EAAP 2009
Session 55 *Incorporation of ethical considerations in professions in livestock industry*

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Development of a tool for the overall assessment of animal welfare at farm level

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Welfare® Quality

The integrated project Welfare Quality®

The primary aims of Welfare Quality® (2004-2009) are:

- To develop a European welfare assessment system for cattle, pigs and poultry
- To transform it into a European animal welfare information system
- To develop practical strategies to improve animal welfare

Illustrations of I. Veissier

The integrated project Welfare Quality®

The primary aims of Welfare Quality® (2004-2009) are:

- To develop a European welfare assessment system for cattle, pigs and poultry (on-farm, during transport & at slaughter)
- To transform it into a European animal welfare information system
- To develop practical strategies to improve animal welfare

Elaborate a model for the overall assessment of animal welfare on a pilot animal-type: Dairy Cows

Objective

leading to results useful for a certification scheme while remaining transparent so as to help farmers define the most appropriate remedial solutions

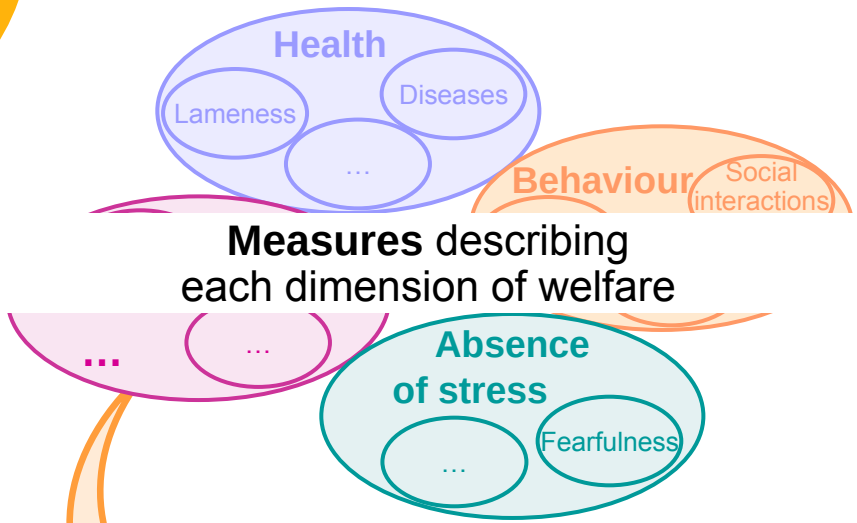
Specifications

Overall assessment of animal welfare:
Problem statement

Going from a simple description of the animals' state
to an overall assessment at farm level

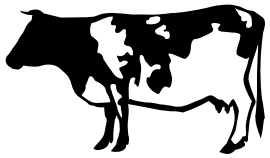
Animal welfare comprises several dimensions
which do not fully compensate each other

(e.g. health, behaviour, absence of stress…)



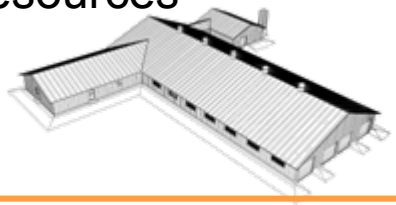
Multicriteria evaluation

Measures on:



animals

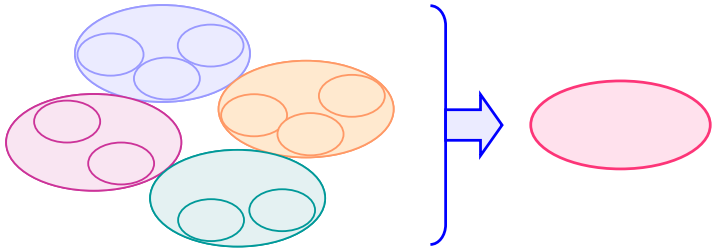
resources



management

Overall assessment of animal welfare:
Underlying ethical questions

The integration of data
into an overall evaluation of the farm
raises several **ethical questions**:



- Should the average state of animals or the worst animals matter?
- Should welfare criteria compensate each other?
- Should we take into account societal aspirations for high welfare levels or the realistic likelihood of achieving such levels in practice?

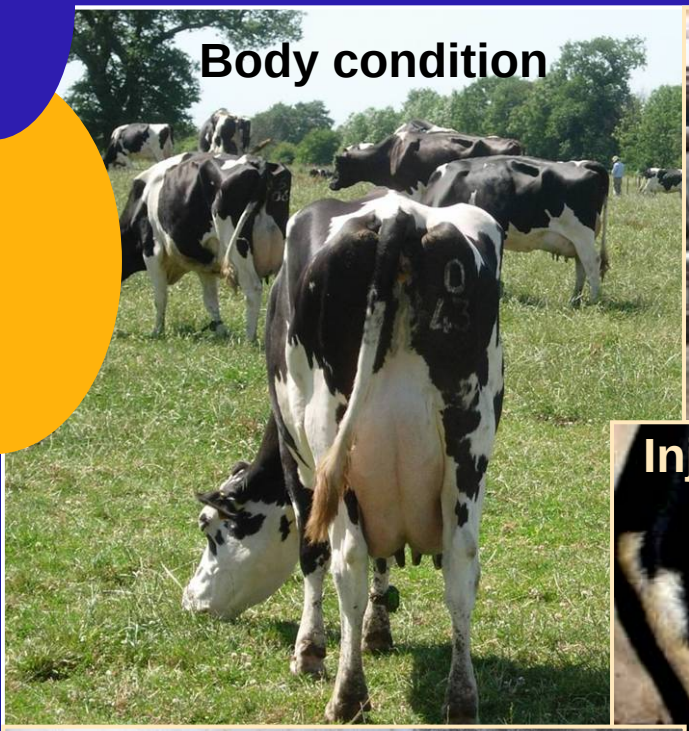
Science alone cannot solve ethical issues
⇨ Model tuned according to **'expert' opinion**:

- animal scientists (for their knowledge of the measures)
- social scientists (for their knowledge on expectations of societal groups)
- stakeholders (as potential users of the overall assessment)

