



SCIENCE AND  
EDUCATION **FOR**  
**SUSTAINABLE**  
**LIFE**



# Management of farm animal welfare

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# Management of farm animal welfare

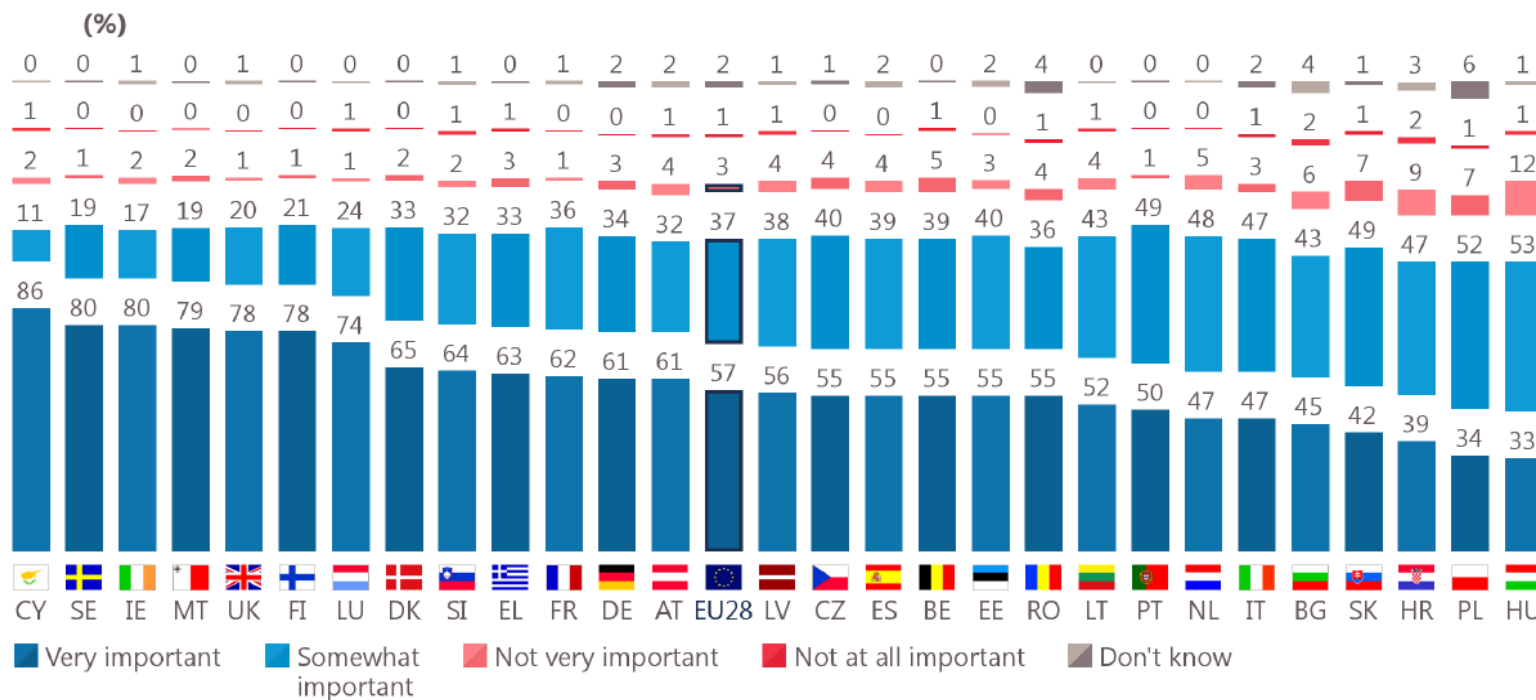
- Animal welfare and society
- Relevance for farmers and companies
- Views on animal welfare
- Welfare assessment and management
- Application of technology
- Conclusions

# Animal welfare and society



# Societal importance of animal welfare

*How important is it to protect the welfare of farm animals?*



SPECIAL EUROBAROMETER 442 (2015)

# Willingness to pay

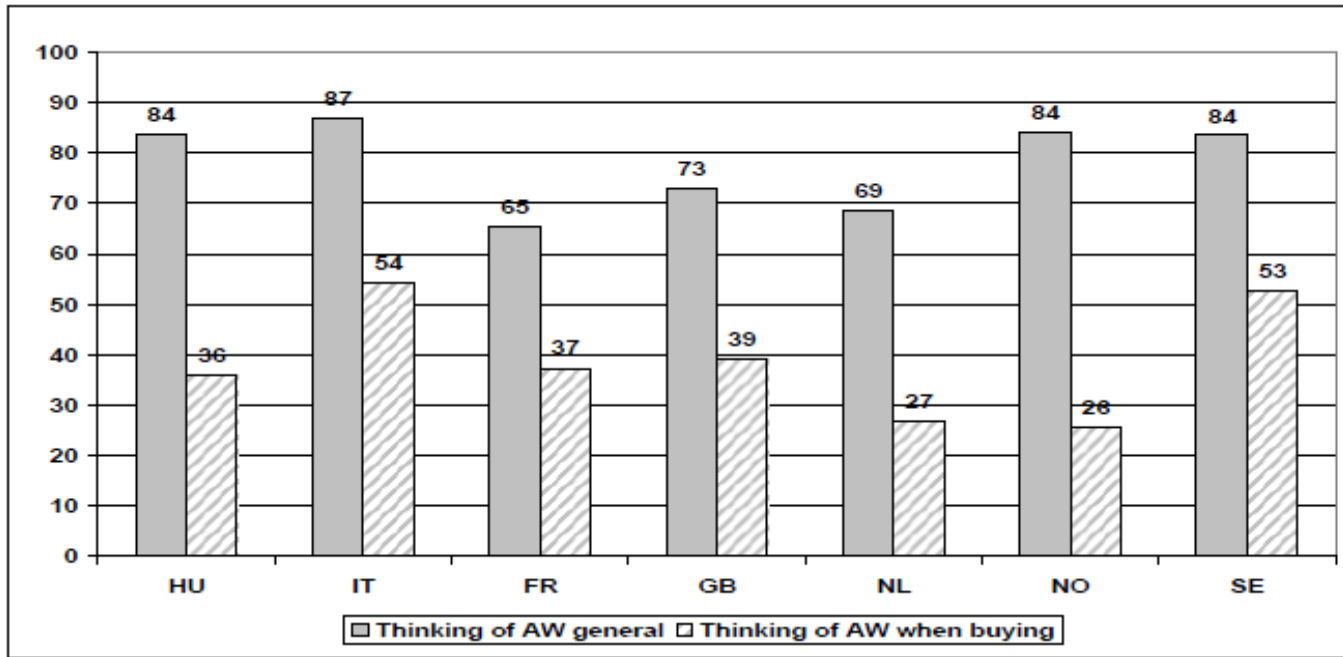
*Would you be willing to pay more for products sourced from animal welfare-friendly production systems?*



SPECIAL EUROBAROMETER 442 (2015)

# Willingness to pay

*Animal welfare is not at the forefront of consumers when shopping for food*



# Willingness to pay

*Is willingness to pay realized in the shop?*

- growing trends in the size of the market share of animal friendly products, e.g.:
  - organically produced products
  - non cage eggs
  - various welfare labelled products (e.g. 'Beter Leven' and 'RSPCA Assured / Freedom Food')
- recent survey in Sweden: 10 % of Sweden's population are now vegetarian or vegan, where the number was 6 % 5 years ago





# Relevance for farmers and companies

# Relevance for farmers

- *Farmers want to take good care of their animals*
- *They recognise the link between good welfare and good economics*

*Good welfare means for example:*

- *Lower production costs: less disease and veterinary costs*



# Bad welfare affects production/economy

Table 1

**The effects of different types of lameness (sole ulcer, digital dermatitis, foot rot) on net return, lameness cases, % of lameness treated, average cost of lameness and average cost per case, following an optimal replacement policy**

