

# Fishy Ethics

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Fish welfare and moral status in aquaculture

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# Why sustainable aquaculture?



# Aquaculture & sustainability: concerns

- *Efficiency problem:*  
1,9 kilo wild fish needed  
for generating 1 kilo of  
(piscivorous) fish
- *Environmental problems:*
  - Fish faeces & food  
pollution, pathogens
  - Habitat destruction
  - Introduction exotic species
  - *Fish welfare problems*



# Fish welfare: a interaction between science and ethics

## How to implement welfare? In 7 steps



How to weigh welfare vis-à-vis other values?

What does welfare mean?  
How do you define it?

# Definitions of animal welfare I

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- Welfare is a concept that combines moral norms and biological ideas
- How one defines welfare shows moral convictions and biological suppositions
- First: balanced biological functioning or coping
- Later: subjective experiences
  - > absence of pain
  - > positive experiences



# Definitions of animal welfare II

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- Welfare assesement: emphasis often still on absence of pain
- Farm Animal Welfare Council 5 freedoms:
  - Hunger and thirst
  - Discomfort and pain
  - Injury or disease
  - Fear and distress
  - To express normal/natural behaviour



# Definitions of animal welfare III

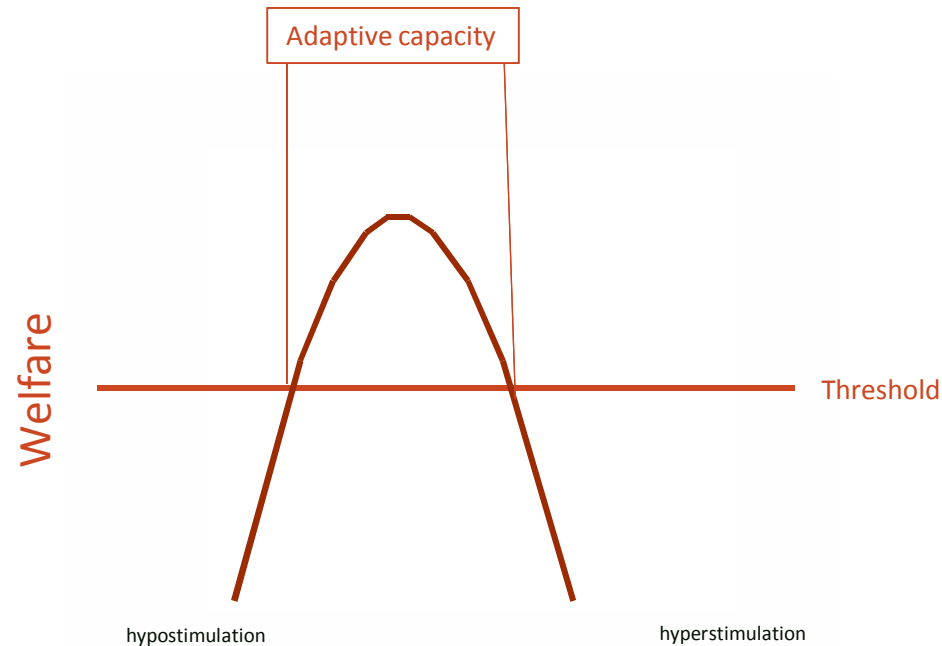
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- 3 groups of visions:
  - 1) Based on functioning/ coping
  - 2) Based on feeling/ subjective experience
  - 3) Based on natural behaviour

Someone's moral background determines where one puts emphasis

**Welfare:**

subjective (emotional)  
state of an organism  
which is reflected by its  
ability to cope with  
presented challenges



**Environmental challenges**

**Determined and affected by the interaction of:**

- **Subject characteristics:** sex, age, genetic make-up, life history, personality
- **Environment characteristics:** enrichment, predictability, duration



# Fish welfare: a interaction

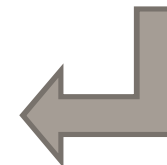
How to implement  
welfare?



How to weigh welfare  
vis-à-vis other  
values?



What does welfare mean?  
How do you define it?



How do you  
measure welfare?