1- Definition of welfare **criteria**

Principles	Criteria	
Good feeding	1.	Absence of prolonged hunger
	2.	Absence of prolonged thirst
Good housing	3.	Comfort around resting
	4.	Thermal comfort
	5.	Ease of movement
Good health	6.	Absence of injuries
	7.	Absence of diseases
	8.	Absence of pain due to management procedures
Appropriate behaviour	9.	Expression of social behaviours
	10.	Expression of other behaviours
	11.	Good Human-Animal relationship
	12.	Absence of general fear

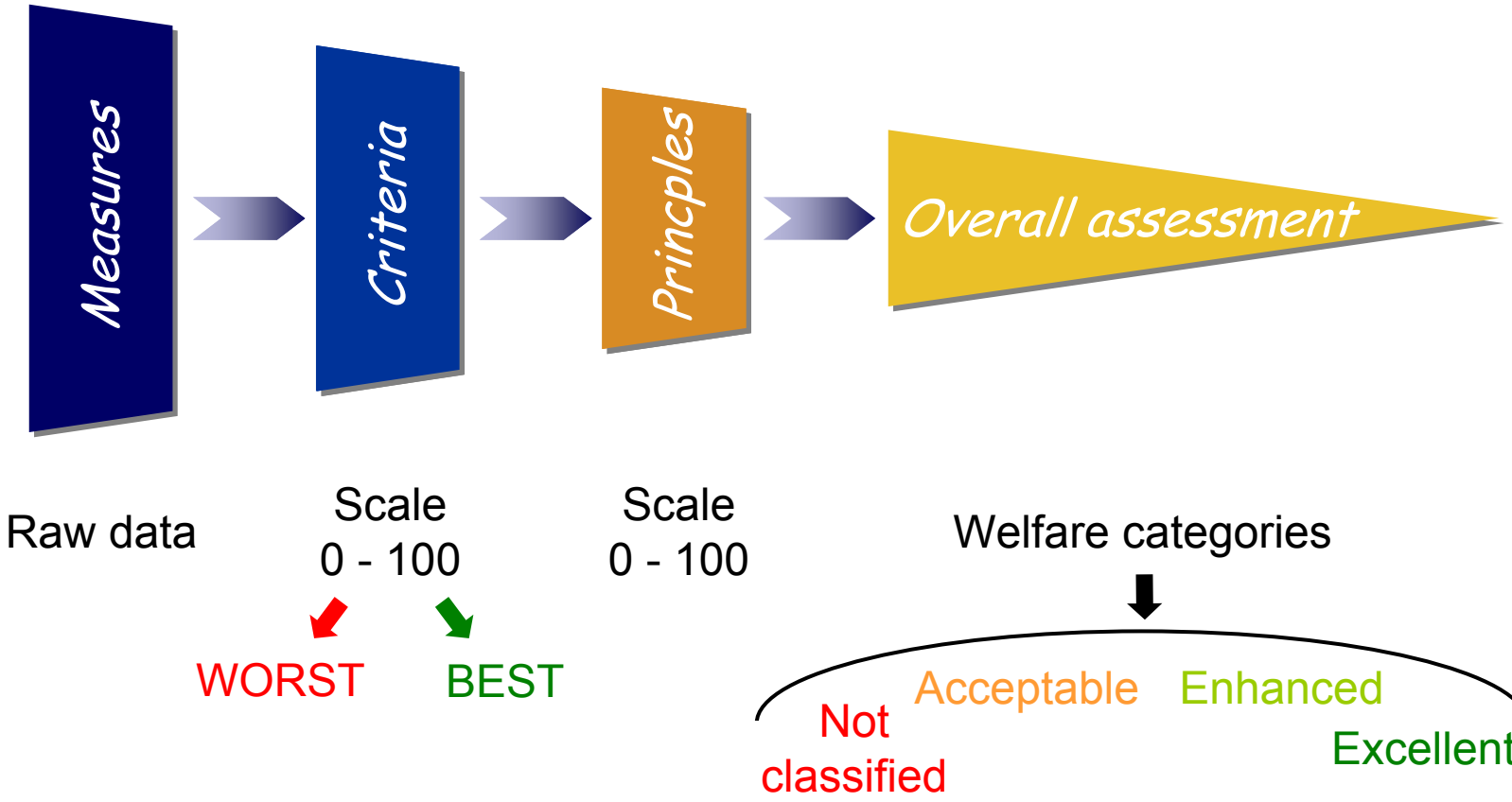
Definition of welfare criteria: *necessary to identify measures that cover all welfare criteria*