	Net return <sup>a</sup>	Lameness cases <sup>b</sup>	% la treated <sup>c</sup>	of Average cost of lameness	Average cost per case <sup>d</sup>
No lameness	426.05				
All	384.31	23.5	94.1	41.74	177.62
Digital dermatitis and foot rot	410.67	12.2	92.3	26.36	216.07
Sole ulcer					
Sole ulcer and foot rot	393.75	7.1	95.5	9.44	132.96
Digital dermatitis					
Sole ulcer and digital dermatitis	389.50				
Foot rot		4.3	97.3	5.19	120.70

<sup>a</sup> net returns in US\$ per cow and year

<sup>b</sup> incidence of lameness (cases per 100 cow years)

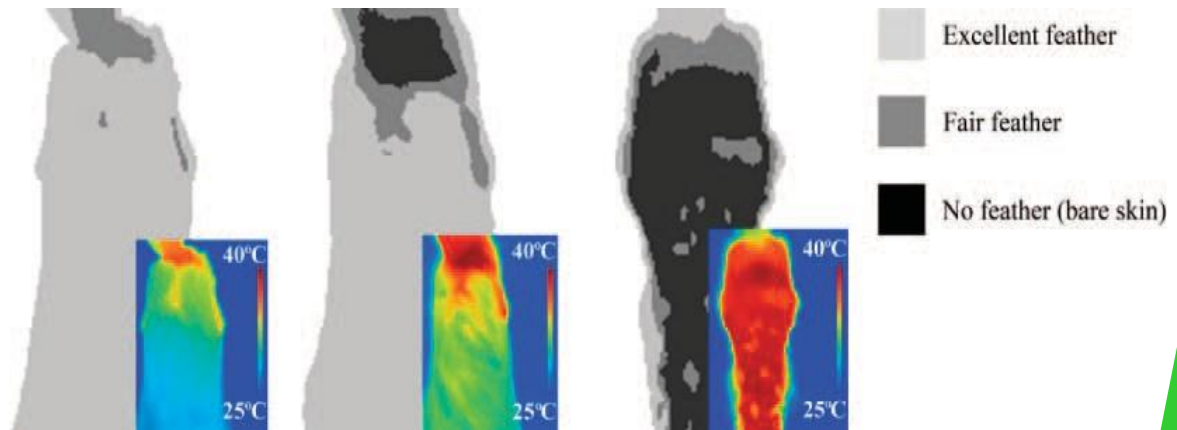
<sup>c</sup> percent of treated lame cow s per lame cow s

<sup>d</sup> average cost per lameness case

(Cha et al., 2010, Prev. Vet. Med. 97, 1-8)



# Bad welfare affects production/economy



(Zhao et al., 2012, Poultry Sci. 92, 295-302)

# Bad welfare affects production/economy



*Badly feathered birds had 46% higher maintenance requirement than well feathered birds*

(Tauson and Svensson, 1980,  
Swedish J. agric. Res. 10, 35-39)

# Relevance for farmers

- *Farmers want to take good care of their animals*
- *They recognise the link between good welfare and good economics*

*Good welfare means for example:*

- *Lower production costs: less disease and veterinary costs*
- *Less quality losses: minimising negative effects of stress on intrinsic quality (e.g. taste, pH, water content, tenderness, damages, etc.)*





# Relevance for farmers

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*Good welfare means for example:*

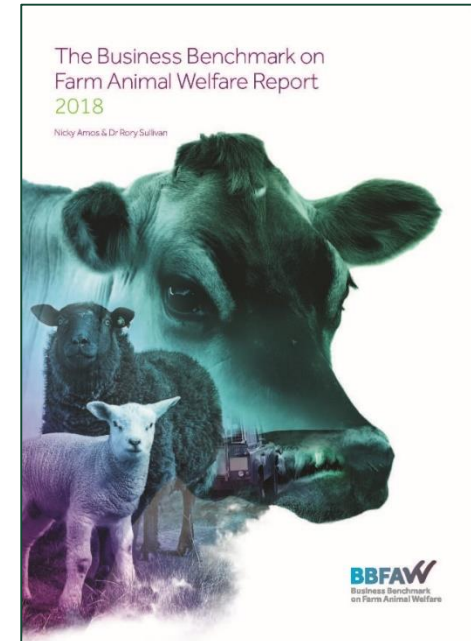
- *Lower production costs: less disease and veterinary costs*
- *Less quality losses: minimising negative effects of stress on intrinsic quality (e.g. taste, pH, water content, tenderness, damages, etc.)*
- *Access to markets: assuring animal welfare as a quality aspect of the product (extrinsic quality)*



# Relevance for companies

*Business Benchmark on Farm Animal Welfare analyses the farm animal welfare management and performance of the world's largest food companies, across 35 criteria under four pillars:*

- *Management commitment*
- *Governance and management*
- *Leadership and innovation*
- *Performance reporting and impact*



(The Business Benchmark on Farm Animal Welfare Report, 2018)

# Relevance for companies

*Business Benchmark on Farm Animal Welfare analyses the farm animal welfare management and performance of the world's largest food companies, across 35 distinct, objective criteria.*

*The 2018 Benchmark covers 150 global food companies:*

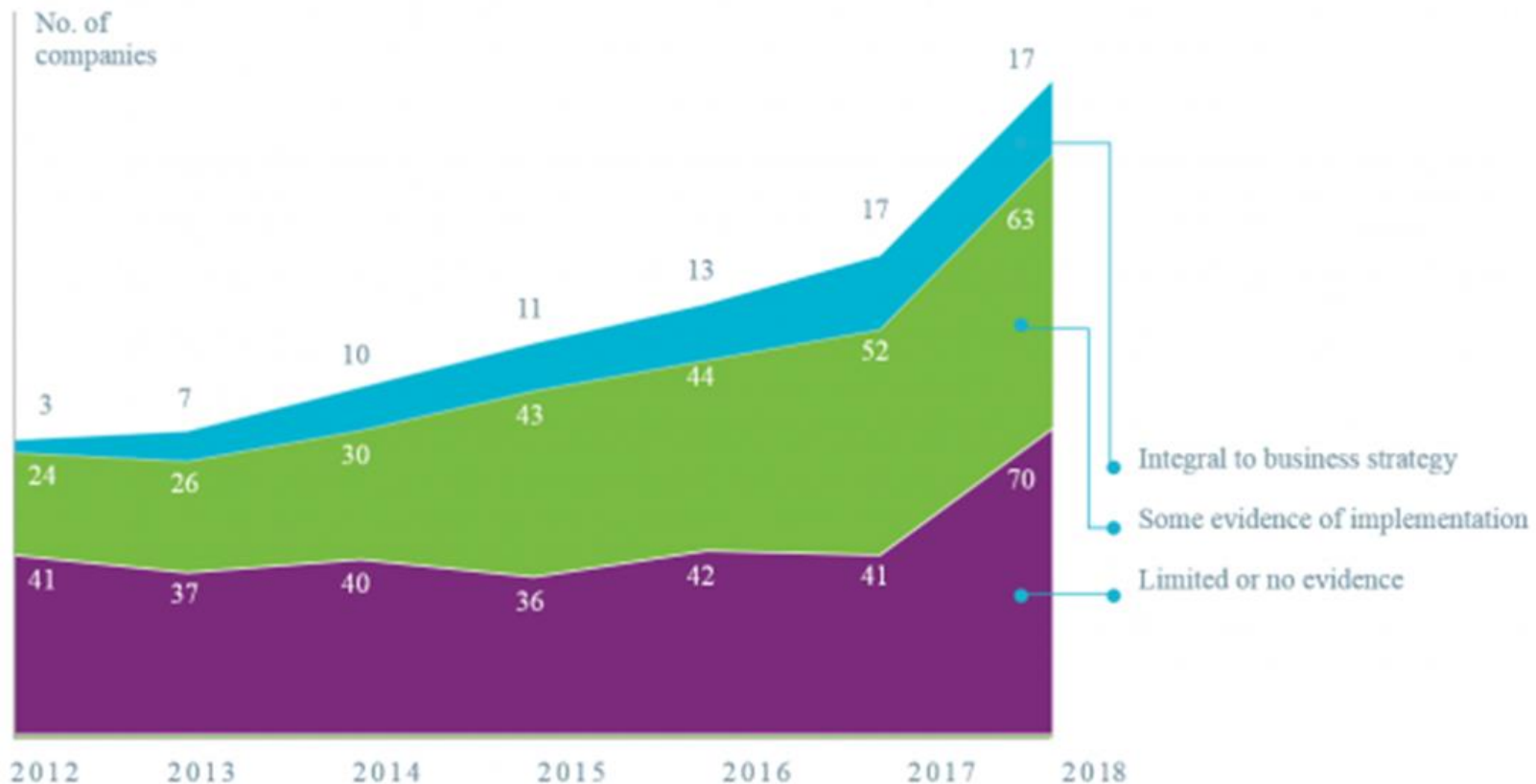
- *52 Retailers and Wholesalers*
- *63 Producers and Manufacturers*
- *35 Restaurants and Bars.*
- *69 companies from Europe, 52 from North America and the rest from a mix of countries including Australia, Brazil, China, Japan, New Zealand and Thailand*

