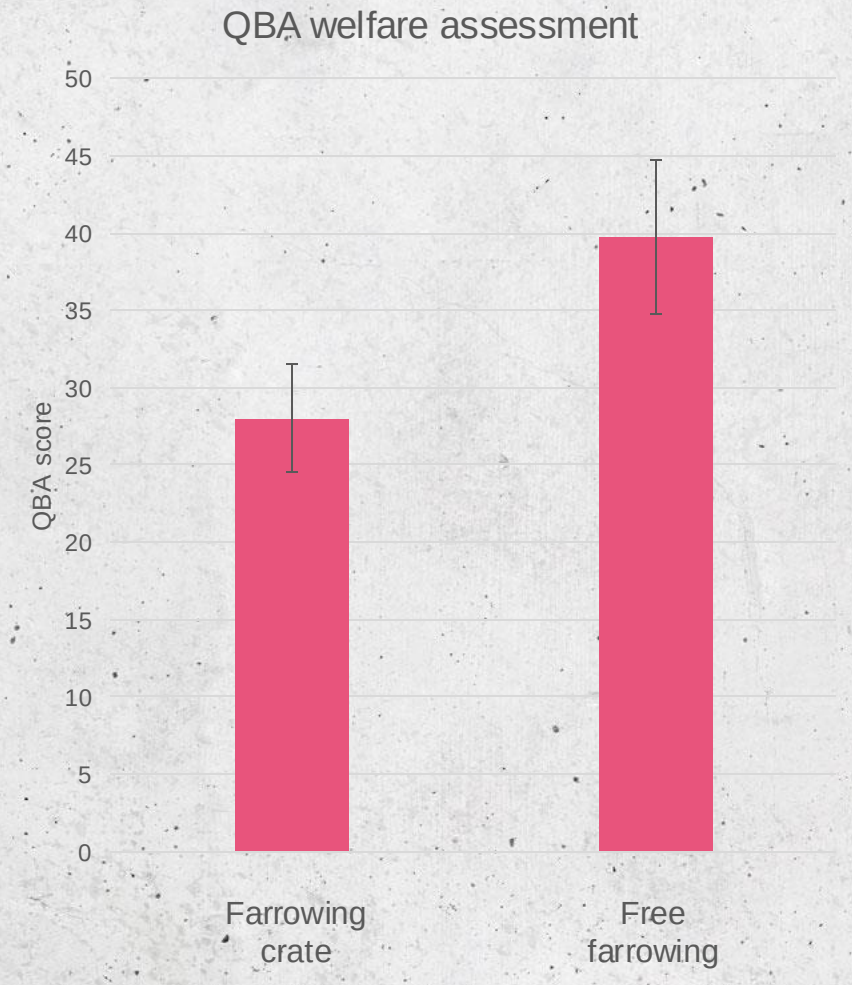
Qualitative behavioural assessment

- Limitations
  - While some critics may dismiss QBA as anthropomorphic the statistical analysis involved in QBA sorts terms into a relative rank between individual viewers and groups
  - Wemelsfelder *et al*. (2012) studied the interobserver and intraobserver reliability of pig farmers, vets and animal activists and found that they not only had significant consensus among the group but also between groups
  - A potential weakness of QBA is its sensitivity to contextual bias, such as an observer may look at a free-range pig vs an indoor setting and make the judgement that the free-range pig must be 'happier'
    - Wemelsfelder *et al.* (2009) found contextual bias is unlikely to seriously distort overserved characterization of pig expression

Qualitative behavioural assessment

- QBA use commercially
  - Unpublished work by our research group investigated the attitudes and opinions of our stockpeople into the use of free farrowing accommodation vs the traditional farrowing crate
  - Similarly to work completed by Wemelsfelder et al (2012) despite peoples positive or negative attitudes and opinions towards the free farrowing alternative, there was consensus that overall, the welfare of the sow is improved in a free farrowing environment.



Conclusions

- Animal welfare is essential for the ethical treatment of animals, ensuring they are free from suffering and able to express natural behaviours.
- The Five Freedoms provide a foundational framework for assessing and ensuring basic animal welfare
- The Five Domains build on this by incorporating mental well-being, offering a holistic approach to animal welfare assessment.
- Practical application of these models in livestock farming, particularly in pigs, is vital for improving both physical and psychological health, which ultimately supports sustainable and ethical farming practices.
- Behavioural indicators serve as critical tools for assessing welfare, highlighting the importance of observing both positive and negative behaviours to guide management decisions.

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