ANSES opinion GAWLRF
Request No. 2021-AUTO-0161
Related Request No(s)

The Director General

Maisons-Alfort, 15 March 2024

OPINION
of the French Agency for Food, Environmental and Occupational Health & Safety

on "guidelines for the establishment of an animal welfare labelling reference framework"

ANSES undertakes independent and pluralistic scientific expert assessments.
ANSES primarily ensures environmental, occupational and food safety as well as assessing the potential health risks they may entail.
It also contributes to the protection of the health and welfare of animals, the protection of plant health and the evaluation of the nutritional characteristics of food.
It provides the competent authorities with all necessary information concerning these risks as well as the requisite expertise and scientific and technical support for drafting legislative and statutory provisions and implementing risk management strategies (Article L.1313-1 of the French Public Health Code).
Its opinions are published on its website. This opinion is a translation of the original French version. In the event of any discrepancy or ambiguity the French language text dated 15 March 2024 shall prevail.

On 16 September 2021, ANSES issued an internal request to conduct the following expert appraisal: "propose guidelines for drawing up an animal welfare labelling reference framework".

1. BACKGROUND AND PURPOSE OF THE REQUEST

Public interest in the conditions under which farmed animals live and die has grown steadily since 2000. This interest has gradually been taken into account by professionals in livestock farming and in the agri-food and distribution sectors. Animal welfare is also increasingly regulated at various levels, including the European Union (EU). This is characteristic of contemporary public action, which involves a multitude of players at different scales and a mix of private initiatives and public provisions. Concerning the agendas of public institutions, the European Commission (EC) has included the possibility of animal welfare (AW) labelling in the timetable for its Farm to Fork Strategy[1] and will state its position on this subject in 2024.

[1] Farm to Fork Strategy (europa.eu)

ANSES's proposal to draft guidelines for drawing up an AW labelling reference framework is therefore fully in line with these policy developments. These guidelines are intended to define a common framework, at a time when numerous non-comparable labels are being developed. ANSES issued an internal request to propose these guidelines based on its own definition of animal welfare (ANSES, 2018) and according to the following principles:

- use scientific data to establish the criteria to be considered for assessing AW;
- cover all food-producing vertebrate animal species and their farming systems;
- consider both levels of the animal production sectors: selection-multiplication and commercial production;
- consider the impact of genetics on AW (hypertypes, for example);
- take account of the interactions between animal welfare and animal health;
- cover all stages of an animal's life:
  - rearing;
  - transport;
  - slaughter.

The establishment of these guidelines included a general reflection on the social, political and economic dimensions of this labelling.

This expert appraisal is limited to foodstuffs produced by vertebrate animals. **It should be possible to apply these guidelines to the drafting of a labelling reference framework for any production sector or livestock animal category.**

2. ORGANISATION OF THE EXPERT APPRAISAL

The expert appraisal was carried out in accordance with French Standard NF X 50-110 "Quality in Expert Appraisals – General requirements of Competence for Expert Appraisals (May 2003)".

The issues being appraised lie within the scope of the Expert Committee on "Animal health & welfare" (CES SABA). ANSES entrusted examination of this internal request to the "Guidelines for an AW labelling reference framework" Working Group (GAWLRF WG), reporting to the CES SABA.

The text of the internal request was adopted by ANSES and signed on 16 September 2021. The GAWLRF WG met 27 times from 23 September 2021.

The methodological and scientific aspects of the work were presented to the CES SABA on 9 November 2022, 4 April 2023 and 11 May 2023. The full report was presented on 12 September 2023 and was adopted by the CES SABA at its meeting of 10 October 2023.

ANSES analyses interests declared by experts before they are appointed and throughout their work, in order to prevent risks of conflicts of interest in relation to the points addressed in expert appraisals.

The experts' declarations of interests are made public via the website: https://dpi.sante.gouv.fr/.

3. ANALYSIS AND CONCLUSIONS OF THE CES AND THE WG

3.1. General context of animal welfare labelling

3.1.1. Political and institutional context of AW labelling

The decision to label animal products intended for consumption, as proposed by the EC in its Farm to Fork Strategy, would ensure transparency and harmonisation of AW labelling in Europe. Indeed, the EC has reported that current AW legislation is being applied inconsistently, and several Member States already offer AW labelling without it being possible to compare or at times verify their specifications, leading to confusion and doubt among consumers. As things currently stand, there is no European legislation governing AW claims or labelling. While certain EU standards provide consumers with some information on production methods (e.g. organic farming, eggs in shell[2]), the remainder of the AW information provided to consumers is based on national labelling systems, which follow different approaches and offer different levels of protection. In the absence of any new measures, the provision of AW information to consumers will depend on European AW legislation (which is currently inadequate), but also on (divergent) national legislation and initiatives, or on market forces (voluntary private labelling schemes). In its impact assessment[3], the EC put forward three proposals for action on AW labelling: "Option 1: Regulating animal welfare claims. Option 2: An EU animal welfare label, limited to cage/non-cage systems. Option 3: An EU animal welfare label, with key welfare criteria."