(The Business Benchmark on Farm Animal Welfare Report, 2018)



# Relevance for companies

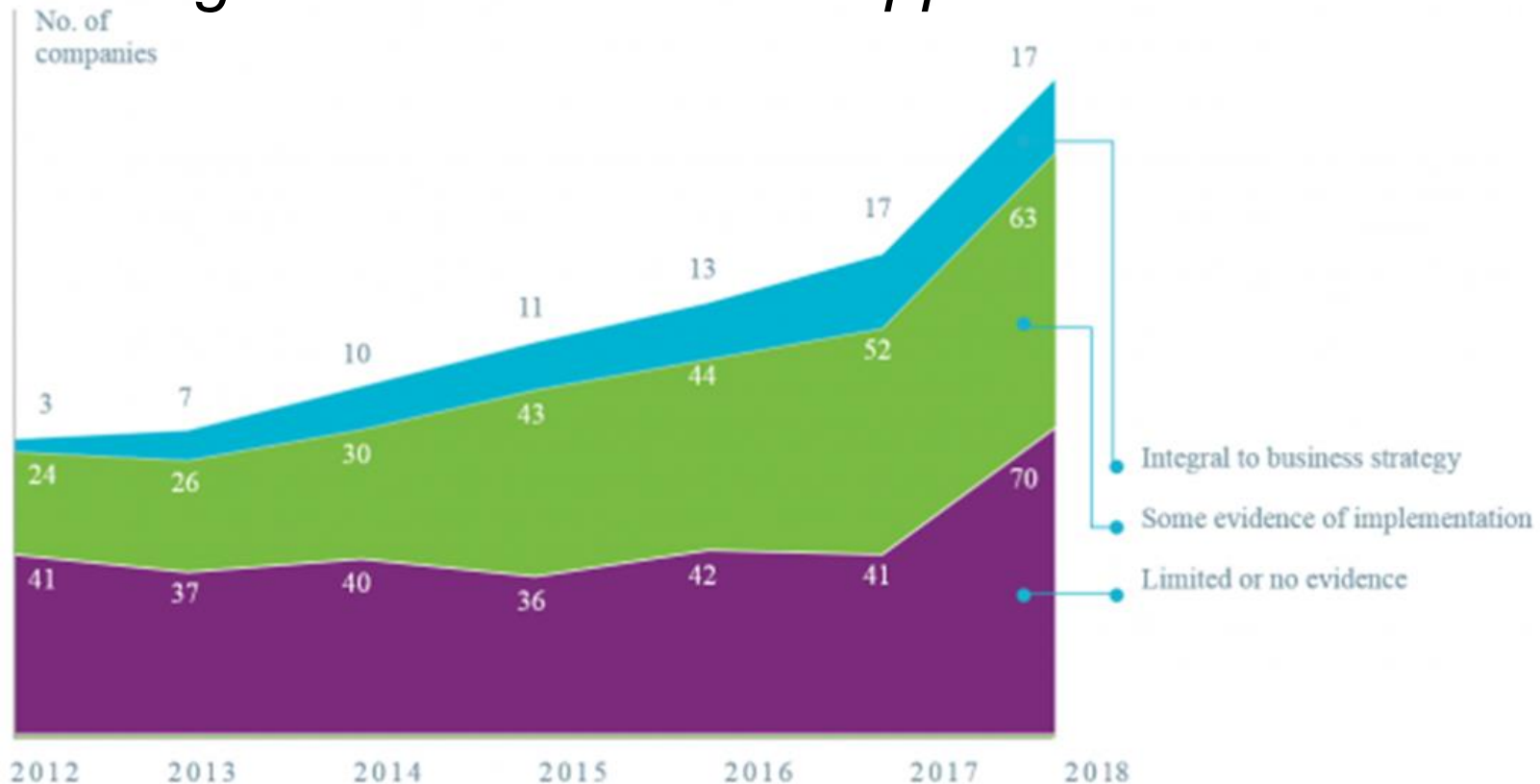
*Companies more and more include animal welfare in their business strategy*



(The Business Benchmark on Farm Animal Welfare Report, 2018)

# Relevance for companies

*The primary drivers for companies to focus on farm animal welfare are consumer interest, risk management and business opportunities*

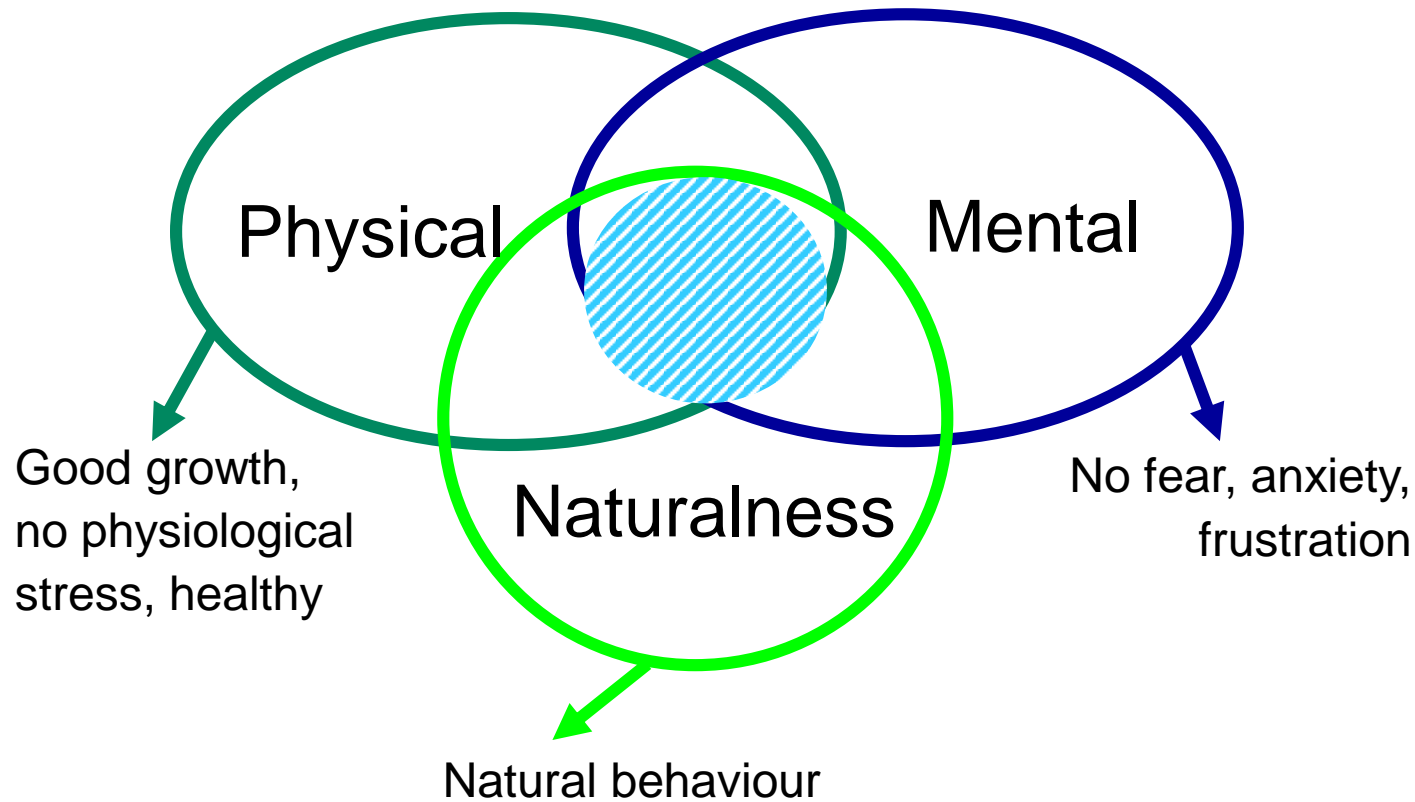


(The Business Benchmark on Farm Animal Welfare Report, 2018)