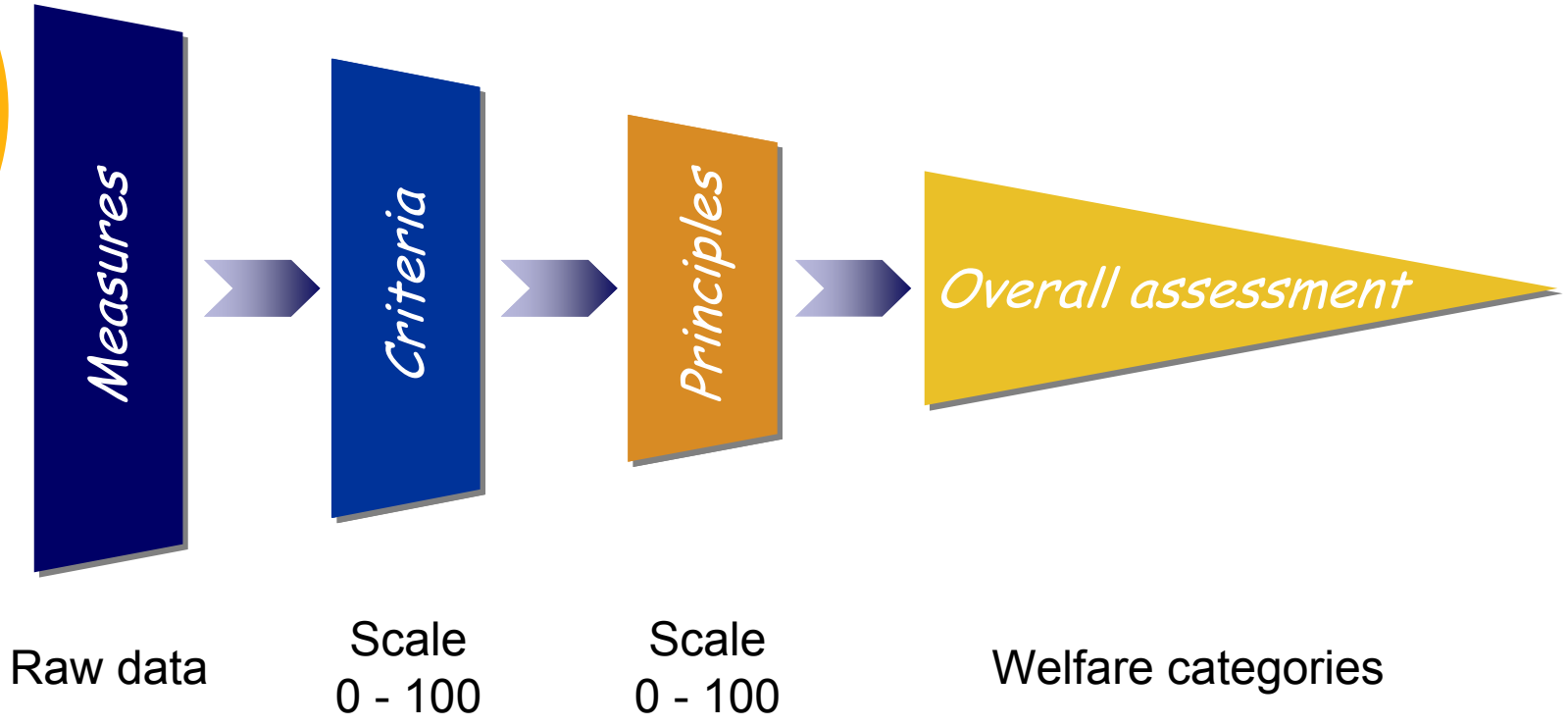
Etc…

~ 40 measures

Sequential evaluation structure



2- Construction of **criteria**



Construction of the criteria from the measures

What needs to be done:

- Identify the measures that can be used to check compliance of the farm to a given criterion
- Pool information from the various measures of the criterion (according to the number of measures, their nature, precision and relative importance ⇨ *several methods are used*)
- Interpret the data collected on the farm in terms of welfare

E.g. 10 % very lean cows: is that very bad, bad, OK, good???

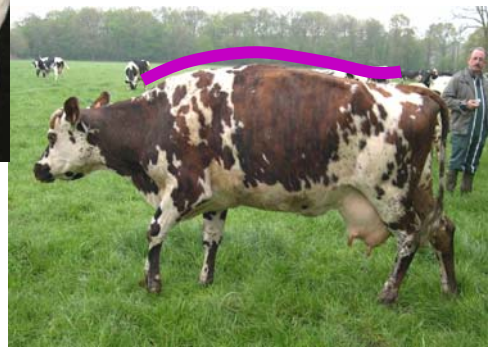
How:

Consultation of experts (*animal scientists*):
datasets of virtual farms on which they have to react
(i.e. rank farms and assign scores)

Construction of the criteria from the measures

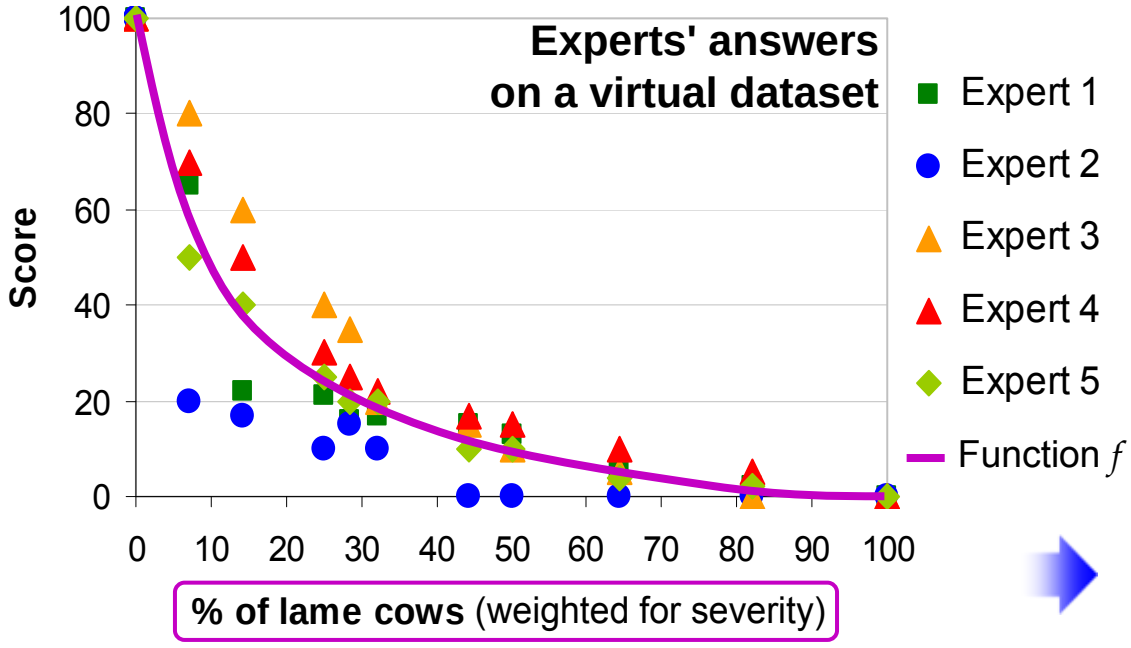
Example:

Criterion *"Absence of injuries"*



Two measures taken at individual level:

Tegument alterations & *Lameness*



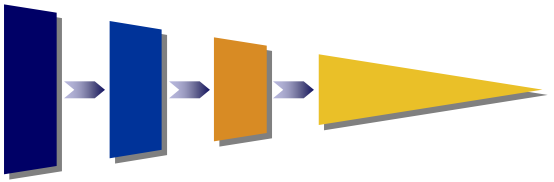
At farm level:

- *% of severly lame cows*
- *% of moderately lame cows*
- *% of normal cows*

Score = f(100 - % 'lame' cows)

with f a non linear function determined by least-square minimisation between experts' and calculated scores

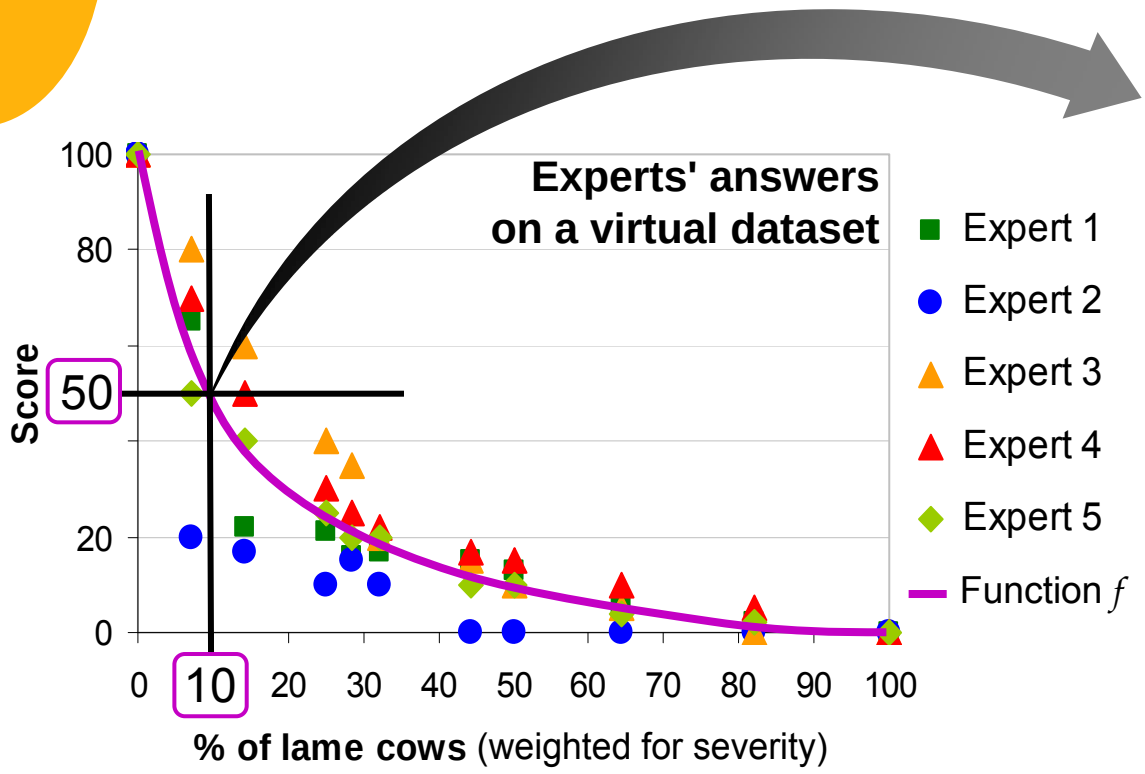
Construction of the criteria from the measures



Back to the ethical question:

Should the average state of animals or the worst animals matter?

⇨ *A **balance** between both rationales*



A score of **50** corresponds to:

10% severly lame cows
(90% normal cows)

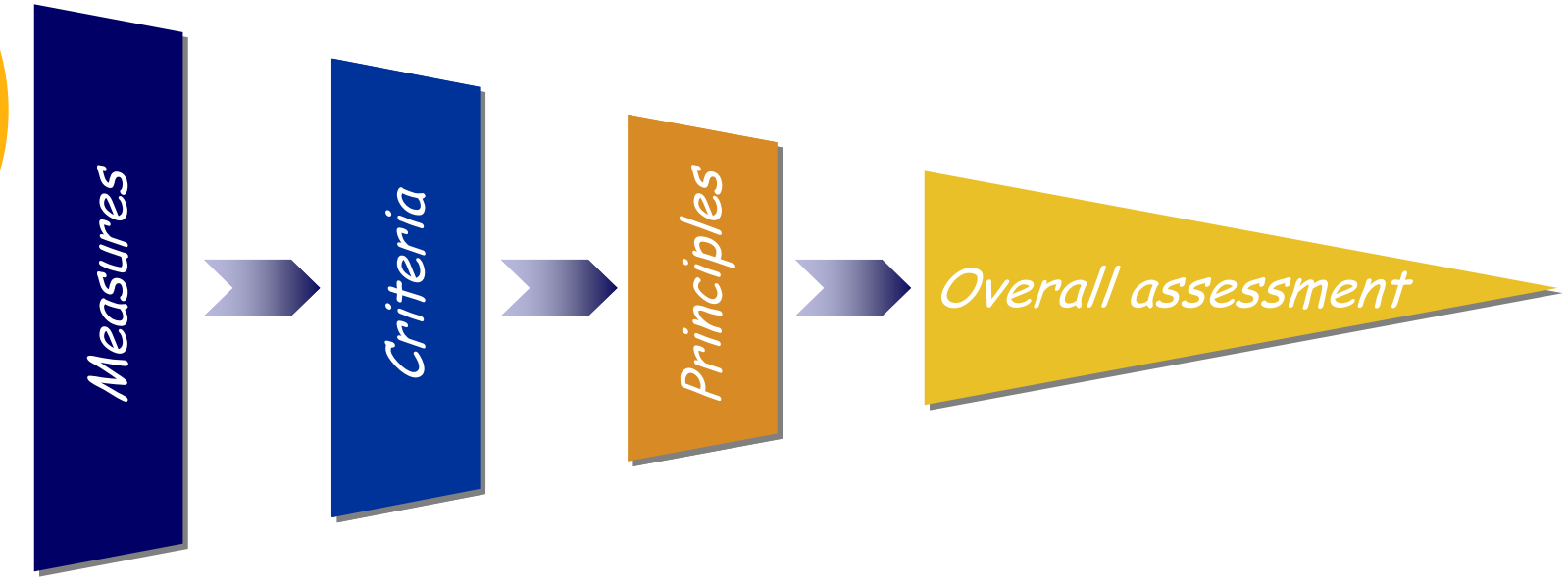
⇨ *Assessment focused on **worst** animals*