Today, all EU countries, as well as Norway, the UK and Switzerland, have developed AW labels. The EC report "Study on animal welfare labelling"[4] lists 51 of these schemes covering all animal production sectors, including 17 with an organic dimension[5]. In France, at the time of writing this opinion, a specific AW label had been created by the Association for animal welfare labelling (AEBEA)[6] and applied to the broiler sector for fresh meat. Other labels have been developed since 2019 but are not yet in use.

3.1.2. AW labelling from a social science perspective: a multidimensional instrument with uncertain implications

Consumer products are increasingly being labelled across multiple sectors, but this comes with significant social, political and economic challenges. Not all the effects of labelling can be easily identified, and this instrument relies on questionable assumptions:

- consumer rationality and homogeneity;
- the reality of a change relying on individual responsibility (basing changes in livestock farming methods on the choice of products by consumers).

A few studies on AW labelling are available, but they have not managed to resolve the uncertainties surrounding the impact of this tool in terms of consumption, let alone in terms of improving AW. The design and application of labelling need to take account of the

[2] Eggs are marketed as eggs in shell or egg products. To make eggs easier to use, the sector offers them in the form of egg products, i.e. presentations other than eggs in shell. These are widely used in the agri-food industry and in out-of-home catering, for reasons of convenience, hygiene and cost. https://oeuf-info.fr/infos-filiere/les-ovoproduits-les-oeufs-coquilles/
[3] https://marketac.eu/wp-content/uploads/2022/01/090166e5df6c01bf.pdf
[4] https://op.europa.eu/fr/publication-detail/-/publication/49b6b125-b0a3-11ec-83e1-01aa75ed71a1/language-en
[5] https://op.europa.eu/o/opportal-service/download-handler?identifier=49b6b125-b0a3-11ec-83e1-01aa75ed71a1&format=pdf&language=en&productionSystem=cellar&part=
[6] http://www.etiquettebienetreanimal.fr/

heterogeneous nature of consumers and supply-chain players (farmers in the different sectors, distributors, etc.). These stakeholders do not all have the same resources, nor are the costs and opportunities of labelling spread equally among them.

If an AW label were to be used, it should be legible and harmonised at European, if not global, level. Similarly, its design and implementation should be overseen by the public authorities.

3.1.3. Legal framework for animal welfare labelling

Specific consumer information on AW is subject to a national and European legal framework. Labelling is defined as encompassing both the written and pictorial elements accompanying or referring to the food product. The label[7] is the preferred medium. The information it conveys may be compulsory or voluntary. Labelling is said to be "compulsory" when food business operators have a duty to comply with it, and "voluntary" when these operators are free to adhere to it if they so wish. Only information certifying superior quality in accordance with a set of specifications can be described as a "quality label"[8].

There is no unified European labelling system for AW, apart from a special obligation to provide information on the way in which laying hens are reared, enabling consumers, since 2008, to find out how eggs are produced. Regulation (EC) No 589/2008 of 23 June 2008[9] on marketing standards for eggs thus aims to provide transparency for consumers by imposing compulsory information[10] through a multi-level system from 0 to 3, with each level corresponding to the way in which laying hens are reared: caged (3), barn (2), free range (1), organic (0).

Voluntary information is also governed by a legal framework. Animal welfare claims are subject to the general principle that consumers must not be misled. A few voluntary statements are also regulated more specifically by European agricultural law (marketing standards for poultry meat and terms promoting good farming practices). The use of certain official labels of quality and origin also implies compliance with AW requirements (organic farming and, to a lesser extent, *Label Rouge*). Organic farming thus explicitly contributes to more humane treatment of animals. Consumers are not necessarily informed of this, but it may be mentioned (in particular the obligation to stun animals before slaughter).

Introducing unified AW labelling by 2024 would require compliance with World Trade Organization law. If the EU opts for compulsory AW labelling, this means that the measure meets the requirements of necessity and proportionality. Any new compulsory information must comply with the requirements of the INCO Regulation[11], and in particular must be

[7] **Label**: any tag, brand, mark, pictorial or other descriptive matter, written, printed, stencilled, marked, embossed or impressed on, or attached to the packaging or container of food (Article 2 i of Regulation (EU) 1169/2011 on the provision of food information to consumers). This is the legal term that covers the broadest range of meanings, and has been used by the experts in the remainder of this report.