# Views on animal welfare



# Views on animal welfare



# Welfare management

# Welfare assessment

*Different ways to 'measure' welfare:*

*1) Input measures (resource based): check if housing conditions and animal care are of good standard (e.g. availability of litter, adequate space, good quality water)*



# Legislation mainly resource based

*E.g.: EU Council Directive 1999/74/EC*

- *Enriched cages:*
  - *750 cm<sup>2</sup>/hen (600 plus)*
  - *nest*
  - *litter*
  - *15 cm perch per hen*
  - *12 cm feedtrough per hen*
  - *2 nipple drinkers per cage*
  - *claw-shortening devices*





# Welfare assessment

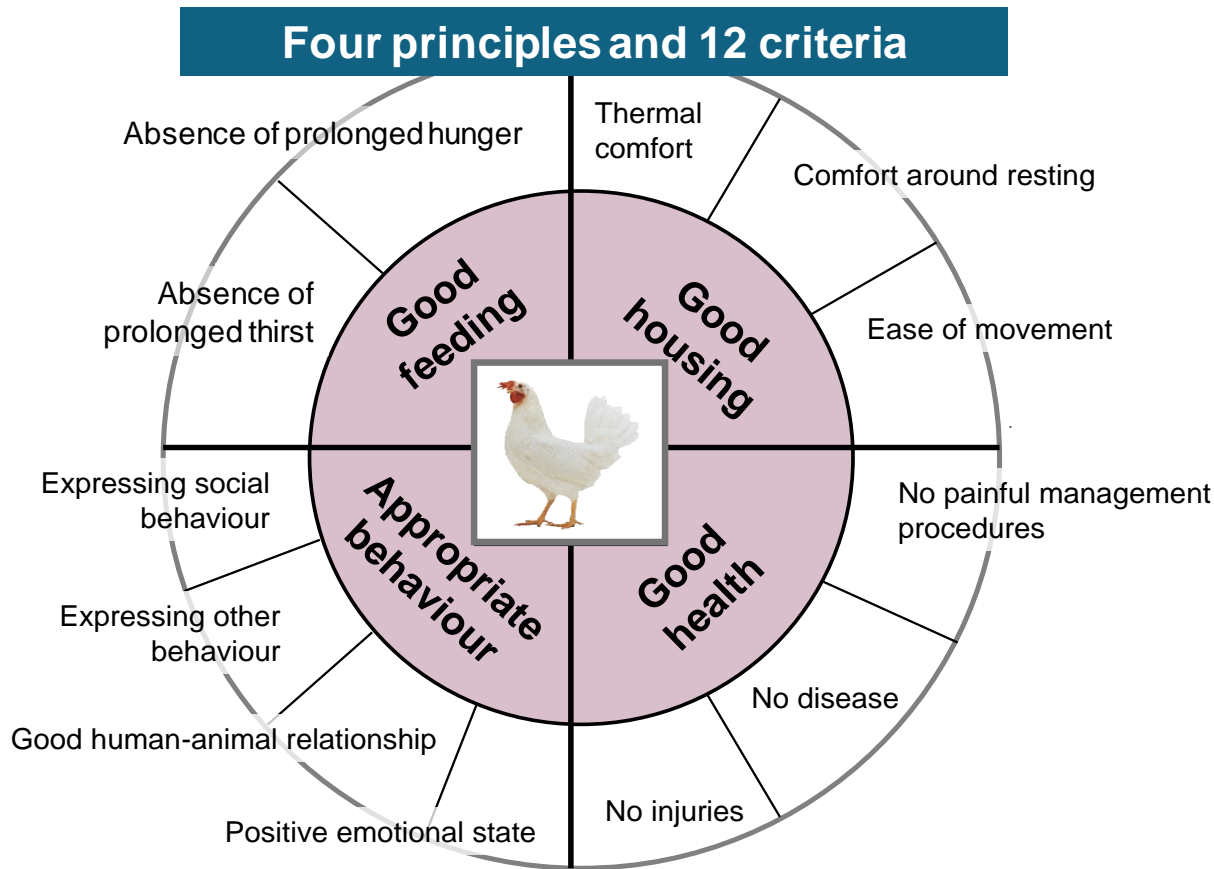
*Different ways to 'measure' welfare:*

*1) Input measures (resource based): check if housing conditions and animal care are of good standard (e.g. availability of litter, adequate space, good quality water)*

*2) Output measures (animal based): measure indicators of animal welfare at the animal (e.g. lameness, wounds, abnormal behaviour, signs of disease)*

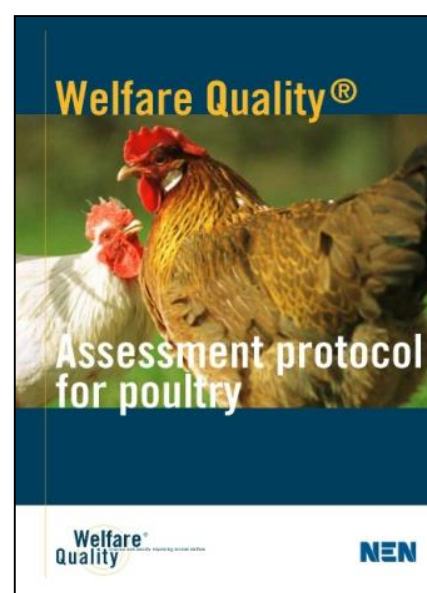
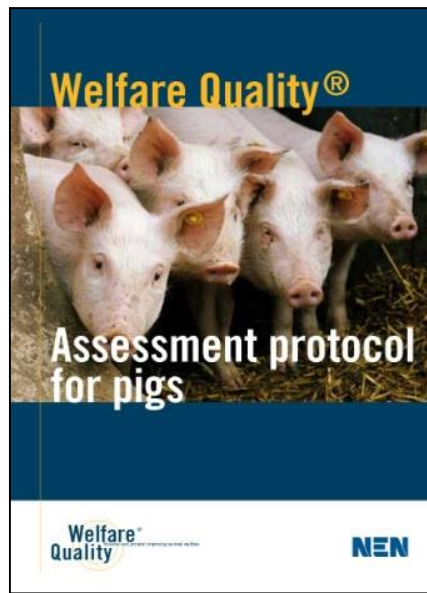
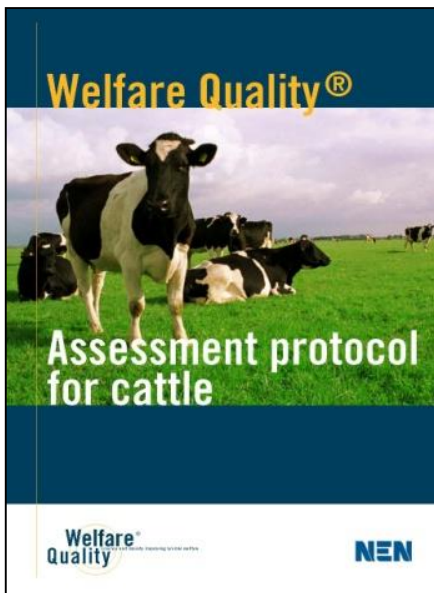


