

Farm Welfare Index for assessment of wellbeing in swine farms

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Abstract

Animal welfare in swine farms can be evaluated by means of different methodologies. An Italian research team has recently developed a new methodology to assess animal welfare in cattle farms. The same methodology has been now applied to pig farms.

The system called FWI (Farm Welfare Index, Italian letters IBA) is based on a specific check list for each different category of animals in the farm. The check list data are elaborated to give a farm score on the basis of limited and objective parameters to be recorded during the farm visit. In such a way the score is given taking into account both well-established technical parameters experimentally tested by specific researches or derived from experience of farmers and advisors and the legislation in force.

The assessment of welfare using FWI is in progress in 80 pig farms located in the North of Italy. The assessed swine farms will be scored according to the FWI methodology by a total score on general farm inputs and by partial scores referring to the housing systems used for different pig categories; in addition non conformity to current regulations will be reported.

At the end of the process, every farm has to be classified by the total FWI score. The index can allocate the farm in one of the 6 different classes with an increasing level of welfare from 1 to 6.

Keywords: animal welfare, welfare assessment, Farm Welfare Index, pig housing.

Introduction

The welfare of farm animals is a current issue. Defined by Hughes (1976) as that "*state of complete mental and physical health in which an animal is in harmony with its environment*", it is required not only for ethical reasons but especially to have healthier animals able to provide more wholesome food.

Employees and farmers in particular must consider animals' welfare as a great opportunity to improve farming techniques and structures to develop productive services, reduce health issues and add value to farm products.

One of the most important aspects for the welfare and health of animals is the farm environment, defined as all the elements around the animal that condition the life and behaviour of the housed animals. Thus, it is not by chance that the environment is the main subject that almost all the current animal welfare evaluation systems focus on.

Among the most important elements that contribute to defining the farm environment is the microclimate (temperature, humidity, air velocity), light, gas and dust concentration, noise, the type of housing (single or collective, fixed or free, open or closed), the living space for each animal, the type of flooring (full, slatted, with litter), the shape and distribution of the farm areas, hygiene conditions and the microbial environment, the feeding system (size and type of equipment to supply feed, location of feeding areas), the water distribution system.

To evaluate the aforementioned aspects, the subjects related to farm construction must be studied in particular, paying special attention to the farm and housing systems, structures, equipment and farm facilities and the environmental control in the buildings.

Systems to evaluate animal welfare

The systems to evaluate animal welfare can be subdivided into the following categories:

- systems based on functional farm equipment and facilities tests in order to verify performance and correlation with animals' welfare (for example, the German test DLG);
- diagnostic systems based on welfare "indicators" for individual animals (for example, productive parameters or behavioural, health and physiological aspects);
- on-farm index systems that estimate the potential of farming methods and structures to provide animals with a certain level of welfare.

On-farm evaluation index systems, the ones only that interest us at this time, are characterized by basic criteria that can be summarized as follows:

- highlighting the most serious mistakes concerning farm system and structures;
- emphasizing the most relevant aspects for farm animals' welfare;
- rapidity of the evaluation (farm visits and then assigning points) and training evaluators and then lowering evaluation costs;
- increased repeatability of points for objective and measurable parameters (in the case of evaluations repeated at different times or by different evaluators).

These criteria provide the general set up of the applicable approach to evaluate the welfare of raised pigs and rely on consolidated technical parameters, set up through research, experimentation and the experience of farmers and technicians as well as, obviously, current legislation.

For this last point, the following regulations enacted by the European Community and in Italy regarding pig prevail:

- the general regulation dealing with protecting farm animals (*Regulation 98/58/CE* enacted by *Legislative Decree nr. 146* of 26/03/2001);
- the specific regulation to protect pig (*Regulation 91/630/CEE*, *Regulation 2001/88/CE* and *Regulation 2001/93/CE*, enacted by *Legislative Decree nr. 534* of 30/12/1992 and by *Legislative Decree nr. 53* of 20/02/2004).

The primary limitation of these evaluation systems is that they cannot rely heavily on scientifically tested criteria, like, for example, possible tests to be carried out on animals (Leeb *et al.*, 2004) or possible laboratory analyses which would involve costs and timeframes that are not compatible with the investigation methods in question.

Another possible critical evaluation point is the time of the farm visit. From this point of view, it is preferable not to establish or give too much importance the evaluation parameters that can vary considerable from season to season. In this regard, an example is the discovery of toxic gas concentrations in farms which, relying heavily on ventilation and moving waste, can vary from summer to winter and from one day to another.