8 Quality label: a mark affixed to a product intended for sale to certify that it has been manufactured in accordance with a set of specifications. The quality label aims to guarantee that the labelled product is of a higher quality than conventional products with regard to certain identified characteristics (Association Infotrack Science Po 2020).

[9] https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:163:0006:0023:EN:PDF#:~:text=Les%20%C5%93ufs%20industriels%20sont%20impropres,contenant%20ce%20type%20d'%C5%93ufs

[10] https://france.representation.ec.europa.eu/informations/non-la-commission-europeenne-ne-veut-pas-la-disparition-des-labels-rouges-ou-du-poulet-de-bresse-2023-02-14_fr

[11] Regulation (EU) No 1169/2011 of the European Parliament and of the Council of 25 October 2011 on the provision of food information to consumers, amending Regulations (EC) No 1924/2006 and (EC) No 1925/2006 of the European Parliament and of the Council, and repealing Commission Directive 87/250/EEC, Council Directive 90/496/EEC, Commission Directive 1999/10/EC, Directive 2000/13/EC of the European Parliament and of the Council, Commission Directives

deemed necessary by the majority of consumers. If the EU opts for voluntary labelling, this must not mislead consumers and must enable them to distinguish conventional products from those guaranteeing a higher level of respect for AW.

3.1.4. General characteristics of an AW label

An AW label is characterised by its nature (public, private or joint initiative), governance, voluntary or compulsory application and ranking system, which may be a single (a quality label) or graduated multi-level system (see the marketing of eggs in shell).

It can take account solely of AW or may combine it with other aspects contributing to the sustainability of production (environmental impact, quality, organic, fair trade, local sourcing, traceability, authenticity, origin, health and nutrition, safety, biosafety, landscape, hygiene, social aspects, etc.). If AW information is aggregated with other aspects assessed using the same reference framework, it may be diluted and lose its value. The many different labelling forms and aspects taken into account to assess AW increase the complexity of the message to the consumer. This is why it is necessary to harmonise the standards for AW labelling specifications in the EU and provide consumers with a certification system that is transparent, shared, independent and in line with the requirements of the European INCO Regulation.

3.1.5. Technical and economic context of animal production sectors

Livestock farming is defined as the production and care of animals that are useful to humans. It can, however, have several definitions: the general activity of livestock rearing itself, the entire production in an area, the economic sector or the production unit. Today's livestock farms are highly specialised and organised into major production sectors. The term "sector" covers all the activities relating to a foodstuff, from production through to consumption. The players in the sector are organised vertically, starting with the upstream partners (suppliers of inputs and various services), then the agricultural producers, the product processing and distribution companies, and lastly the consumers (see Figure 1).

Within each sector, a distinction is made between "production factor" (animals used for milk, eggs, etc.) and "production objective" (animals used for meat). The lifespan of animals can be broken down into different phases: rearing, transport, slaughter. The duration of these phases and the age at which the transition from one phase to another occurs for each species and each sector vary greatly.

The poultry, pig, rabbit and fish farming sectors are organised into a pyramid linking two types of farm: those specialising in the production of breeding stock and those producing commercial livestock. The pyramid for the main species has a highly structured selection level (see Figure 2).

This pyramid structure does not exist in the cattle, sheep and goat sectors, as most production farms renew their herds themselves.

The responsibility of the players regarding AW depends on the structure of each sector.

2002/67/EC and 2008/5/EC and Commission Regulation (EC) No 608/2004. https://eur-lex.europa.eu/legal-content/en/TXT/PDF/?uri=CELEX:32011R1169