# Welfare Quality principles and criteria for good welfare

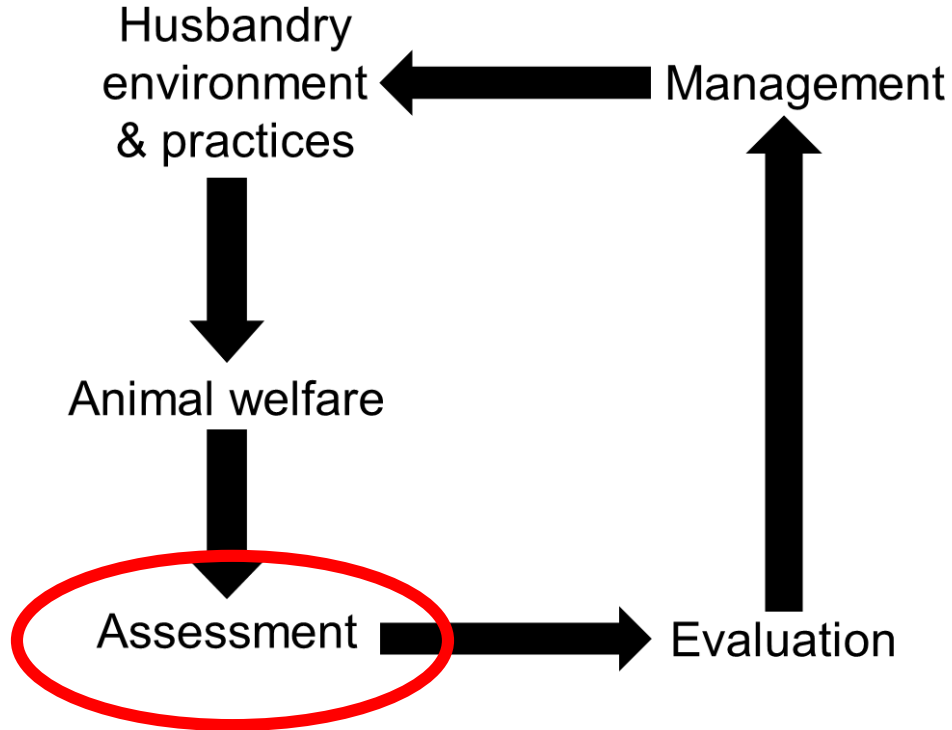


(Blokhuys et al., 2013)

