Definition of criteria for overall assessment of animal welfare

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Abstract

Welfare is multidimensional, comprising good health, comfort, expression of behaviour, and so on. Its overall assessment therefore requires a multicriteria evaluation. The set of criteria shall be exhaustive (no missing item), minimal (only necessary items), agreed by stakeholders, and legible (a limited number of criteria). Furthermore, the interpretation from one criterion shall not depend on that from another. We propose a set of 12 subcriteria grouped into four criteria: feeding, housing, health and optimised emotional states. This work will assist in developing measures to be used on-farm to form a European standard for overall assessment of animal welfare.

Keywords: *animal welfare, integration, multicriteria evaluation, overall assessment*

Introduction

Consumers are concerned about the living conditions of farm animals. As a consequence of this, numerous trade groups (producers, distributors, retailers, chain restaurants) have created certification schemes which include animal welfare (eg Integrale Keten Beheersing in the Netherlands, Swedish Broiler Control, Filières Qualité Carrefour in France, McDonald's Europe, RSPCA Freedom Food in the UK). These initiatives aim at allowing consumers to choose 'high welfare standard' products, but the assessment of welfare varies from one scheme to another. There is no European standard to assess animal welfare while bringing the information to consumers. The EU project Welfare Quality® seeks to fill this gap for cattle, pigs and poultry, by proposing an overall assessment system which is scientifically valid and widely accepted by stakeholders (Blokhuis *et al* 2003).

Welfare is multidimensional (Mason & Mendl 1993; Fraser 1995) and so its assessment corresponds to a multicriteria evaluation problem. The first step towards solving this problem is to define a set of criteria relevant for animal welfare, while following theoretical and practical requirements for a multicriteria evaluation (Bouyssou 1990; Roy 1996). Our objective here is to propose such a set of criteria suitable for an overall evaluation of animal welfare.

Properties of a set of criteria

The set of criteria, which makes an overall assessment possible, should fulfil the following requirements (Bouyssou 1990):

• It must be *exhaustive*, ie containing every important viewpoint.

• It must be *minimal*, ie 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. Moreover, to avoid double counting there should be, as far as possible, no functional links between criteria.

• The set of criteria should be *agreed* by all stakeholders and considered as a sound basis for operating a practical assessment. The criteria and their application should be transparent and easy to understand, avoiding 'black boxes' in the aggregation procedure.

• To be '*legible*' the set of criteria should be composed of a limited number of criteria. In fact, to implement an aggregation procedure, it is necessary to show the values obtained for the different criteria correspond to one another. To handle this task, it is generally considered that twelve criteria is a maximum.

Table 1 Set of criteria and subcriteria used in WelfareQuality® to develop an overall welfare assessment.

Criteria	Subcriteria	Specifications
Good feeding	1. Absence of prolonged hunger.	
	2. Absence of prolonged thirst.	
Good housing	3. Comfort around resting.	Assessed through behaviour (including rising up and lying down movements) but not injuries (included in 5).
	4. Thermal comfort.	
	5. Ease of movement.	Not considering health problems (included in 6, 7, 8) and movements around resting (included in 3).
Good health	6. Absence of injuries.	Except those produced by a disease or voluntary interventions (eg mutilations)[1].
	7. Absence of disease.	Absence of clinical problems other than injuries[2].
	8. Absence of pain induced by management procedures.	Eg mutilations and stunning.
Appropriate behaviour[3]	9. Expression of social behaviours.	Balance between negative (eg aggression) and positive (eg social licking) aspects.
	10. Expression of other behaviours.	Balance between negative (eg stereotypies) and positive (eg exploration) aspects.
	11. Good human-animal relationship.	No fear of humans.
	12. Absence of general fear.	Except fear of humans.

[1] For suckling piglets 'mortality' is considered with injuries because death is mostly caused by crushing by the sow.

[2] This includes mortality for young animals (except suckling piglets) and during transport. Mortality at other times is not considered because it largely depends on management and culling strategies.

[3] 'Social behaviours' (9) and 'fear of humans' (11) are very important components of farm animals welfare (Hemsworth & Coleman 1998; Boe & Faerevik 2003). They have been isolated respectively from 'other behaviours' (10) and 'general fear' (12), to avoid masking the effects of these latter elements.