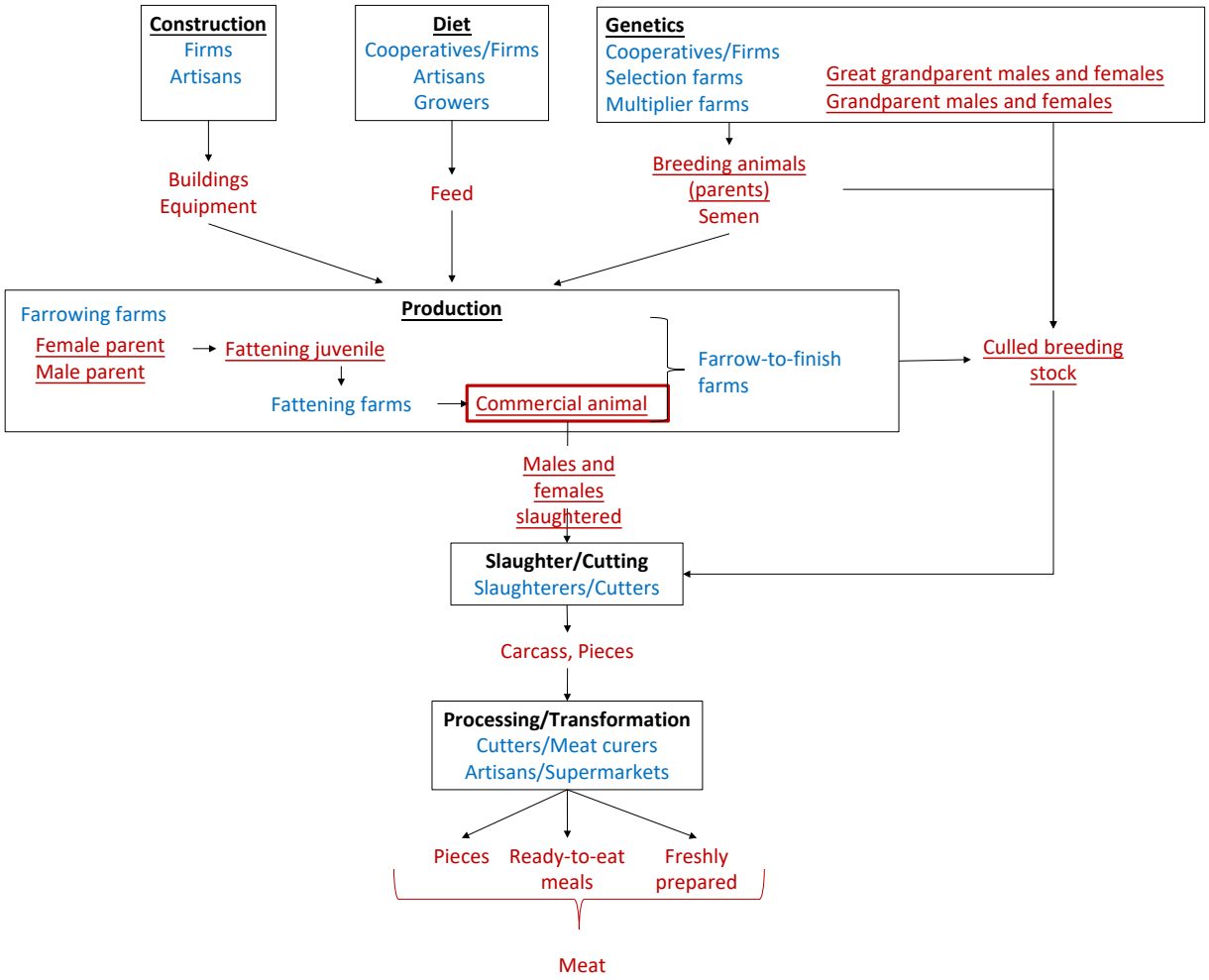

Figure 1: Generic diagram of the organisation of the monogastric mammal sector (pigs, rabbits)

