Introduction to Welfare Quality and animal based welfare outcomes

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Animal Welfare
IRTA

Croatia
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Research areas

- Animal Production
- Agroalimentary Industries
- Environment & Global Change
- Plant Production
- Agrifood Economics
Animal Welfare

Research lines

1. **Animal Welfare at slaughter**


3. Development of animal welfare assessment systems on farm and at slaughter.

4. Evaluation of alternatives to painful management procedures (dehorning and castration).
1. Public concern

2. Welfare assessment protocol

3. Welfare implementation
1. Public concern

2. Welfare assessment protocol

3. Welfare implementation
Public concern

Cows (milk) 25%
Pigs (meat) 44%
Hens (eggs) 58%

Animal welfare is an important attribute of an overall ‘food quality concept’

EU Commission Special Eurobarometer: Attitudes of consumers towards the welfare of farmed animals (2005)
1. The government by law

- Animals are defined as sentient creatures and no longer just as agricultural products (Treaty of Amsterdam, 1997).

- Legislation on farm animals, transport and slaughter.
On Farm

- 01/01/2003: Ban the construction of new stalls installations
- 01/01/2006: Ban the use of tethers for sows and gilts
- 01/01/2013: Ban the use of individual stalls
Most important aspects:
- Ban the use of individual stalls for pregnant sows
- Increase the living space
- Improve the quality of the flooring surfaces
- Allow permanent access to materials for rooting
- Introduce higher level of training and competence on welfare issues for the stockmen and the personnel in charge of the animals
Most important technical aspects:
- Light requirements and maximum noise levels.
- Permanent access to materials for rooting and playing.
- Permanent access to fresh water.
- Additional restrictive conditions to carry out mutilations on pigs.
- Minimum weaning age of four weeks.
Who has to take the responsibility?

1. The government by law

- Animals are defined as sentient creatures and no longer just as agricultural products (Treaty of Amsterdam, 1997).
- Legislation on farm animals, transport and slaughter.
- CAP reform
- International development (OIE)
63% would change shopping place to buy animal welfare friendly products

Survey of 29,152 European citizens (25 countries)

1. The government by law
2. Consumer choice

• **Producers**: are willing to improve A. W. but they are worried about …

• Lack of information to the consumers

• Reticence to pay higher prices

• Imports
The International Financing Corporation has recognised animal welfare as an important element of commercial livestock operations around the world.

High standard on animal welfare...
- Enhance business efficiency
- Meet consumer expectation
- Satisfy domestic and international markets
**Barriers to consumption ‘animal friendly’ products**

Mean scores for importance (1=most important)
- information 2.28
- availability 2.53
- influence 3.25
- disassociation 3.37
- cost 3.55

When purchasing eggs, meat or milk can you easily identify from the label those products sourced from animal welfare friendly production systems?

EU Commission Special Eurobarometer: Attitudes of consumers towards the welfare of farmed animals (2005)
Five areas of action:

- Upgrading standards and secure enforcement
- Developing Research
- Introducing standardised animal welfare indicators
- Informing and promoting AW (labelling and communication strategies)
- Supporting international initiatives (OIE..)
1. Public concern

2. Welfare assessment protocol

3. Welfare implementation
EU integrated project Food-CT-2004-506508

- 44 partners
- 13 European countries
- 4 Latin American countries

www.welfarequality.net
Improved animal welfare in Europe

Approach

Improve housing and management on farm and during transport and slaughter

Practical strategies
1. Minimizing handling stress (stockmanship)
2. Genetic solutions to welfare problems
3. Eliminating injurious behaviours (tail biting in pigs, feather pecking in poultry)

1. Reducing lameness in cattle and broilers
2. Minimizing neonatal mortality in pigs
3. Alleviating social stress
Improved animal welfare in Europe

Aims

Improve housing and management on farm and during transport and slaughter

Connect animal welfare to informed consumer choices

High EU welfare standards and protection against low standard imports

Product information

Welfare monitoring

Developing a monitoring system to assess welfare quality in cattle, pigs and chickens
Approach