Proposal for a list of welfare items fulfilling these properties

The literature offers several lists of principles that need to be fulfilled to achieve animal welfare, eg the *five freedoms*: 1) freedom from hunger and thirst, 2) freedom from discomfort, 3) freedom from pain, injury and disease, 4) freedom to express normal behaviour, and 5) freedom from fear and distress (Farm Animal Welfare Council 1992). These *five freedoms* have been widely used in certification schemes (eg Freedom Food scheme; Main *et al* 2001) and in EU regulations. However, they present some limitations. Several freedoms overlap, for example, an uncomfortable resting place (Freedom 2) is often associated with injuries (Freedom 3). Freedoms 2 and 5 are very general and can cover most of welfare aspects. Other authors have provided more detailed lists of animal needs (reviewed by Bracke *et al* 1999) while others propose lists of measures (eg Winckler *et al* 2003). Taking the existing literature into consideration, we applied the following principles to choose a set of welfare items:

• Welfare items shall be applicable to any farm animal species.

• Since welfare relates to mental states (Duncan 2002), the assessment should be based on measures taken on animals and grouped according to what the animal perceives. For instance, poor resting areas may lead to behavioural difficulties (eg in lying down) and to injuries, but we considered that the former results in discomfort and the latter in pain; hence they were considered separately. By contrast, injuries, whatever their cause, were considered together because they are all likely to result in pain. We nevertheless kept pain induced by management procedures (castration, slaughter, etc) separate because of the clearly identified cause.

• Compensation within a given item may be allowed while less compensation is allowed between items (eg good human-animal relationships cannot fully compensate for lack of social contacts [Raussi *et al* 2003]).

• Hazards with a low probability (like fire or attacks by predators) will not be included.

We thus defined a list of 12 items (Table 1, column 2) which fulfils most of the requirements for a set of criteria.

This list appears to be *exhaustive* since the aspects of animal welfare quoted in the literature (eg Bracke *et al* 1999; Capdeville & Veissier 2001) can find their place.

This list seems *minimal* as each item has been shown to be important for welfare and redundancies between items have been avoided thanks to clear specifications on the limits of each item (Table 1, column 3).

Each item appears to be capable of *independent interpretation*. Nevertheless, some functional dependencies between

items were noticed. For example, if fear of humans is measured by flight distance, health and observed fear are dependent because lame animals flee less than healthy ones (Špinka *et al* 2005). Refining the assessment of each item (eg by assessing fear of humans only in non-lame animals) will help minimise such dependencies.

We consulted the advisory committee of WelfareQuality ® composed of representatives of consumers, distributors, producers, animal advocates and policy makers. They were in *agreement* on this list. In addition, discussions were organised in 49 focus groups of consumers (in seven European countries) and showed that consumers consider our list as a relevant basis to assess welfare.

As presented previously, twelve items is at the upper limit agreed for *legibility*. Even if all criteria are assessed on a two-level scale,

$$2^2 \times \sum_{\alpha=1}^{10} (12 - \alpha) = 264$$

possible combinations should be explored to perform the final aggregation into the overall assessment.

Reorganisation of the 12 welfare items into four criteria

To be fully supported by users, the criteria should be easy to understand. To ease communication with stakeholders, particularly consumers, and because it would make the set more legible (as discussed in the previous section), it was decided to use a smaller number of items.

We grouped the 12 items into criteria defined so that compensation was minimal between criteria (eg good health is unlikely to compensate for the lack of appropriate behaviour) while keeping the 12 previous items as subcriteria (Table 1, column 1). The resulting four criteria correspond to the functional areas: feeding, housing, health, behaviour, and to the general questions:

• Are the animals properly fed and supplied with water?

• Are the animals properly housed?

• Are the animals healthy?

• Does the behaviour of the animals reflect optimised emotional states?

Conclusion and animal welfare implications

Reliable science-based assessment of animal welfare requires carefully constructed assessment tools. In this paper, we propose an exhaustive and minimal set of 12 subcriteria, independent in their interpretation, regrouped into four criteria to ease communication, especially with consumers (Table 1). This leads to a hierarchical structure where the information at each level will remain available, particularly at the subcriterion level. This makes the whole process transparent, so helping farmers identify those improvements on which they should focus their efforts.

This set of criteria will be used within WelfareQuality® to develop welfare assessment systems. Subsequent steps include the choice of appropriate measures to evaluate each subcriterion, deciding on a mathematical expression for each subcriterion, synthesis of the subcriteria into the criteria with clear formal aggregation (avoiding black boxes), and aggregation of the criteria into the overall assessment.

Such an assessment scheme to properly capture the welfare state of the animals will be of great potential benefit and should help lead to improvement in the animals' quality of life.

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