# How do you measure welfare?

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- At first sight seems a purely empirical affair, but value-moments in research
- 2 research groups can reach opposite conclusions about welfare based on same set of data



# Preference tests

“Helpful, but some problems:

- What exactly do you measure?

- Best of 2 evils?
- Familiarity? Curiosity?
- Short-term vs. long-term welfare
- Emphasis on objectively measurable
- Should welfare be measured on the level of the individual or the group?



**Welfare:**

subjective (emotional)  
state of an organism  
which is reflected by its  
ability to cope with  
presented challenges

Welfare

Adaptive capacity

threshold

Environmental challenges

**Parameters indicative of allostatic load/state:**

- **Behaviour:** cope with challenges, learning, anxiety, fearfulness
- **Physiology:** cortisol base-line, recovery following challenges
- **Gene expression:** *mr*, *gr-alpha*, *gr-beta* and their ratio
- **Disease:** susceptibility, recovery, mortality

# Reward system & enrichment

3 weeks of offering enjoyable food  
(small crustaceans)



Enriched environment

*For quality of life*

Boerrigter, et al. (under review)  
Manuel, et al. (in prep)

# Reward system & enrichment

Enrichment reduces anxiety-like behaviour in **zebrafish** (reduced shelter seeking)

Enrichment and hedonic feeding reduces fear/avoidance for a negative stimulus

Enrichment reduces up-regulation of genes in the brain which are associated with stress