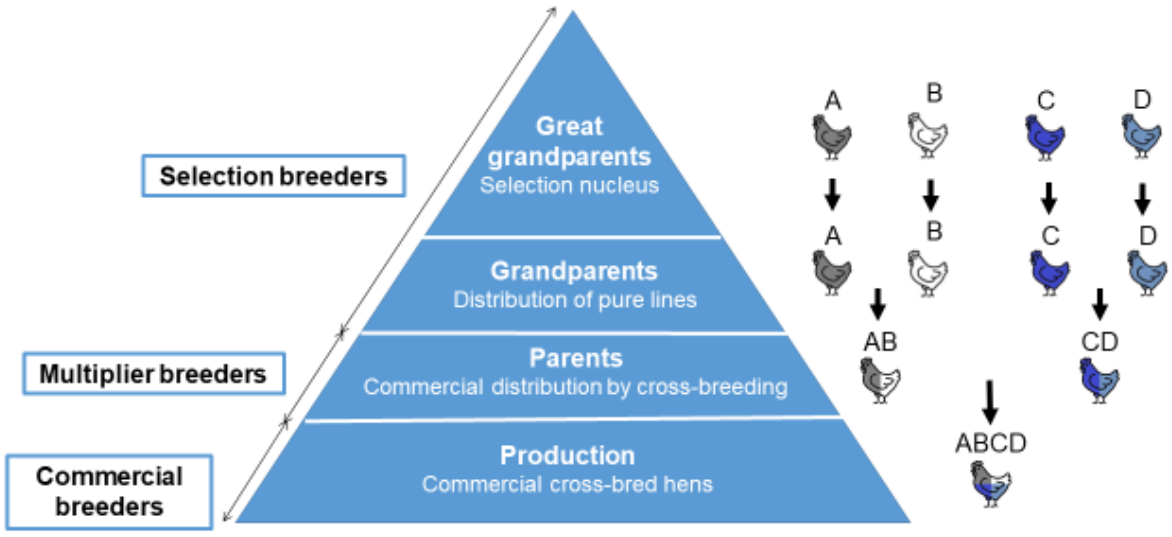

Figure 2: Pyramid selection diagram for the laying hen sector

The selection of pure A, B, C and D lines takes place at the top of the pyramid within a small number of farms (selection nucleus). The breeding stock is then multiplied in pure lines by the selection breeders (grandparents) and supplied to multiplier breeders, who will use them to produce cross-bred breeding stock (AxB and CxD) and then "commercial" hens (AB x CD), which will be supplied to egg-producing breeders.

Taking the level of AW into account at the selection-multiplication level will guarantee the AW of all relatives (ascendants and collateral) of animals at the production level. As with the latter, animals bred for genetic selection or multiplication are the result of genetic choices made for and by the sector; they grow up and live on farms before being transported and then slaughtered, and are also production objectives or factors. The assessment of their welfare should therefore follow the same approach as for animals at the production level. Regardless of the sector, it should be emphasised that there is a risk to the welfare of animals on selection farms, insofar as these are adult animals, kept on the farm for long periods, whose growth and diet require specific management. They are also subject to particular risks associated with reproduction. Furthermore, as the economic value of an animal in a selection programme is much higher than the market value of an individual at the production level, and this becomes even more true when moving up towards the selection nucleus, the living conditions of these animals may also be affected by excessive control of their environment. This includes, for example, the need to keep these animals confined for health reasons, as well as all the adaptations that are essential for rearing animals with a very high level of performance (phases of feed restriction, protocols and hormone treatments for reproductive purposes, frequent handling, etc.). This is the step at which the issue of defining a level of performance that has become incompatible with several AW principles generally arises. Special attention should therefore be paid to these animals, as they are subject to several risk factors threatening AW, particularly at genetic level since they constitute a genetic extreme for the sector. Their phenotypic traits are exacerbated (the animals are homozygous for the traits concerned), and these traits are then diluted by successive crosses (animals from crosses becoming heterozygous for the traits concerned). Lastly, taking the entire selection procedure into account implies considering, firstly, the early culling of individuals not retained during the selection steps and, secondly, at the production level, the elimination of collateral animals with no economic value (male chicks in the layer sector, young males in the dairy sector, etc.).

3.1.6. Defining animal welfare: an ethical and practical issue

In the context of this expert appraisal, the ethical approach that could guide debate on human relations with farmed animals is fundamentally utilitarian. In principle, society considers livestock farming to be legitimate because of the many services it provides: nutritional benefits, enhancement of natural environments and agro-ecological prospects, social uses, etc. However, this legitimacy is not absolute, but is based on a balance between the services provided and the impact on the animals, the professionals involved and the environment. Any treatment of animals that does not respect their living, sentient and conscious nature, or any farming systems that have an excessive impact on the environment or natural resources, can be regarded as illegitimate. Regarding AW, therefore, the conditions under which intensive livestock farming is currently practised are widely challenged by society, and by scientists themselves. An example of this is the European Citizens' Initiative "End the Cage Age"[12], which committed the Commission to tabling, by the end of 2023, a legislative proposal to phase out, and finally prohibit, the use of cage systems for all animals mentioned in the initiative. Practices that are detrimental to animals and whose benefits are not unanimously recognised (fur production, bullfighting, caponisation, force-feeding, etc.) may also be considered illegitimate. The respective weights of the two sides of this scale vary greatly depending on the sensitivity

[12] https://citizens-initiative.europa.eu/initiatives/details/2018/000004/end-cage-age_en

and convictions of each person in their relationship with animals, and is constantly evolving within society.

The intuitionist approach based on the animal's integrity can serve as a guide to this approach in analysing the impact of farming practices on animals. This approach is based on the idea of integrity, i.e. that the animal must be considered in its entirety, its indivisible and essential unity, a unity that cannot be compromised without depriving it of what defines it and provides it with a certain autonomy. The notion of integrity covers different dimensions of being. Species integrity concerns the animal's individual and species identity. For example, having horns is part of the species integrity of cattle. Integrity is also understood at the anatomical and functional levels, at the individual level and in interactions with the physical and social environment (ecological integrity). For example, the animal needs sufficient space and a minimum level of environmental enrichment in order to carry out activities in line with its behavioural repertoire (e.g. foraging, access to a bath, depending on the species), while the fundamental dimension of social relations should not be overlooked. It can also include consideration of the mental state of individuals recognised as conscious living beings (conscious or phenomenological integrity), to which the question of pain and suffering is linked. This analysis of integrity is based on three distinct aspects: the animal's living conditions, any changes made to the animal and the methods used to bring about these changes (genetic selection or manipulation, mutilation with or without taking pain into account, etc.). In light of this ethical approach and ANSES's proposed definition of AW, the various AW risk factors have been defined and used as a basis for creating assessment protocols for the labelling reference framework.