Or

5% severly lame cows
+ 18% moderately lame
(77% normal cows)

⇨ ***All** animals in an impaired welfare state count*

3- Construction of **criteria**



Raw data

Scale
0 - 100

Scale
0 - 100

Welfare categories

From criteria to principles

What needs to be done:

To be able to produce principle-scores from scores obtained at criterion level, **while respecting the ways of reasoning adopted by the experts to aggregate criteria**

How:

Consultation of experts (*animal* and *social scientists*): virtual datasets with different combinations of criterion scores on which they have to react (i.e. assign a principle score)

From criteria to principles

Results from consultation:

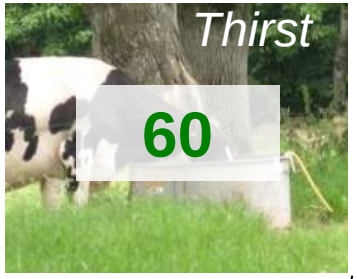
- *More importance assigned to some criteria*
- *More importance assigned to bad scores*
  (i.e. no full compensation between good and bad scores)

Ethical question on compensation between criteria?

We use Choquet integral, an operator that allows to follow simultaneously these two rationales

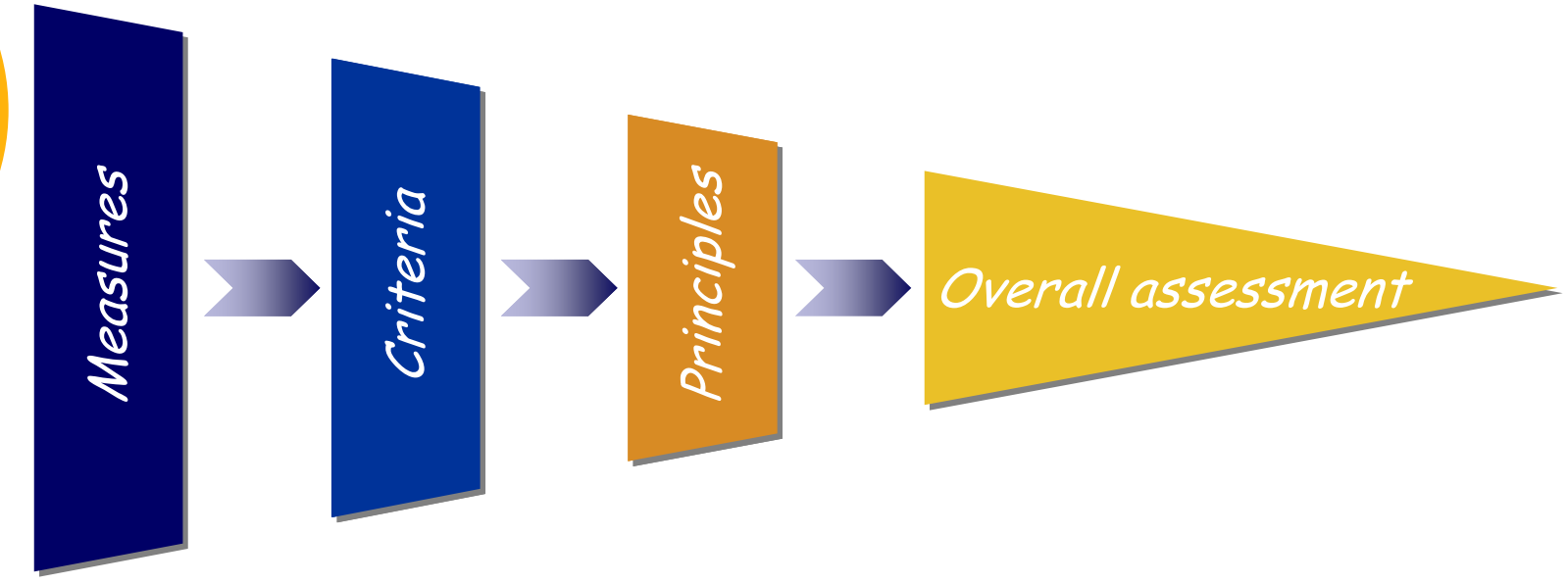
Example: principle 'Good feeding', composed of 2 criteria:

+



< 50

4- Aggregation of **principles**



Raw data

Scale
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Scale
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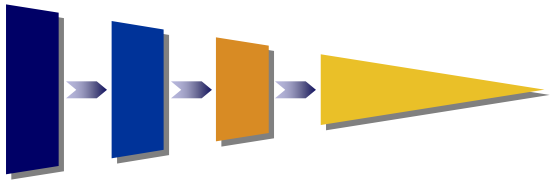
Welfare categories

Aggregation of criteria into the overall assessment



Objective = To assign farms to ordered welfare categories

- **Excellent** — very high welfare ⇨ may correspond to a niche market, e.g. within a specific voluntary scheme
- **Enhanced** — farms with good farming practices but not excellent ⇨ may serve to guarantee good level of welfare within a more general quality voluntary scheme
- **Acceptable** — acceptable welfare level, but insufficient to be used within a voluntary scheme
- **Not classified** — very poor welfare considered as unacceptable