# Welfare Quality assessment



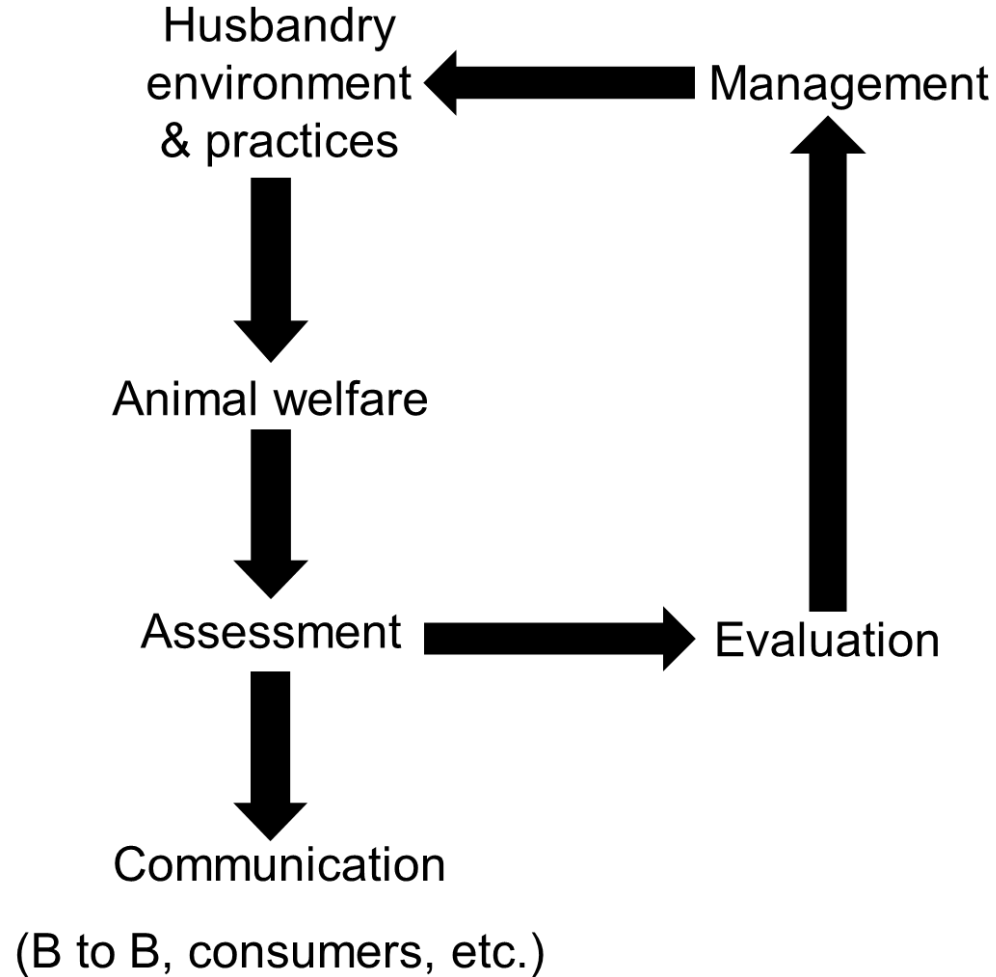
# Welfare management



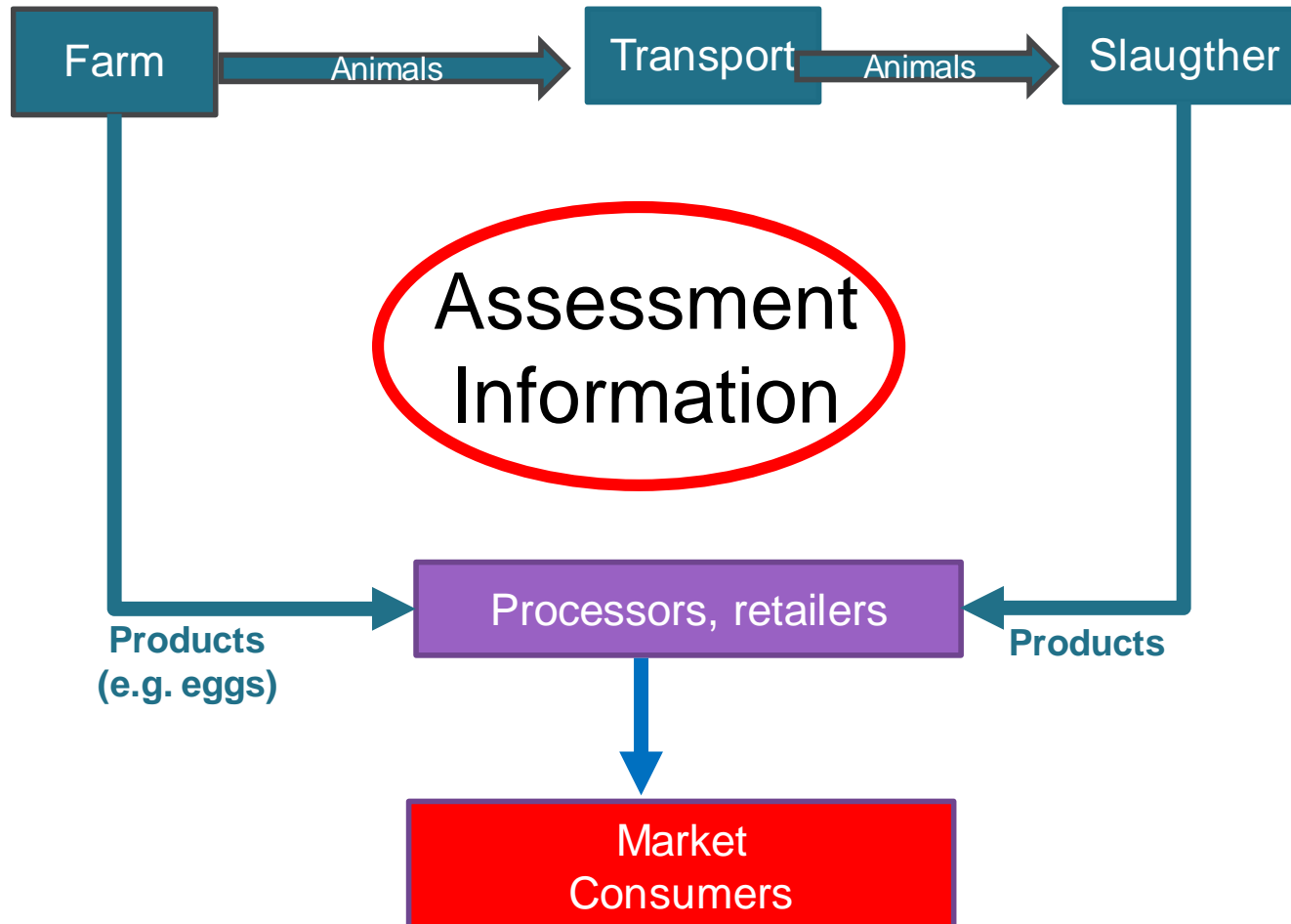
Continuous improvement



# Welfare communication



# Welfare communication



# Application of technology

# Welfare assessment by assessors

## Disadvantages:

- Time consuming
- Biosecurity risk
- A “snap shot” of the welfare state



## Technology a solution?





# Chicken Boy

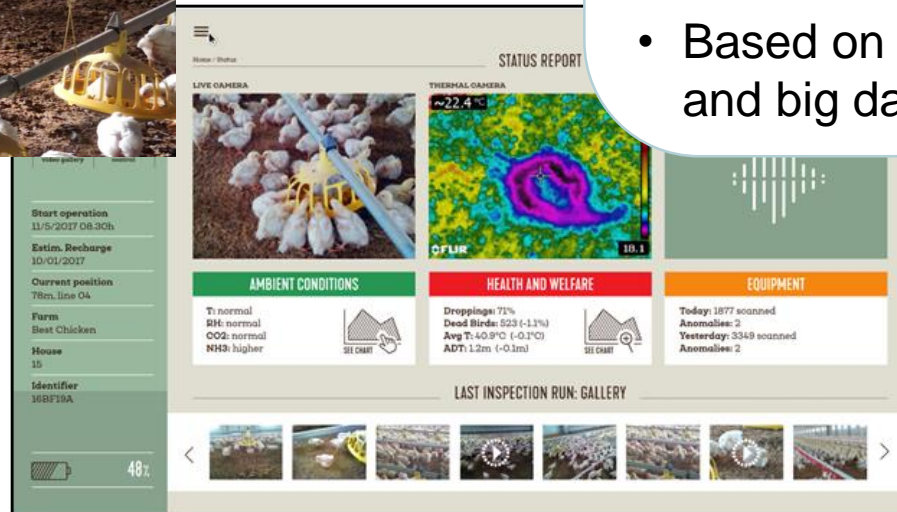
Faromatics, Spain



ChickenBoy



- **Autonomous ceiling-suspended robot**
- Assessment of
  - Ambient conditions
  - Health and welfare
  - Equipment failures
- Multiple sensors & cameras
- Based on deep learning and big data

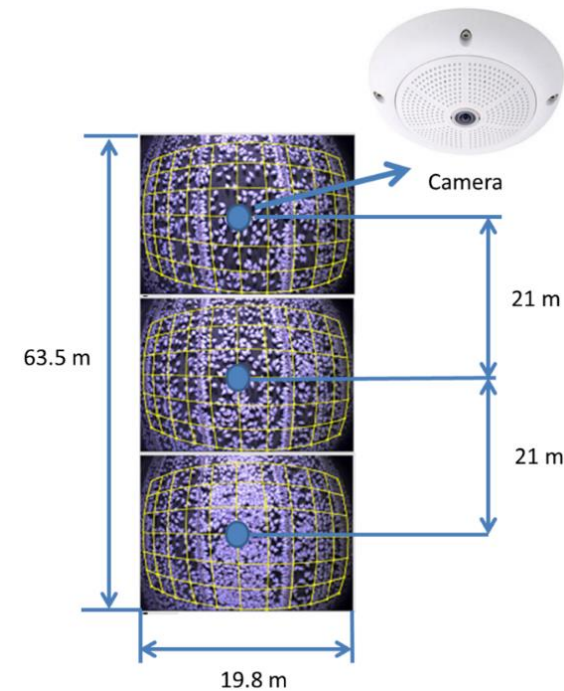
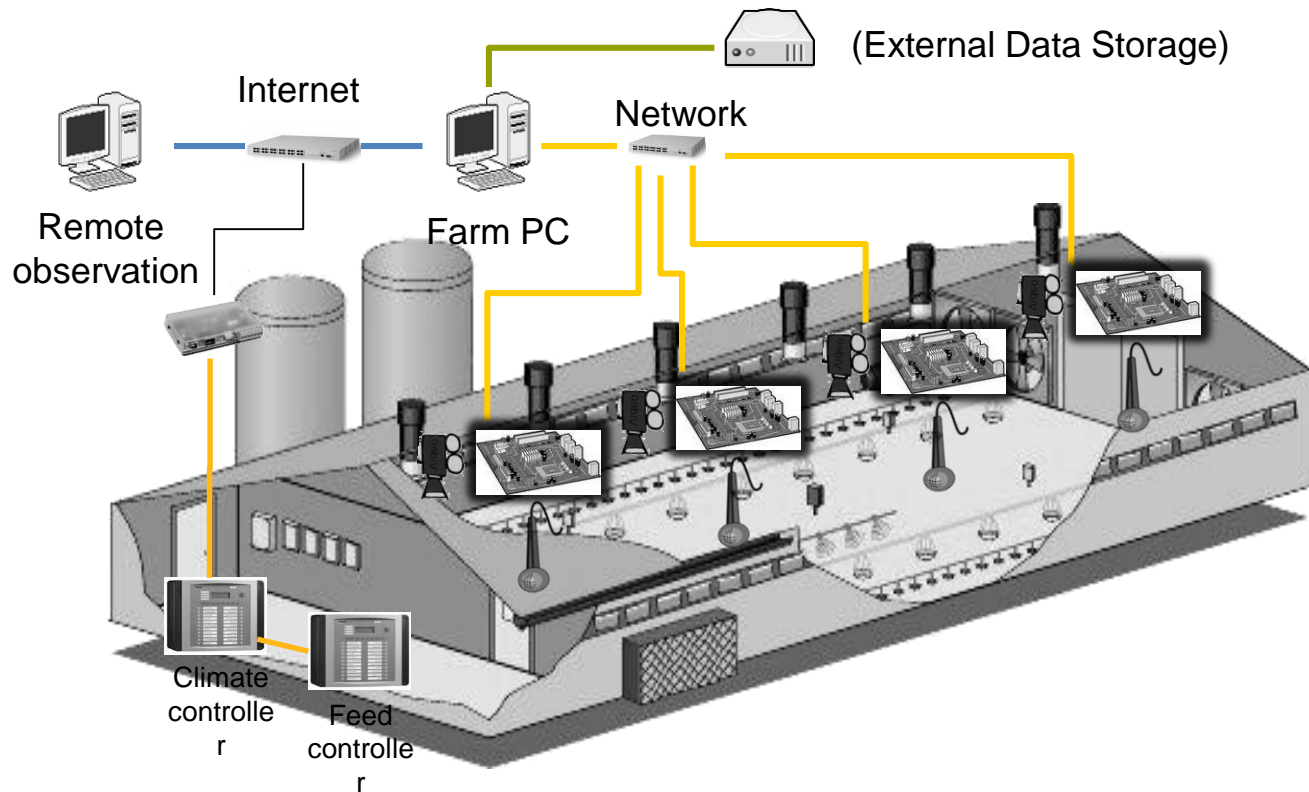


# CowView localisation

GEA, Germany



CowView localizes every cow in real time, provides information about estrous activity, gives early warning about diseases



Analysis software translates these images into an index for animal activity and distribution



# Research question

Can measurements of activity changes be used to assess lameness in commercial broiler flocks?