3.2. Players concerned by the creation of a labelling reference framework for AW

These guidelines are intended for scientists and stakeholders planning to establish a labelling reference framework including one or more AW assessment protocols for a given animal sector or category, with a view to labelling. They are not aimed directly at consumers, even though the labelling process must be transparent and accessible to all. The label communicates the overall result of the AW assessment according to the reference framework established for an animal sector or category, and informs the consumer about the level of AW experienced by the animals in the sector/category.

The introduction of an AW label should ensure that conflicts of interest are avoided and that the links between the participants in its design are transparent. If the labelling system is compulsory, the content of the information must be drawn up with guarantees of impartiality and scientific objectivity.

If the labelling system is voluntary, it seems difficult to avoid any vested interests in a context of concerted development of the reference framework. The public authorities should nevertheless ensure that the specifications are drawn up on a scientific basis and that the participation of experts and stakeholders in the design of the label is at least subject to the principle of transparency. This implies making public any present or past links between the persons and organisations involved in drawing up the reference framework and (i) economic entities whose activities contribute to producing or marketing the goods or services covered by the reference framework, or (ii) animal protection organisations. This formalisation of ethical rules will ensure that consumers are aware of any conflicts of interest likely to influence the positions and opinions expressed and affect their impartiality and objectivity.

3.3. Risk analysis and components for establishing an animal welfare labelling reference framework

To establish an AW labelling reference framework, it is essential to start from the physical, behavioural and cognitive needs specific to each species that depend on the animal's age and physiological stage, which will determine the optimum resource conditions.

3.3.1. Identification and analysis of animal welfare risk factors

Identifying the risk factors is a prerequisite to describing the AW assessment protocol that forms the main part of the labelling reference framework. It consists in describing how each risk factor threatens AW and the potential improvements associated with it. It should be emphasised that these threats (e.g. injuries) may be multifactorial in origin, and improvements to welfare may require action on several factors. Moreover, the same risk factor can have contradictory effects on different components. For example, with pigs and ruminants, forming groups by physiological stage facilitates herd health management, but deprives young animals of the opportunity to learn from adults. As these are general guidelines for a labelling reference framework, risk factors threatening welfare common to all animals in the production sectors have been identified. These risk factors meet the objectives of the internal request and apply to all animals in a sector: those belonging to the selection-multiplication level, as well as those at the production level (including those not yet in production), while considering the specific threats to animal protection during the animal transport and slaughter stages (see Figure 3).

Eight risk factors were identified for establishing an AW assessment protocol for a labelling reference framework (see Figure 4)