Among the different on-farm evaluation index systems, *ANI* is particularly noteworthy (*Animal Needs Index* or, in the original German, *TGI- Tier-Gerechtheits-Index*). The original and creative idea of creating an animal welfare evaluation index comes from Bartussek, who proposed an animal welfare index as part of the Austrian regulations on factory farming (1985). This index was subsequently drafted and improved to arrive at the current version called *TGI 35 L* (or *ANI 35 L*), applicable to cattle, laying hens and fattening hogs (Amon *et al.*, 1999).

The farm visit is based on the evaluation form where the range of scores assigned are listed based on environmental conditions, technical and technological prerequisites and the measures regarding the way the farm is managed for different functional areas that have an impact on the animals' health and welfare.

TGI 35 L is essentially based on technical farm system requirements, like the availability of space and the quality of flooring and considers 30-40 verification criteria, including: the possibility of moving; the possibility of “social “interactions among animals of the same species; flooring types and conditions; light and air conditions; characteristics of staff working in the barn.

The system purposely leaves out aspects regarding feeding since it is considered that supplying appropriate animal feed is a *sine qua non* condition not so much for wellbeing as the farm's profitability.

The scores given initially varied between one and seven points for each functional area of the farm, for a maximum of 35 points. With subsequent changes, the points were further differentiated, including negative and maximum points over those initially proposed (from -9 to + 45.5). Now, this system takes into account that animals can counterbalance negative influences in functional areas with positive aspects.

In Austria, the *TGI 35 L* has been used since 1995 for organically certified farms. The minimum score needed to obtain certification is 21 for current structures and 24 for new or renovated buildings. Based on the species in question, the system gives “importance” to different variables considered.

Based on this concept, another model was developed by Sundrum *et al.* (1994). Created as a contribution for public calls for tender, it provides a simplified method to evaluate animals' welfare on calves, pigs and hens farms.

TGI 200 (or *ANI 200*) considers 60 -70 evaluation criteria and, in particular, emphasizes factors that impact animals' health. The points assigned are within a variable range from zero to 200. The reason for such a high score is due to the possibility of various special features occurring in various functional categories. For this reason, based on the type of species and the purpose of the farm, it is not always possible to reach the maximum number of points in terms of excellent care and health.

Methodology

A group of researchers at the Research Centre on Animal Production in Reggio Emilia and the Department of Agricultural and Forest Engineering of University of Florence fine-tuned an evaluation system for farm animals' welfare as part of the activities carried out for a project funded by Emilia-Romagna Region.

The project aimed at providing and testing the check lists and experimentally evaluating them with a significant sample of pig farms to verify how they comply with regulations and reference technical requirements for animal welfare.

Below, the main activities carried out for the project are summarized:

- codifying the FWI evaluation system, singling out macro survey areas and aspects of the farm to emphasize;
- arrangement of checklists and defining how they are tested at the farms;
- filling out the checklists at pig farms;
- creating an appropriate spreadsheet (an *Excel* file) to input the data collected and automatically assign points and a FWI class;
- checking and validating the data collected and inputting them on a spreadsheet created for that purpose;

- correcting the pending spreadsheet and validating it;
- classifying the farms using the FWI system, processing sample data and conclusions drawn.

The evaluation system called FWI (Farm Welfare Index, Italian initials IBA) is based on a checklist that allows points to be assigned based on wellbeing, starting with a limited number of objective parameters that are easily measured during the farm inspection. Nevertheless, in some cases, subjective evaluations must be used because aspects such as the internal surface areas of barns and the cleanliness of troughs would require time and special equipment to be evaluated in a way that can then be used. Additionally, it is unanimously agreed that evaluating animal welfare cannot be completely objective.

Different variants of the checklist can be used for all types of pig farms (breeding/fattening farms, breeding farms, fattening farms) with housing of animals inside the buildings.

The parameters studied refer to the following main themes:

- farms systems and barn structures;
- environmental control;
- feed and drinking water;
- animals' hygiene, health and behaviour;
- checking animals, equipment and facilities;
- farm staff.

The checklist for assigning the FWI is subdivided into different parts (table 1). For each farm unit, a general form must be filled out (form A), a form for each farm building (form B) and a form for each type of animals kept inside each building (forms C, D, E and F). Different functional areas are considered for each building and for each type of animal: resting area, feeding area and exercise area.

For instance, in the case of a farm with a building including a room for pregnant sows and several rooms for farrowing sows and with a building divided in different rooms for post-weaned piglets, the following forms have to be drawn up:

- n. 1 form A - General Part;
- n. 3 form B - Building;
- n. 1 form C - Mating/pregnancy;
- n. 1 form D - Farrowing/lactation;
- n. 1 form E - Weaning.

To make it easier to fill out, all questions that have to be answered by the head farmer have been placed in the General Part of the form while the remaining forms in the checklist can be only filled out by the surveyor through observation, measuring and evaluation. The surveyor is equipped only with a compass, an 8-m flex meter and a laser diastimeter.