## Lameness

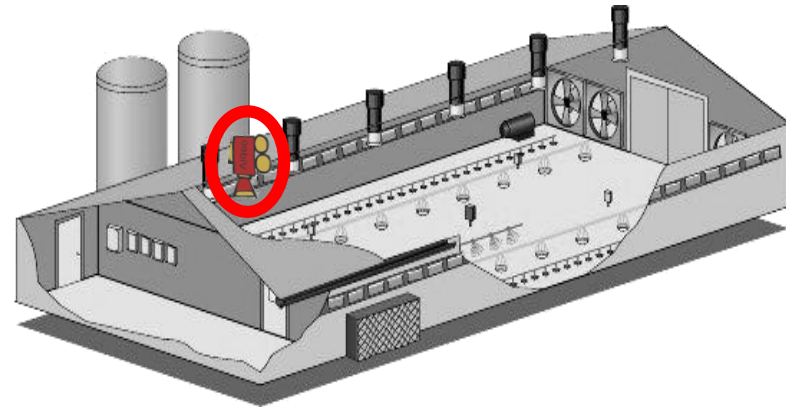
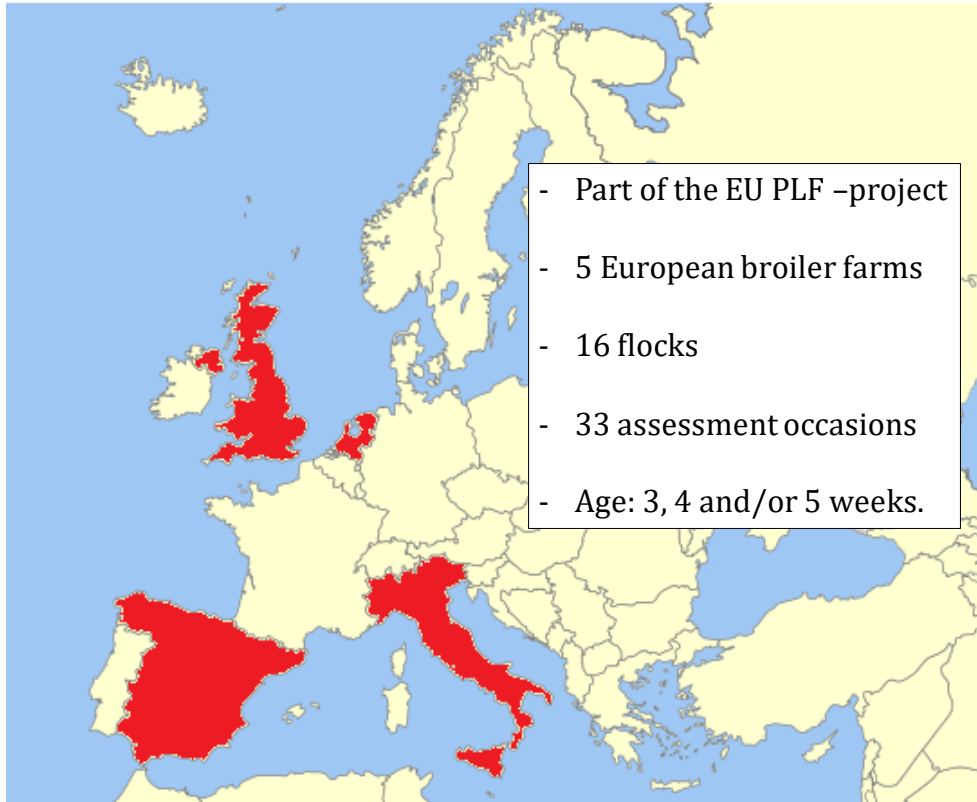
(Welfare Quality®, 2009; Kestin et al., 1992)

Gait Score 0 - 5

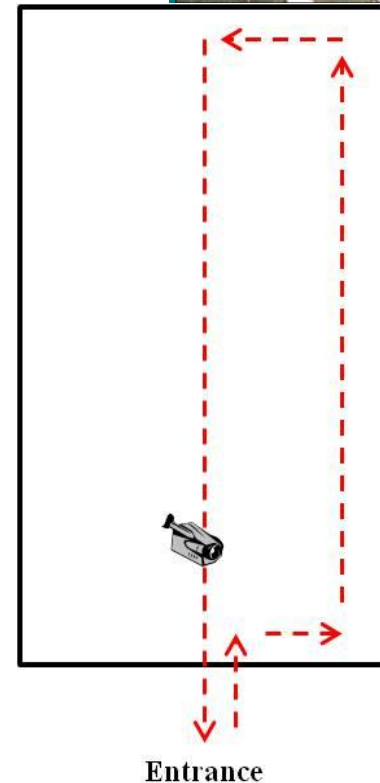
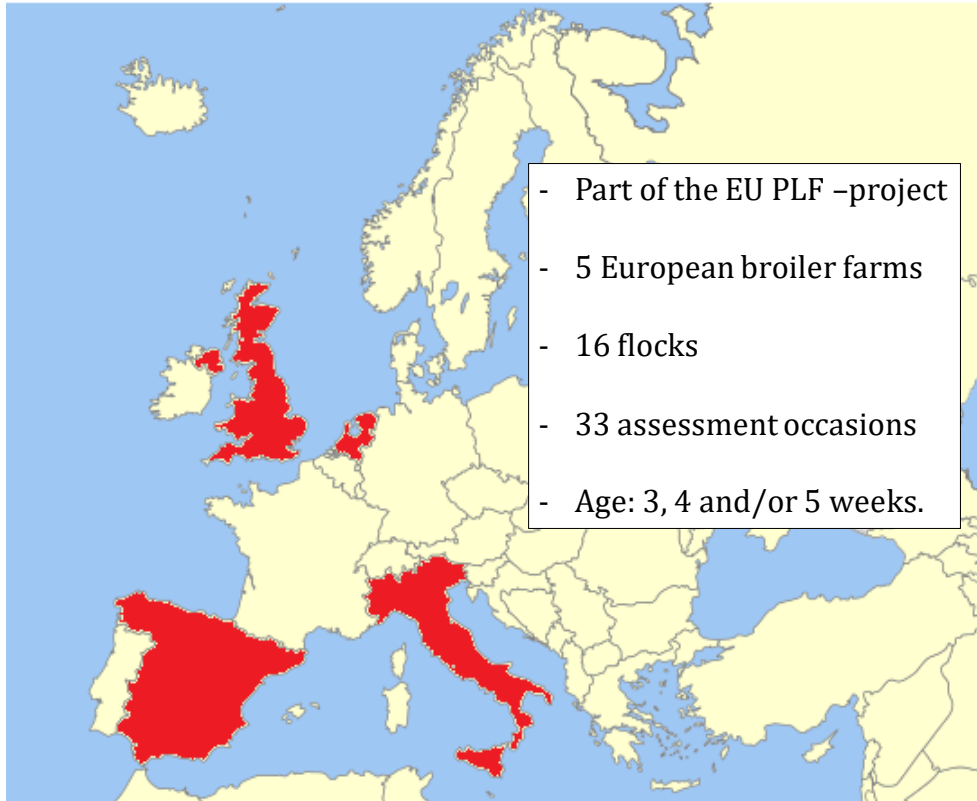