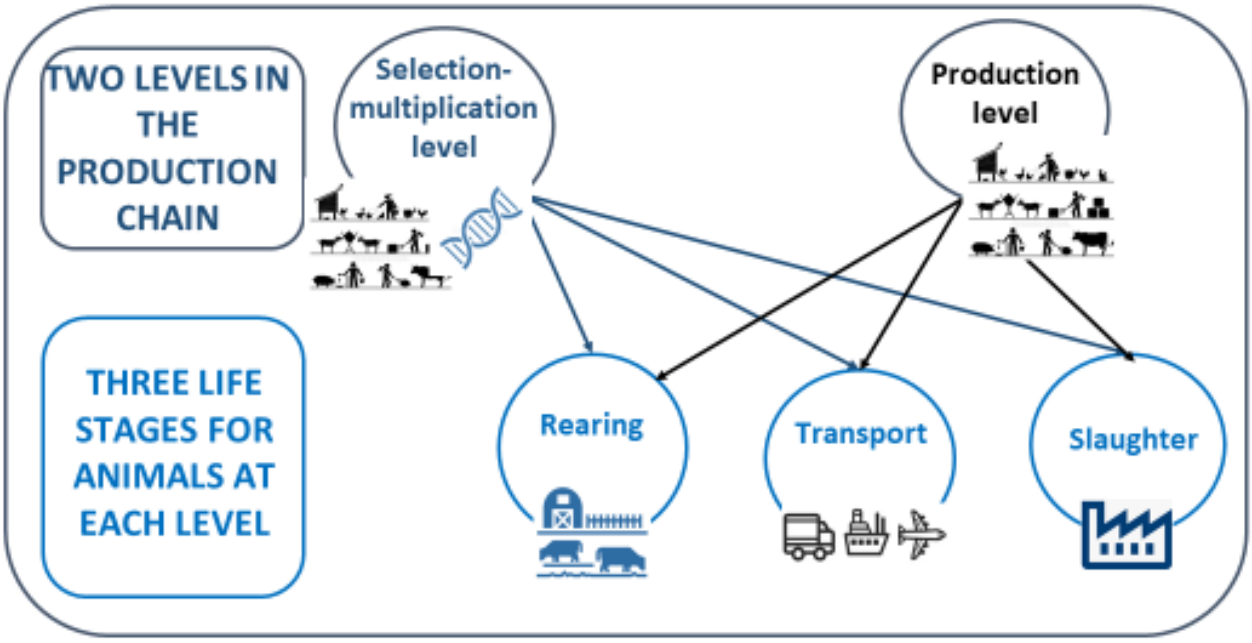

Figure 3: Risk factors are assessed for animals at the selection-multiplication level as well as those at the production level of a sector. For each level in the sector, risk factors are assessed for the three stages in the animals' lives: rearing, transport and slaughter

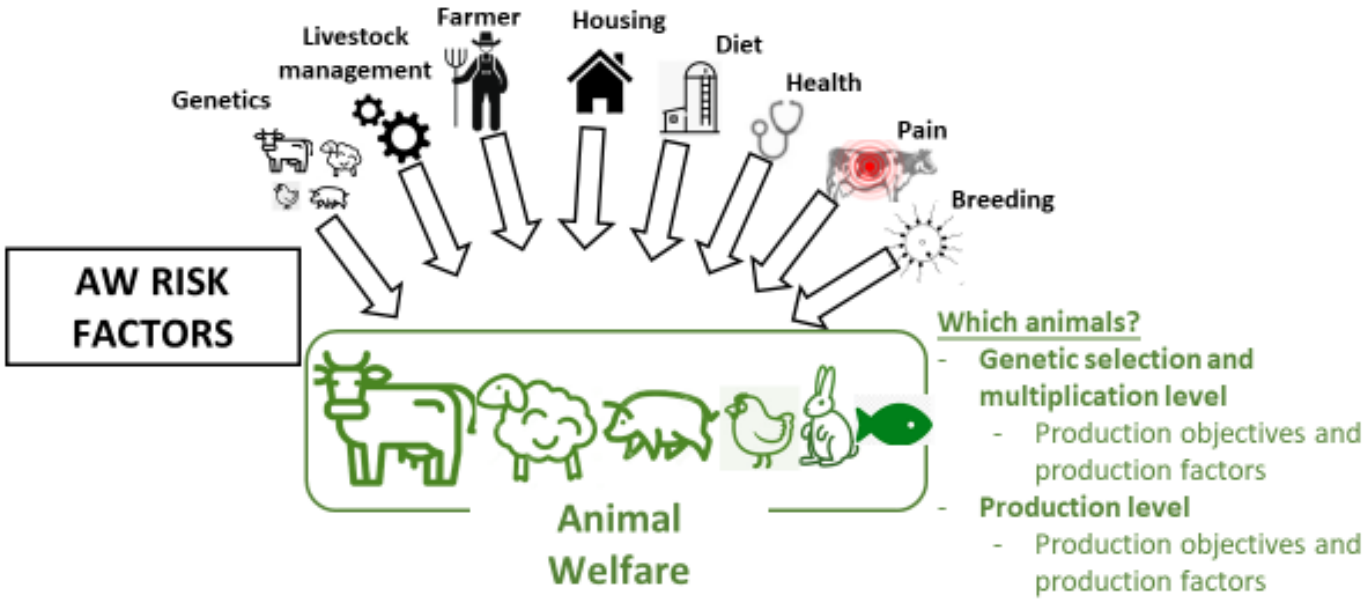

Figure 4: Eight risk factors threatening AW in livestock farming were identified in order to create an AW labelling reference framework that takes account of all the animals in a given sector and the three stages of an animal's life

This analysis led the experts to identify the direction of the actions designed to exclude or avoid any risk to AW for each factor concerned. This is summarised in Table 1 below. The assurance that the AW assessment protocol meets the requirements summarised in Table 1 is achieved through assessment measures that apply to all animals in the sector (both levels), including those not yet in production.