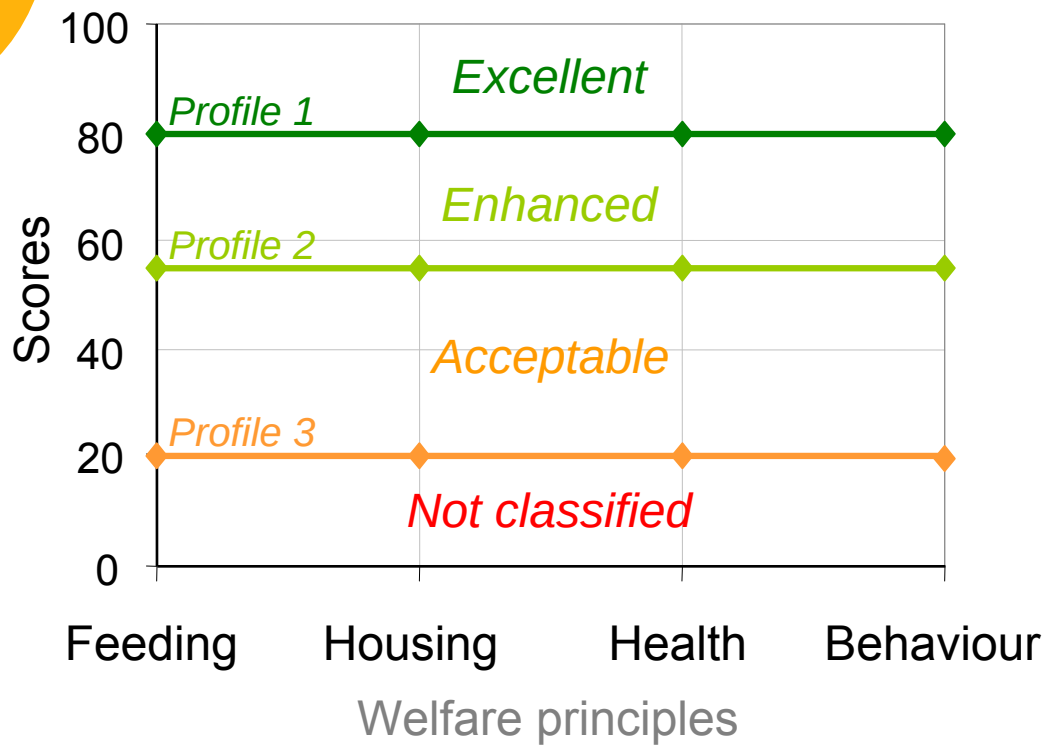
Defined in accordance with stakeholders' expectations about the potential uses of the evaluation system - Consulted experts: representatives of producers, breeders, retailers, vets, animal protectors, and institutions

Aggregation of criteria into the overall assessment

Objective = To assign farms to ordered welfare categories

while limiting compensations between principles

⇨ *Comparison to pre-defined profiles that delimit the categories,*



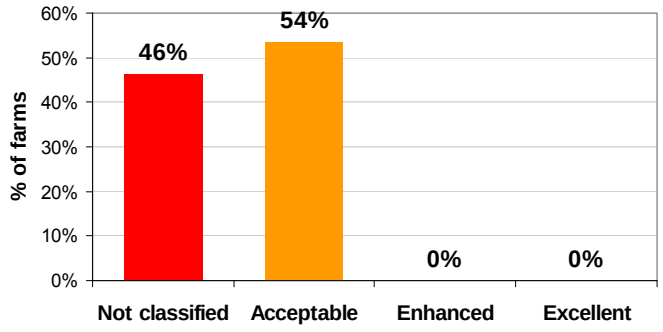
Definition of:

⇨ *reference p*

⇨ *membership rules*

⇨ *UNANIMITY*

Ethical question on compensation between principles?



Distribution of 69 dairy farms visited within Welfare Quality®

Aggregation of criteria into the overall assessment

Objective = To assign farms to ordered welfare categories

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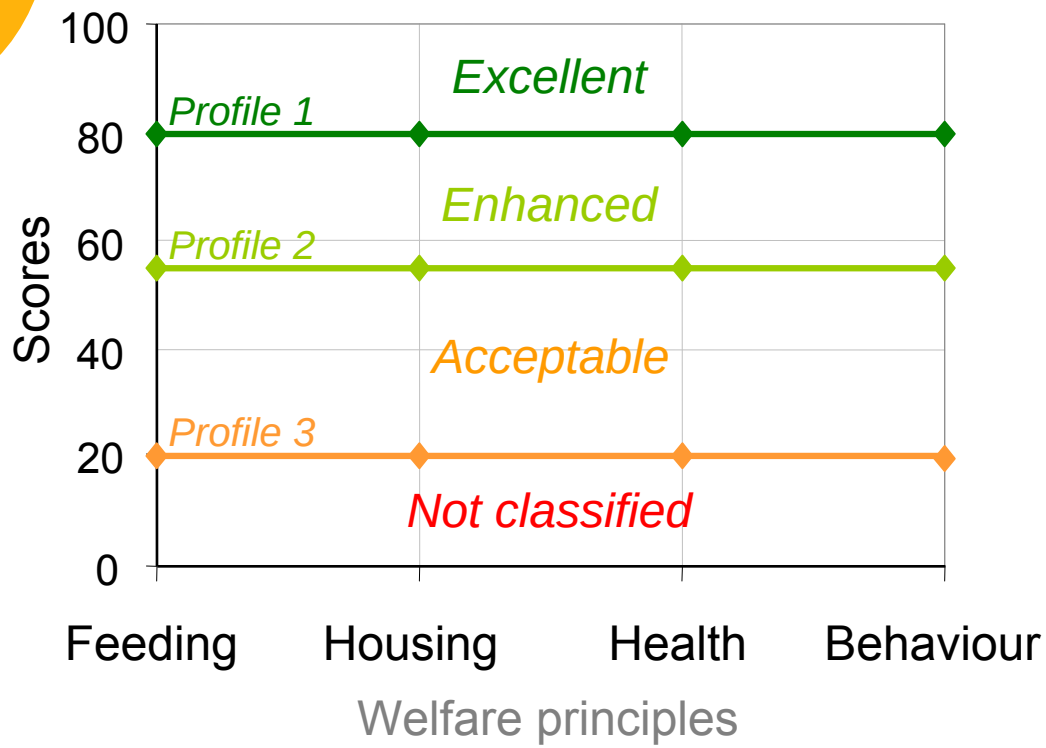
⇨ *Comparison to pre-defined profiles that delimit the categories,*



Definition of:

⇨ *reference p*

⇨ *membership rules*

⇨ ~~*UNANIMITY*~~

⇨ *Set of different rules*

Ethical question on societal aspirations vs. realistic levels?