Producer

Housing
Management

Animal Welfare

Welfare assessment system

Improvement strategy

Product info

Consumer
AW as a multidimensional concept

Consensus on animal welfare being a multidimensional concept

e.g. Five freedoms (FAWC 1992)

1. Freedom from hunger and thirst
2. Freedom from discomfort
3. Freedom from pain, injury and disease
4. Freedom to express normal behaviour
5. Freedom from fear and distress

Consequences for the assessment of welfare

→ There is no unique measure of animal welfare
   Each aspect of welfare needs to be checked

→ What is the relative importance of each aspect?
   Can there be compensations between aspects???
We need to define a list of criteria fulfilling theoretical and practical requirements:

- The list must be **exhaustive**, i.e. containing every important aspect;
- The list must be **minimal**, i.e. containing only necessary criteria (banning redundant or irrelevant criteria);
- Criteria must be **independent** of each other. The interpretation from one criterion shall not depend on that from another criterion. To avoid double counting there should be no functional links between criteria;
- The list of criteria should be **agreed** by all stakeholders and considered as a sound basis for operating a practical assessment;
- To be ‘**legible**’ the list of criteria should be composed of a limited number of criteria.
**Animal welfare assessment system**

**4 PRINCIPLES**

| Good Feeding | 1. Absence of prolonged hunger |
| Good Housing | 2. Absence of prolonged thirst |
| Good Health  | 3. Comfort around resting       |
| Appropriate Behaviour | 4. Thermal Comfort |
|               | 5. Ease of movement            |
|               | 6. Absence of injuries         |
|               | 7. Absence of disease          |
|               | 8. Absence of pain induced by management procedures |
|               | 9. Expression of social behaviours |
|               | 10. Expression of other behaviours |
|               | 11. Good Human-Animal relationship |
|               | 12. Positive emotional state   |

**MEASURES**
Measures

• AW measures must cover all criteria of welfare.

• There is no AW measure that can be used on its own.

• Three types of measures:
  – animal based
  – management based
  – resource based
**General principles:**

- *Environment or resource based indicators vs. Animal based*

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<thead>
<tr>
<th>ENVIRONMENTAL-BASED PARAMETERS</th>
<th>ANIMAL-BASED PARAMETERS</th>
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<tbody>
<tr>
<td>Density</td>
<td>Wounds</td>
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<td>Feeding, drinking space</td>
<td>Tail biting</td>
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<td>Temperature</td>
<td>Body Condition</td>
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<td>Type of floor. Etc.</td>
<td>Social behaviours.</td>
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<td>Bursitis.</td>
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<td>Panting; Shivering.</td>
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<tr>
<th>MANAGEMENT-BASED PARAMETERS</th>
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<td>Euthanasia criteria</td>
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<td>Castration procedures</td>
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<td>Hygiene</td>
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<td>Management of sick animals. Etc.</td>
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# Animal welfare measures

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<tr>
<th>Criteria</th>
<th>Resource-based</th>
<th>Animal-based</th>
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<tr>
<td>Thermal comfort</td>
<td>Temperature</td>
<td>Shivering, panting, huddling</td>
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<td>Ventilation</td>
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<td>Ease of movement</td>
<td>Ramp</td>
<td>Slipping, falling</td>
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<tr>
<td>Positive emotional state</td>
<td>Light, noise</td>
<td>Reluctant to move, turning back</td>
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</table>
Measures on resources & management
- guaranty of means / quality of the living
- but measures depend on systems so:
  - difficult to compare farming systems
  - may not suitable for new systems

Measures taken into account to diagnose causes of poor welfare and advice farmers/transport drivers on ways to improve animal welfare

Measures on animals: health, behaviour…

Measures to be preferred to assess animal welfare state
Animal based measures

- Animal based measures ≠ behaviour
- Clinical measures
- "Indications" of behaviour
Management and resource based measures are also used as a complement and in their own right.
General principles:

• Be valid
  – Concurrent validity (comparison with validated measures)
  - Predictive validity (effects of treatments)
General fear

1. 32 post-weaning pigs (35 kg) and 32 finishing pigs (100 kg).
2. A trough in a test pen with apples in pieces.
3. Three novel stimulus (visual, auditory and olfactory).
General principles:

- Be valid
  - Concurrent validity (comparison with validated measures)
  - Predictive validity (effects of treatments)
  - Consensus between experts

- Be reliable: different observers record the same data (objective: inter-observers correlation > 0.65)

- Be feasible on farms / at slaughter
  requires limited amounts of animal handling, time, cost, skills,…
AW monitoring system

PIGS
- Sows and piglets (breeding herd)
- Growing pigs (finisher herd)
- Pigs at slaughter

CATTLE
- Dairy cows
- Beef cattle (+ welfare at slaughter)
- Veal calves [dairy calves & heifers]

POULTRY
- Meat chicken
- Lying hen
Validation of the AW assessment system

1) Gather data on AW assessment systems from a large and representative sample of farms and slaughterhouses around Europe

2) Use epidemiological and other statistical modelling techniques to refine the number and types of measures:
   - Identification of risk factors
   - Calibration of simplified versions
Standardisation of the measures

- Scope
- Sampling size and sampling strategy
- Method description (order of the measures)
- Classification (scoring system)
Sows and piglets (breeding herd)

45 farms in the Netherlands (Indoors)

27 farms in UK
  15 Indoors
  12 outdoors (2 organic)

- Wide variety of farming systems:
  - Outdoors - Indoors
  - Organic - Conventional
  - Deep-straw – Fully-slatted
  - Stalls – Group housing
Growing pigs

On farm

30 farms in France (Indoors)
7 on-straw
23 on concrete/slatted floor

41 farms in Spain
30 Indoors on concrete/slatted floor 11 outdoors

At slaughter

11 Abattoirs in Spain
10 finishing pigs and
1 Sows
<table>
<thead>
<tr>
<th>PRINCIPLE</th>
<th>CRITERIA</th>
<th>measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good Feeding</strong></td>
<td>1  Absence of prolonged hunger</td>
<td>Body condition score</td>
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<td>Feeding management</td>
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<td>2  Absence of prolonged thirst</td>
<td>Water supply</td>
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<td><strong>Good Housing</strong></td>
<td>3  Comfort around resting</td>
<td>Pressure injuries</td>
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<td>Absence of manure on the body</td>
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<td>4  Thermal comfort</td>
<td>animals shivering, panting, huddling behaviour</td>
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<td>5  Ease of movement</td>
<td>Environmental temperature</td>
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<td>Total pen space and stocking density</td>
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<td>Good health</td>
<td>6</td>
<td>Absence of injuries</td>
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<td>Absence of disease</td>
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<td>8</td>
<td>Absence of pain induced by management procedures</td>
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<td>Appropriate behaviour</td>
<td>9</td>
<td>Expression of social behaviours</td>
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<td>10</td>
<td>Expression of other behaviours</td>
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<td></td>
<td>11</td>
<td>Good human-animal relationship</td>
</tr>
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</table>
Welfare assessment

- Farmer interview (management-based measures)

Overview of the protocol
Health management
Hygiene management
Record keeping
Mutilation routine
Euthanasia criteria
Sow, farrowing & piglet management
Welfare assessment

- Farmer interview (management-based measures)
- **Animal-based measures:**
  - Respiratory problems
  - Qualitative behaviour assessment
  - Behaviour
  - Thermoregulatory measures
  - Human-animal relationship
  - Clinical measures, health measures, lameness, pressure injuries
Animal-based measures

Sows:
- 30 pregnant sows (early, mid- & late pregnancy)
- 10 lactating sows and their litters

Growing pigs:
150 of 10 pens / farm

INDIVIDUAL level

PEN level

3 POINT SCALE

0
Good welfare

1

2
Poor welfare
Order of the measures

• Farmer interview (management-based measures)

• Animal-based measures:
  • Respiratory problems
  • Qualitative behaviour assessment
  • Behaviour
  • Thermoregulatory measures
  • Human-animal relationship
  • Clinical measures, health measures, lameness, pressure injuries

• Resource-based measures
Resource-based measures

- Pen cleanliness
- Stocking density
- Floor type
- Feeder type and number
- Drinker type and number
- Temperature
- Bedding
- Environmental enrichment
- Hospital pen
### At slaughter