Types of questions and assigning points

One of the most complex aspects in defining an evaluation method for welfare is certainly assigning points to the individual questions and the groups of similar questions by type. In fact, it is important to carefully weigh the different parameters in question in order to create a reliable and sufficiently objective classification grid that fulfils the goal of evaluating farm animal welfare. There are essentially four types of questions on the checklist:

1. free response or description;
2. yes/no answer;
3. codified answer;
4. numeric answer.

Several type 1 questions do not assign points and are only included to more precisely characterize the farm and to allow further cross-checks with other types of questions.

Assigning points must be varied based on the relative importance given to individual questions; in fact, always using the same points is not helpful (for example, 0-3 points or -1 to +1) as shown by several evaluation systems that are used, because the same importance is given to aspects that can have very different significances.

In short, by defining the classification system, the following basic criteria were respected:

- assigning higher maximum scores and minimum negative scores for the most important and easiest aspects to evaluate like, for example, the type of housing or farm surface area;
- assigning the lowest maximum scores to detailed, or less important, aspects and more uncertain evaluation parameters, like those that require a more subjective evaluation by the surveyor;
- setting up an adequate program to calculate points that take into consideration the type of questions and how they interact and provide for different possibilities in terms of the number of forms to fill out.

FWI score

The FWI score is made up of the sum of 3 partial scores:

- *GENE* score, for general data;
- *BUIL* score, for buildings;
- *CATE* score, for pig categories.

A farm's *BUIL* score is obtained from the weighted average of the total live weight for the individual scores for each building. The *CATE* score comes from the sum of the points assigned to the various pig categories.

The FWI evaluation system assigns a welfare index for each farm evaluated; the index value places the company in one of 6 prearranged levels:

- Class 1 - Farm does not comply with the minimum welfare requirements;
- Class 2 - Farm with a low level of welfare;
- Class 3 - Farm with a sufficient level of welfare;
- Class 4 - Farm with a fairly good level of welfare;
- Class 5 - Farm with a good level of welfare;
- Class 6 - Farm with an excellent level of welfare.

Assigning the FWI is accompanied by a short technical chart that lists the most serious lacks found in order to allow the company to make those changes aimed at improving the level of its animal welfare.

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Conclusions

The project arranged a new evaluation system for the animal welfare at pig farms. The FWI system (Farm Welfare Index, Italian letters IBA) is based on filling out a checklist that varies based on the type of farm and allows a score to be assigned, starting with a relatively limited number of objective parameters that can be easily measured during the farm visit.

The methodology inspires the on-farm index systems, including the famous Austrian ANI (Animal Needs Index), which provides a general framework for the applicable approach to evaluate wellbeing, relying on prepared consolidated technical parameters, experimentation and the experience of herders and technicians as well as, obviously, current legislation.

The FWI system is characterized by the following basic elements:

- highlighting the most serious system and farm structure oversights, allowing the farmers to receive more useful and specific information to improve animal welfare;
- emphasizing the most relevant aspects for animal welfare;
- the evaluation is relatively quick (a farm visit lasts 2-4 hours, based on the complexity of the farm and the number of buildings);
- training evaluators does not take long, even if it is preferable to use staff with a certain amount of experience on pig management, equipment and structures;
- thanks to the software available, entering data and the evaluation is quick and relatively simple and the possibilities of error are kept to a minimum.

The proposed methodology has to be validated in specific research projects aiming at comparing the FWI scores with physiological, sanitary and behavioural indicators or with productive performances.

Table 1. Parameters included in the FWI system checklist for pigs

FORM	PARAMETERS
A - GENERAL PART	General data on the company and farm, managing animals, checking facilities and registration, staff, structures for isolation, health
B - UNIT/ROOM	Categories of pig present, barn features, environmental control, level of cleanliness and state of the internal areas of the building and of the equipment
C - MATING/PREGNANCY (sows, gilts, boars and mating facilities)	Housing systems, space allocation, feeding and watering systems, features of various functional areas (feeding place, resting place, excretory place), floors, environmental control, hygienic-sanitary and behavioural aspects
F - FARROWING/LACTATION (sows, suckling piglets)	Housing systems, space allocation, feeding and watering systems, features of various functional areas (feeding place, resting place, excretory place), floors, environmental control, hygienic-sanitary and behavioural aspects
E - WEANING (weaned piglets)	Housing systems, space allocation, feeding and watering systems, features of various functional areas (feeding place, resting place, excretory place), floors, environmental control, hygienic-sanitary and behavioural aspects
F - FATTENING/BREEDING (growing / fattening pigs, young gilts, immature boars)	Housing systems, space allocation, feeding and watering systems, features of various functional areas (feeding place, resting place, excretory place), floors, environmental control, hygienic-sanitary and behavioural aspects

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