# EU PLF project



# EU PLF project





Exp. 319 Freq= 2 Hz lux= 0.8 lux

10134:58.757

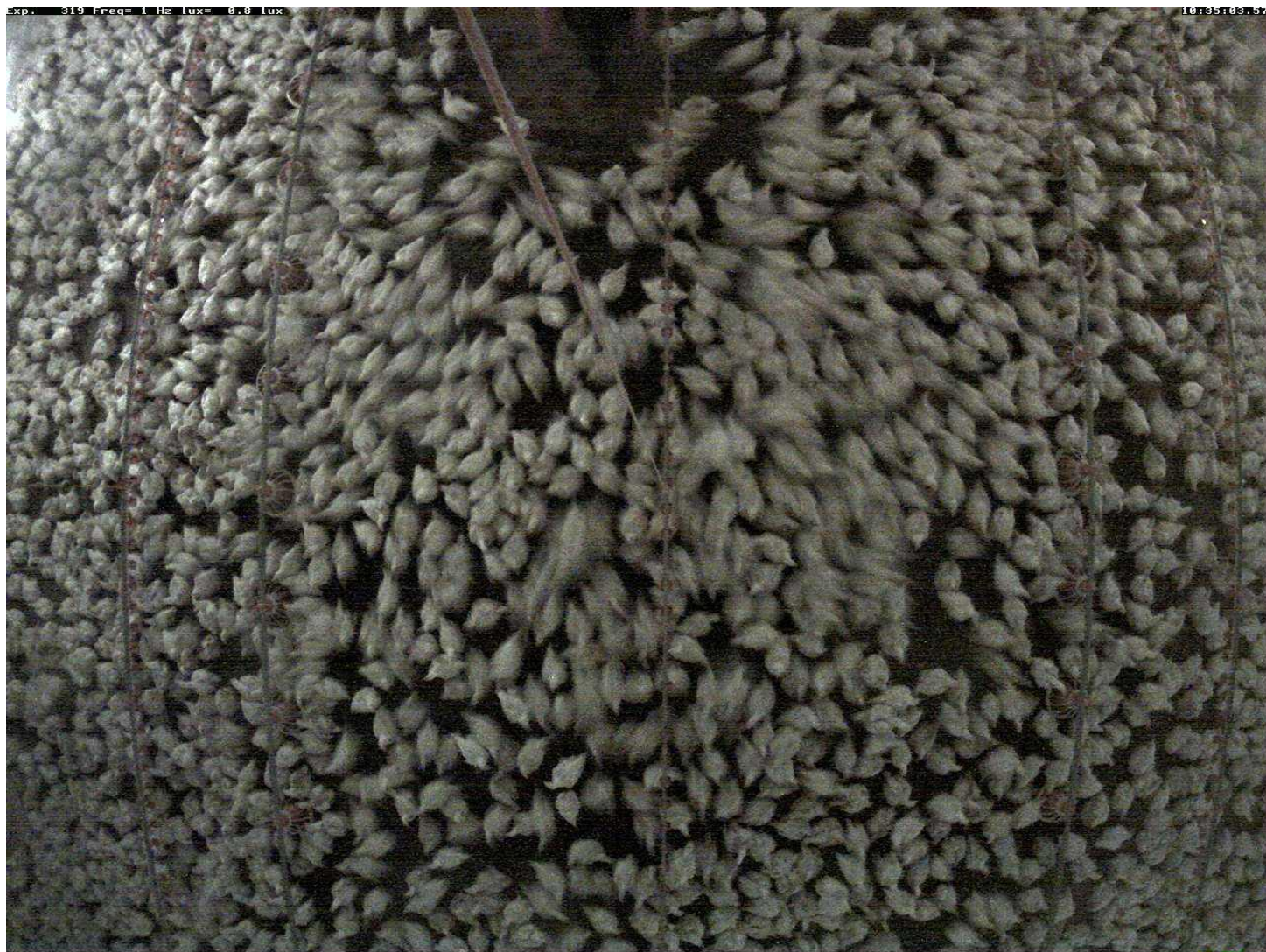
100349 1L EL UC TT

[exp] FS REC



Exp. 319 Freq= 1 Hz lux= 0.8 lux

10:35:03.577



100350 IL EL UC TT

[exp] FS REC





Exp. 319 Freq= 1 Hz lux= 0.7 lux

10:35:06.791

100350 1L EL UC TT

[exp] FS REC



exp. 319 Freq= 1 Hz lux= 0.7 lux

10:35:12.897



100350 IL EL UC TT

[exp] FS REC



Exp. 319 Freq= 1 Hz lux= 0.7 lux

10:35:19.646



100350 IL EL UC TT

Exp1 FS REC



exp. 319 Freq= 2 Hz lux= 0.7 lux

10135153.069

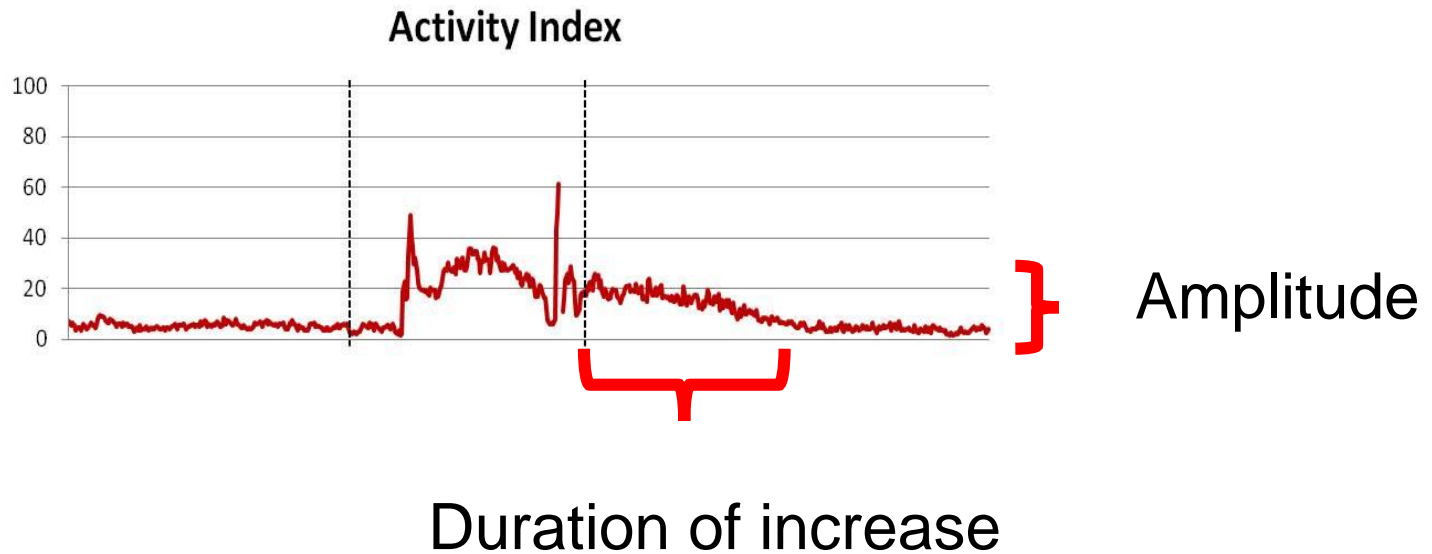


100350 EL UC TT

[exp] FS REC



# Estimation of lameness



Best predictive equation for Gait Score:

$$GS_{ijk} = \beta_{0ijk} \text{ const} + \beta_1 \Delta \text{ Amplitude}_{ijk} + \beta_2 \text{ Age}_{ijk}$$

# Conclusions

# Management of farm animal welfare

*Animal welfare should be considered a central concept in the management of animals that produce food to ensure public acceptance, economic profitability and compliance with legislation*

*Technology will further develop to assist welfare assessments*

*Different sources of information need to be combined for effective management of animal welfare and transparent communication to consumers*



**Thank you for  
your attention!**



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