<table>
<thead>
<tr>
<th>Information collected</th>
<th>Sample size</th>
<th>Place</th>
<th>Time required</th>
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</thead>
<tbody>
<tr>
<td>Slipping, Falling</td>
<td>2 lorries</td>
<td>Unloading</td>
<td>3.0 hours</td>
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<tr>
<td>Reluctance to move, Turning back</td>
<td>2 lorries</td>
<td>Unloading</td>
<td></td>
</tr>
<tr>
<td>Shivering, Panting, Sick animals, Dead animals, Space allowance in lorries, Bedding of lorries</td>
<td>6 lorries</td>
<td>Unloading/from unloading to lairage</td>
<td></td>
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<tr>
<td>Lameness</td>
<td>2 lorries</td>
<td>From unloading to lairage</td>
<td></td>
</tr>
<tr>
<td>Shivering, Panting</td>
<td>8 pens</td>
<td>Lairage</td>
<td>0.75 hours</td>
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<tr>
<td>Space allowance in lairage pens, Flooring of lairage pens, Dead animals, Water supply, Food provision</td>
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<tr>
<td>High pitched vocalizations</td>
<td>Group level</td>
<td>From lairage to stunning</td>
<td>0.25 hours</td>
</tr>
<tr>
<td>Stunning effectiveness</td>
<td>60 animals, divided into 3 batches of 20 with time break in between</td>
<td>Stunning area</td>
<td>0.50 hours</td>
</tr>
<tr>
<td>Wounds on body, Pneumonia, Pleurisy, Pericarditis, White spots on liver</td>
<td>60 samples divided into 3 batches of 20 with time break in between</td>
<td>After slaughter</td>
<td>1.0 hours</td>
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</tbody>
</table>

**Total time**: 5.5 hours
Dead and sick animals

Clear indicator of welfare problems:

- Death: breathing, heart beat, corneal reflex

- Sickness: Animals unable to walk
Resource-based measures

- Unloading and waiting area
- Use of electric prods
- Showers during lairage
- Risk of injuries due to the facilities
- Emergency pens
- Stunning system
Time required:

- 5-7 h
- Interview: 40 min (20-60 min)
- Visit: 4-6 h
- Duration depends on:
  The experience and skills of the assessor

On Farm:
- Interest of the farmer
- Size of the farm and distance
- Nr of rooms
- Nr of animals per pen
- Behaviour (frightened animals)
- Dirtiness
- Light intensity

At Slaughter:
- Frequency of truck arrivals
- Time between unloading and the beginning of the slaughtering

At Slaughter:
- Frequency of truck arrivals
- Time between unloading and the beginning of the slaughtering
Acceptability and feasibility

Positive response from the farmer participants
- Little input on their part
- None of the measures are invasive or involve moving pigs/sows in/out of pens.

Feasibility
- The protocol works well

- System design affects practicality of some measures
  Large pens (behaviour)
  Large group
  Outdoor farms
1. Public concern

2. Scientific framework to assess welfare

3. Welfare implementation
Welfare implementation

1. Research tool

2. To provide advice and support to farmer

3. Product information system
Product information system

4 Principles

<table>
<thead>
<tr>
<th>Measures</th>
<th>Criteria</th>
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<tr>
<td>~30 on-farm measures developed by animal scientists</td>
<td>12 Preference dimensions giving value judgment</td>
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Advice to farmers

<table>
<thead>
<tr>
<th>4 Principles</th>
<th>12 Welfare criteria</th>
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<tbody>
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<td>Good feeding</td>
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<td>Positive emotional state</td>
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Improvement strategies

- **Installations:**
  design, construction and maintenance.

- **Management:**
  Husbandry practices, transport procedure, distances,.

- **Genetic:**
  Selection.

- **Quality of handling:**
  Attitude and knowledge of the personnel
“The human factor”

- Poor stockmanship may cause chronic fear

- It may also lead to poor supervision of the animals (eg low detection rate of lameness in dairy cows)...