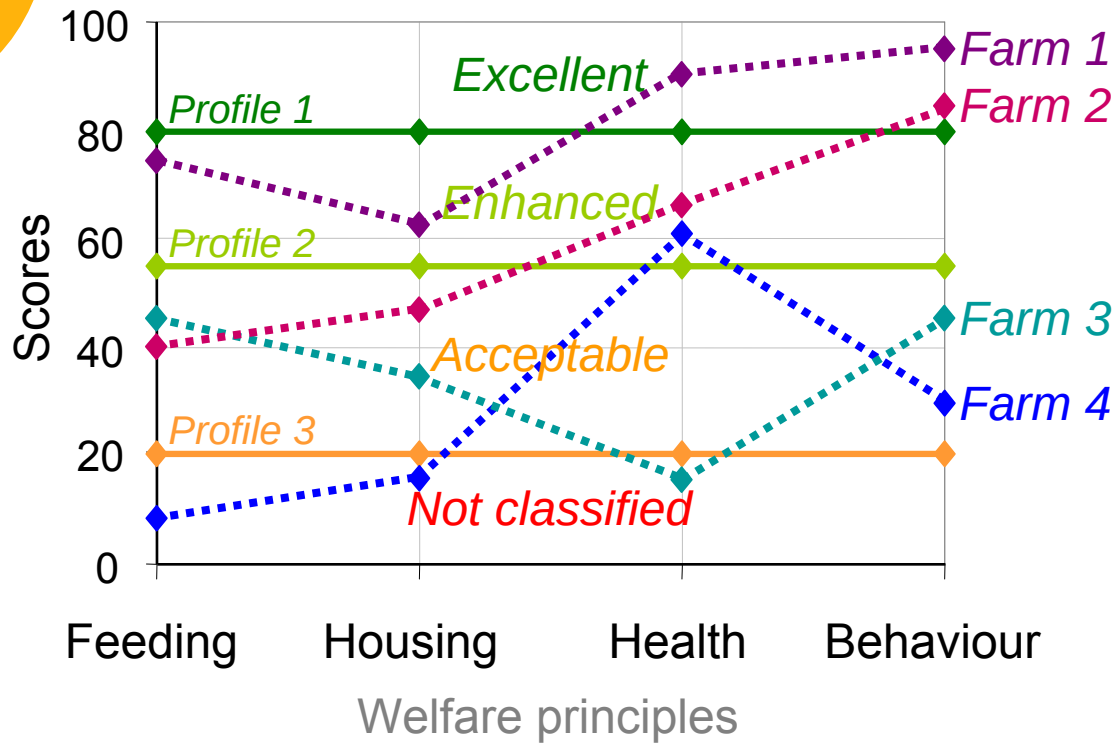
Submitted to and discussed with potential users of the evaluation system

Aggregation of criteria into the overall assessment

Objective = To assign farms to ordered welfare categories

while limiting compensations between principles

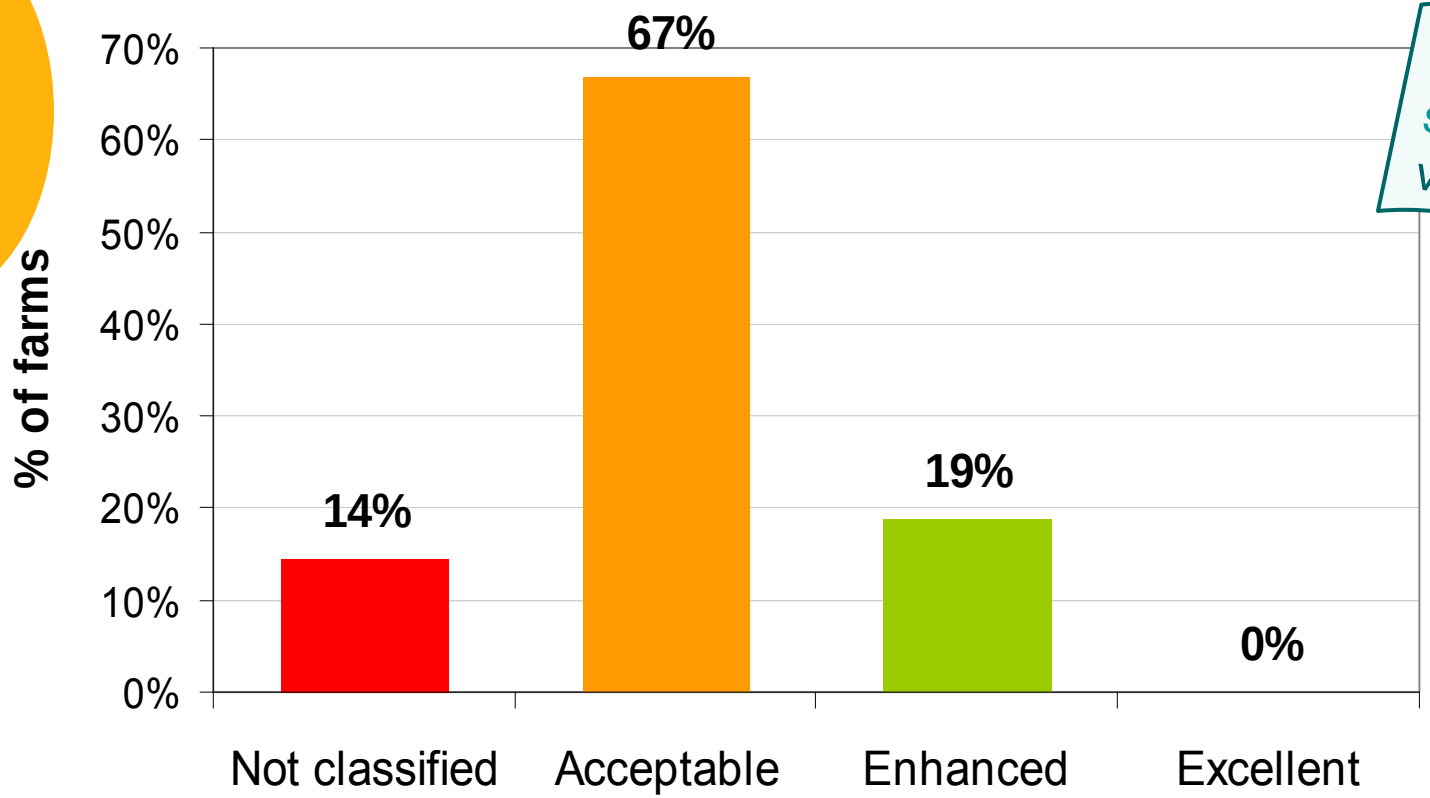
⇨ *Comparison to pre-defined profiles that delimit the categories,*