# Fish welfare: a interaction

1. How to implement welfare?

2. How to weigh welfare vis-à-vis other values?

5. Why is welfare important?

3. How do you define welfare?

4. How do you measure welfare?

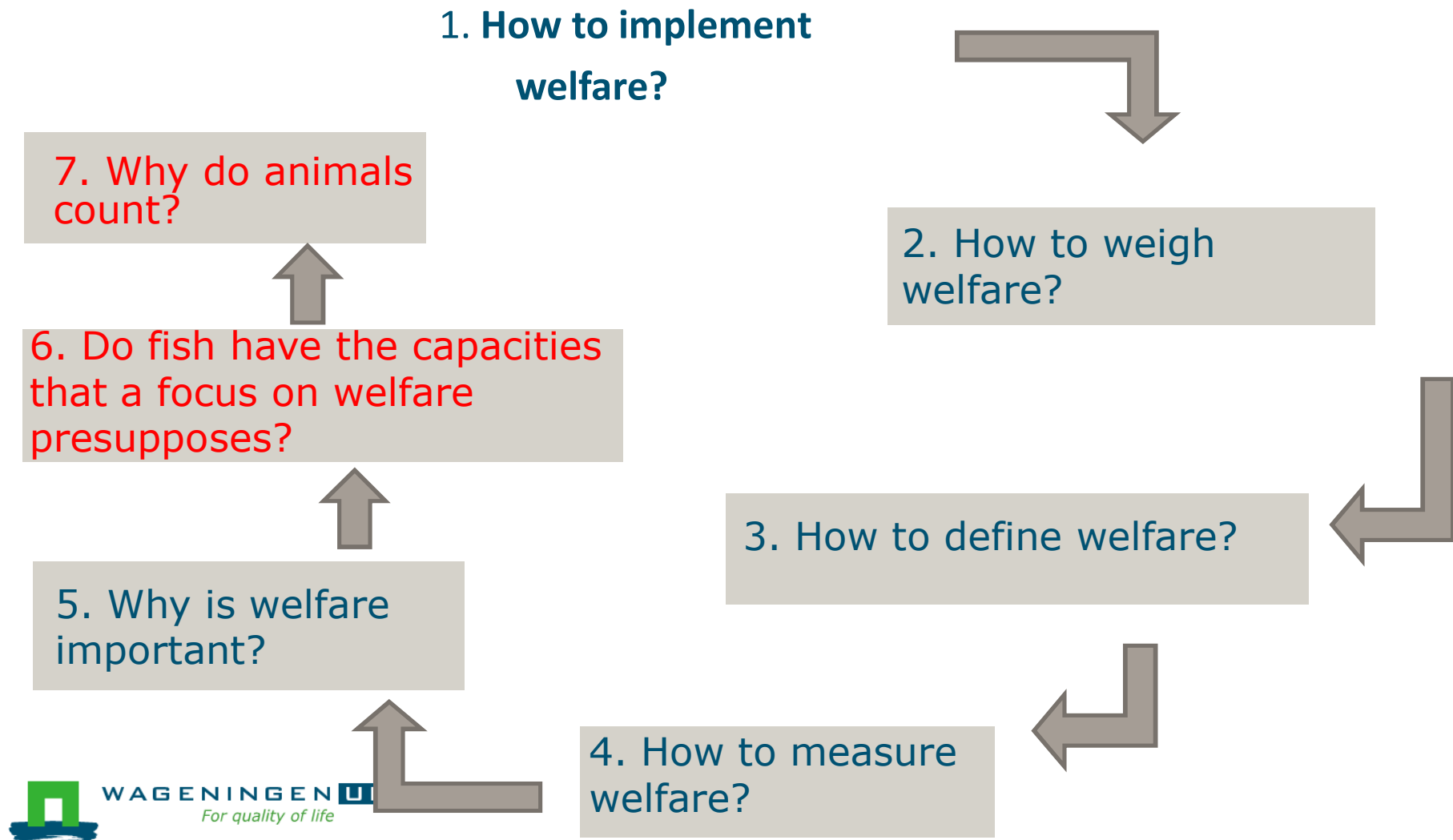


# Why is welfare important?

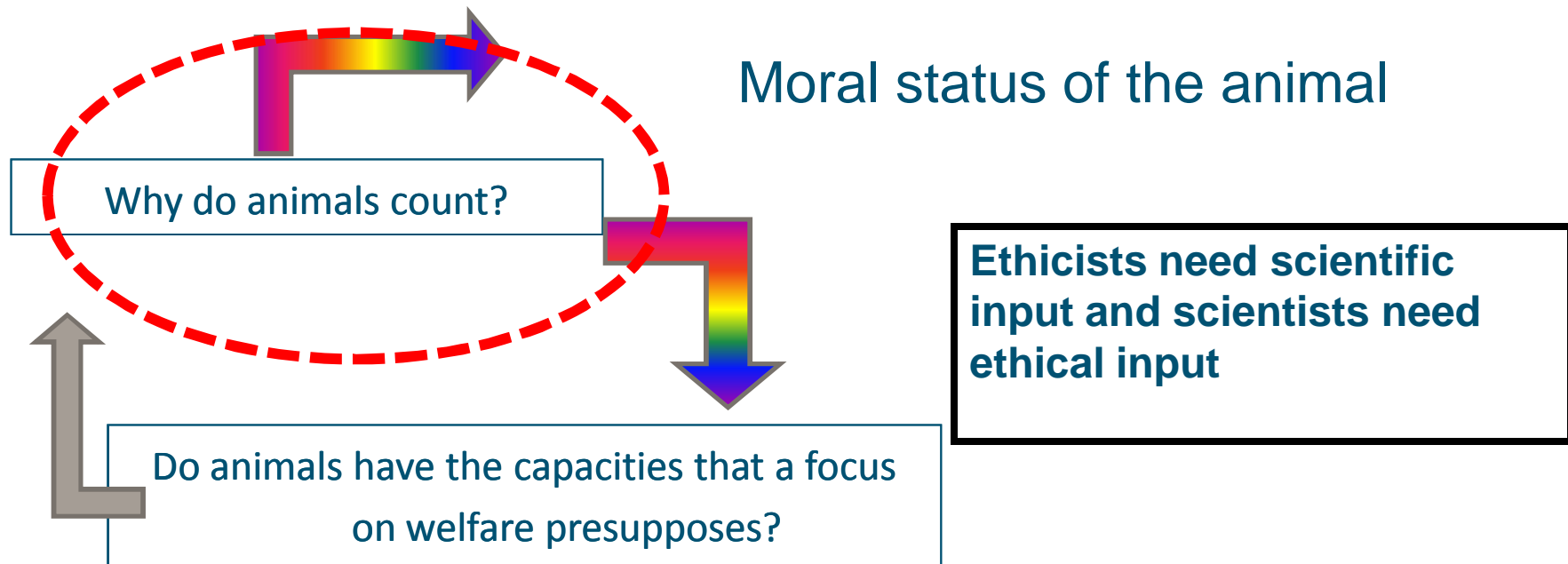
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- Speaking about welfare presupposes that welfare is relevant for our moral decisions
- Assumes that animals have an interest in the absence of pain and suffering and the presence of pleasure, or in natural behaviour
- Presuppose certain moral theories and excludes other ones