- And to husbandry practices that are not necessary or acceptable
Training the stockpeople and the veterinarians is probably the most cost-effective strategy to improve animal welfare.

Without specific training on animal welfare, veterinarians and animal scientists may miss some important aspects of it.

Treatment of pain remains a major issue.

(eg Hewson et al., 2007)
Approach

Producer

Housing

Management

Animal Welfare

Welfare assessment system

Product info

Consumer

Improvement strategy
Measures → Criteria → Principles → Overall assessment

4 main independent dimensions describing welfare

1 Synthetic information attached to a product

Information to customers, consumers
Sequential evaluation structure

Q1 average vs. worse off animals?

Q2 compensation between criteria?

Q3 dogmatic vs. pragmatic?

Overall assessment

Welfare categories

Not classified

Acceptable

Enhanced

Excellent

Raw data

Scale 0 - 100

WORST

<20 unacceptable

50 not bad, not good

BEST

Scale 0 - 100

~30

12

4

1
From measures to criteria
Q1 average vs. worse off animals?

Experts consulted: animal scientists who developed the measures

Criteria: absence of injuries
Measure: % lame cows

Expert opinion is used to transform raw data into scores that express compliance with welfare criteria

The worse off animals are given priority
Overall welfare is also important (eg [5% severely + 50% moderately lame animals] results in a lower score than [10% severely lame + 90% not lame])

\[ \text{balance} \]
Experts consulted: animal and social scientists

- More importance attributed to some criteria

Example: principle 'Good feeding', composed of 2 criteria:

- More importance attributed to bad scores (i.e. no full compensation between good and bad scores)

We use an operator that allows these two rationales. Nevertheless, compensation between criteria is small.
From principles to overall assessment

- Excellent
  - The welfare of the animals is of the highest level.

- Enhanced
  - The welfare of animals is good.

- Acceptable
  - The welfare of animals is above or meets minimal requirements.

- Not classified
  - The welfare of animals is low and considered unacceptable.
Objective = To assign farms to ordered welfare categories while limiting compensations between principles

⇒ Comparison to pre-defined profiles that delimit the categories

Definition of:
⇒ reference profiles according to value scale
<20 unacceptable
55 just above 50
80 symmetrical to 80
Objective = To assign farms to ordered welfare categories while limiting compensations between principles

⇒ Comparison to pre-defined profiles that delimit the categories

Definition of:

⇒ membership rules

⇒ UNANIMITY?

Confrontation with practice

Distribution of 69 dairy farms visited within Welfare Quality®
while limiting compensations between principles
⇒ Comparison to pre-defined profiles that delimit the categories

Objective = To assign farms to ordered welfare categories

Definition of:
⇒ membership rules
⇒ UNANIMITY
⇒ Set of different rules
Objective = To assign farms to ordered welfare categories while limiting compensations between principles

⇒ Comparison to pre-defined profiles that delimit the categories

<table>
<thead>
<tr>
<th>Scores</th>
<th>Feeding</th>
<th>Housing</th>
<th>Health</th>
<th>Behaviour</th>
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<tbody>
<tr>
<td>100</td>
<td>80</td>
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Farms:
- Farm 1: Profile 1, Excellent
- Farm 2: Profile 1, Excellent
- Farm 3: Profile 2, Enhanced
- Farm 4: Profile 3, Not classified

Objective: To assign farms to ordered welfare categories.
Conclusion on evaluation model

- Balance between priority given to the worse off animals and overall welfare of all animals in a group.
- Compensation between criteria is very limited.
- Balance between societal expectations (theoretical judgement of farms) and what can realistically be achieved in practice.

A software is being developed for the storage of data and the calculations of scores.
Training in the use of the tools in a uniform and reliable way

1. Information of the measures
   - Scope
   - Sampling size and sampling strategy
   - Method description (order of the measures)
   - Classification (scoring system)
Training of observers

Training workshop

- Evaluation with photos or video clips of each measure.
- Discussion marked differences with gold standard
- Discussion of the protocol
- Visit to farm and abattoirs for training by direct observation. (explanation of the golden standard)
- Evaluation of the measures by direct observation.
- Statistical evaluation of on-farm data.
Thank you for your attention

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