≥ 2 and 2
≥ 2 and 2
≥ 3 and 1
≥ 2

Aggregation of criteria into the overall assessment

Distribution of 69 dairy farms visited within Welfare Quality®

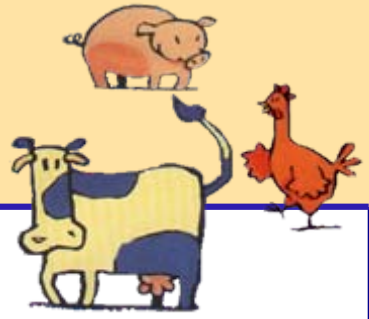


Ethical question on societal aspirations vs. realistic levels?

A **balance** between societal aspirations and what can be realistically achieved in practice

Significant relationship between categories and assessors' overall impression of the visited farms (Likelihood-Ratio test, $\chi^2 = 5.56$, $P = 0.02$)

Conclusion



- The construction of the evaluation model respects multidimensionality of animal welfare
- The model for an overall assessment of animal welfare proposed in Welfare Quality® formalises the reasoning followed by:

  scientists (in animal and social science)

  and potential users

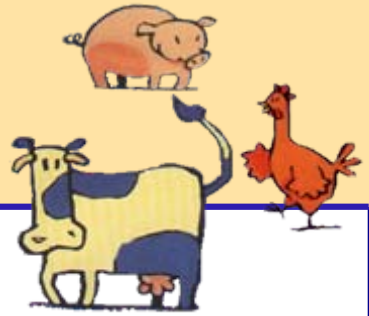
  to assign scores to the observed farms

⇨ *Can be easily standardised and automated for routine use*

Software tool
in preparation

P. Champciaux,
A. Lamadon,
J.P. Brun *[INRA]*

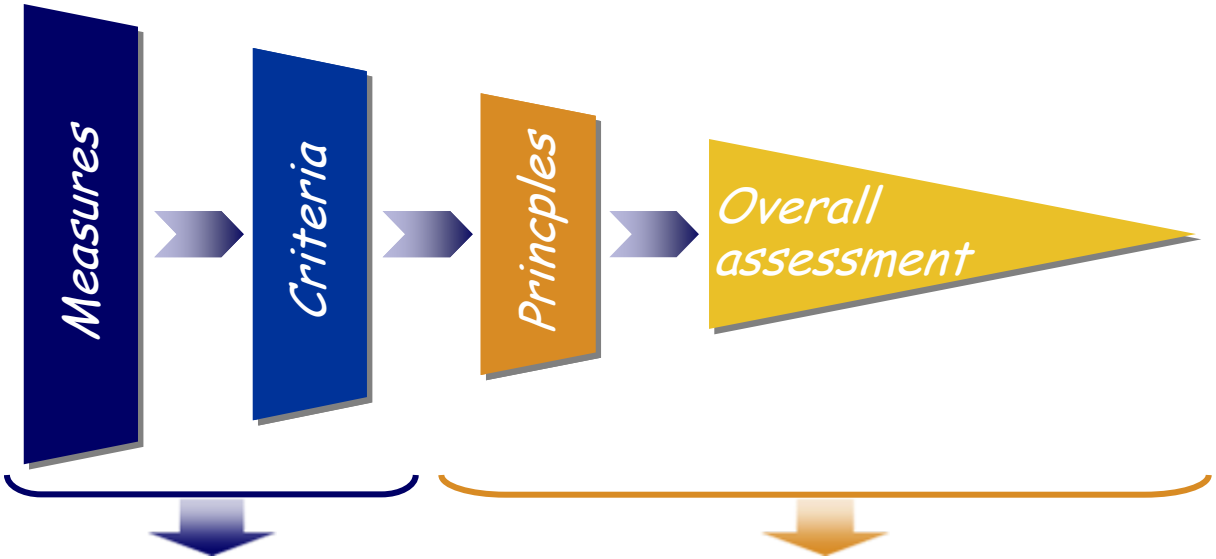
Conclusion



- Transparency

  Intermediate scores are available

  ⇨ They can help producers understand their final result and encourage them to take efficient remedial measures



Work extended to the other animal types considered in Welfare Quality®

Thanks for your attention…

5- A software tool

Objective:

To facilitate the implementation of the assessment system

➡ *Design of a **software chain** to ease the collection of data, their storage, the calculations of scores, the synthesis of results, and simulations of potential improvements*

Different users:	…	with different objectives
Farmers & Slaughterhouses		To visualise their own results (measures and scores) and simulate possible improvements
Assessors / Advisors		To visualise the results of the units they assessed and simulate possible improvements
Certification bodies		To visualise the results of the units they certified
Administrators		To manage database
Visitors		To get an overview of the assessment system

Design of the software tool

General organisation

Data acquisition tool

On farm / at slaughter

Web-based tool

At office (Internet)

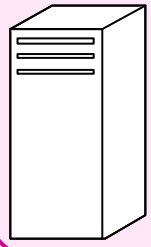
Module 1
Acquisition of data
farms and slaughterhouses

Module 2
Storage of data
farms and slaughterhouses

Module 3
Calculation of scores
farms & slaughterhouses
(criteria, principles and overall assessment)

Module 4
Interface, possible interactions with measures and scores

Laptop



Web-server

→ Information flows (by Internet)