# Fish welfare: a interaction



# Welfare: an interaction



# Three modes of thinking on 'moral status' of animals

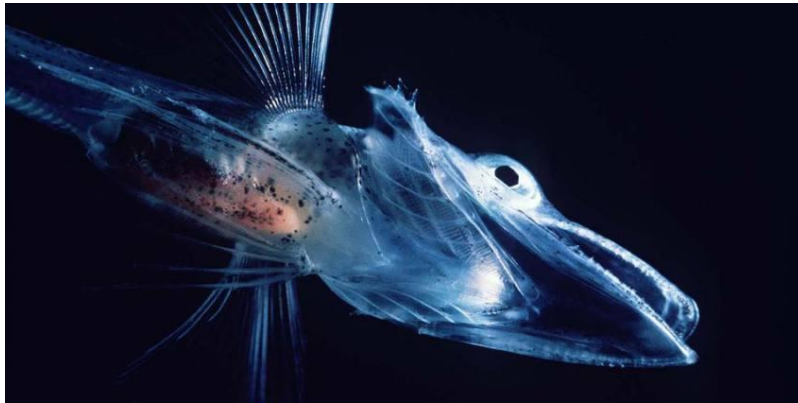
| Sources of moral status              |  | Ethical reasoning, ideal way of being |
|--------------------------------------|--|---------------------------------------|
| 'Sentience' /<br>'Subject of a life' | Their ability to feel pain, suffer, feel pleasure (being in relevant ways like us) | Rational, altruistic                  |
| Empathy /<br>Sympathy                | Our ability to feel from their perspective, communicate                            | Relational, friendly                  |
| Awe                                  | Difference from, rather than similarity to humans                                  | Immersive, modest?                    |

# Empathy- line difficult

- Not cuddly
- No clear facial expression
- We cannot hear them
- Difficult to establish a relationship with a fish



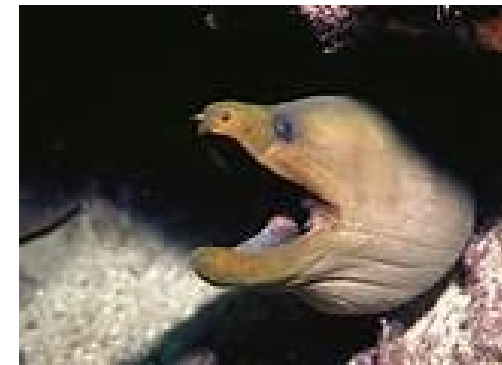
# Awe-line promising



Gobies: creation of a mental map

Fish with antifreeze in their blood

- Sex-change in fish
- Fish that swim thousands of kilometers to find their way home
- Fish that change the position of their mouth to climb rocks



Moray eels and groupers: cooperative hunting across species

# Sentience-line convincing to some

- Fish do consciously experience pain
- Trout research with bee poison and vinegar
- Novel object test
- Combines behaviour with physiological data
- Pain has an evolutionary function
- Does assume that fish experience pain differently than people. What exactly does this mean?
- However, note that there are over 30.000 species of fish: can't generalise > More research needed



Victoria Braithwaite





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# Summary

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- When we are trying to determine how to implement fish welfare at the farm, we need to first answer a number of questions
- This requires an interaction between values and facts, between ethics and biology
- A focus on fish welfare assumes that animals count in our moral deliberations
- Raises the question: what is moral status based on?
  - sentience
  - empathy
  - awe

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Thank you for  
your attention

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Questions?