Table 1: Guideline corresponding to each risk factor to be taken into account in an AW labelling reference framework

Risk factor	Guideline
Genetics	The reference framework should strive to verify the direction of the sector's breeding programmes: – towards abandoning hypertypes and the hyperspecialisation of selection procedures; – towards greater robustness/resilience and healthier animals in situations where resources are limited (in quantity and quality).
Livestock management	The reference framework should assess whether livestock management systems: – ensure the establishment and maintenance of strong bonds and dominance-submission relationships between individuals, mainly by avoiding re-grouping animals too often or keeping them at too high a density, given the social/gregarious nature of farmed species; – guarantee access to resources and space for all animals, which has a more beneficial effect on subordinate animals; – value the animals' longevity; – take account of animals considered to be of lesser economic value, giving them the same attention as those viewed as economically viable.
Farmer	The reference framework should assess whether the animals: – are monitored (in zootechnical and health terms) on a daily basis and for a sufficient period of time, including by farmers using precision farming tools; – benefit from frequent, positive interactions with the farmer.

	The reference framework should assess whether farmers and other people in contact with the animals on the farm have received training in animal behaviour, welfare and health.
Housing	The reference framework should assess whether the accommodation: – provides optimal environmental and hygiene conditions for the animals at each physiological stage; – is large enough to allow the animals to express their behavioural repertoire, with ergonomic floors, walls and equipment that pose no risk of injury; – provides the animals with temporary, regular access to an exercise area, where appropriate; – allows access to the outdoors, where appropriate, while ensuring that the animals can meet their feeding and watering needs and have natural/artificial shelter; – is subject to optimal internal and external biosafety rules; – includes physical and occupational enrichment tailored to the species and physiological stage of the animals.
Diet	The reference framework should take account of the fact that: – feed is available, easily accessible, balanced and healthy, and suited to the species and age of the animals; – water is constantly and optimally available, and of acceptable physico-chemical and bacteriological quality; – each animal can satisfy its behavioural needs linked to the feeding activity; for example, grazing (ruminants and rabbits), foraging (pigs) or pecking/scratching (poultry).
Health	The assessment of the reference framework should focus on: – the implementation of good farming practices and conditions, combined with the existence of and compliance with preventive (biosafety, vaccination) or curative protocols drawn up in advance and regularly updated (compulsory biennial health visit, farm health assessment, treatment protocol) to ensure, if not the total absence of disease, the preservation of good health and rapid recovery of the animals; – very regular monitoring of farmed animals (individuals or batches, depending on the sector) and rapid and appropriate treatment of any sick or injured animal, regardless of its economic value; – the obligation to provide care in order to avoid neglect or unsuitable care; – emergency killing, when unavoidable, requiring a precise ethical and regulatory framework and compliance with good practices tailored to each species.
Pain	The reference framework should ensure that: – stressful and/or painful practices are eliminated as far as possible or at least replaced by less invasive practices; – farming practices are controlled so as not to become stressful or painful; – pain deemed unavoidable is treated with appropriate medication.
Breeding	The main risk factors that the reference framework should take into account for breeding are: – the establishment of selected, overstretched populations leading to their early culling; – particular housing conditions: confinement, isolation and early separation of young; – particular handling of animals (AI, directed breeding, collection of gametes), and certain treatments applied to synchronise reproduction among the farm's animals.

Transport	The main risk factors that the reference framework should take into account for transport and slaughter are: – fitness of animals for transport; – waiting and reception conditions for animals on departure and arrival; – loading and unloading conditions: mix of unfamiliar animals, inappropriate handling methods and equipment, inexperienced/untrained handlers, loading density; – transport duration; – structural deficiencies in vehicles and facilities, poor driving and road conditions, unfavourable (for the animals) microclimate and environmental conditions.
Slaughter	The reference framework should take account of: – planning of operations and organisation of premises; – qualifications and skills of operators (including an Animal Welfare Officer); – quality and functionality of equipment and its correct use by operators. The two main points requiring attention are the effectiveness of animal stunning and monitoring their loss of consciousness and life.

3.3.2.Indicators and aggregation process for assessing AW with a view to labelling

The risk factors are analysed to identify situations that may have an adverse effect on AW. AW is individual (for one animal) and multi-aspect. Six aspects were defined: genetics, diet, environment, health, behavioural interactions and mental state. Each AW aspect has its own criteria (directly linked to the risk factors identified above), which are associated with indicators that can be measured to assign a value. These indicators must be scientifically validated according to the procedures defined in the protocol. Because AW is individual, an overall assessment of AW at the level of the animals on a farm or in a sector requires both the data collected individually and the scores obtained for each indicator to be combined. This is the aggregation process. The labelling reference framework defines and describes all the choices made by the stakeholders and scientists who drafted it. It includes, among other chapters, the AW assessment protocol based on the use of indicators to assess the level of AW during the various stages of the animals' lives, the process for aggregating the indicator measurements obtained, the system for ranking the overall value obtained, etc. leading to a **label expressing the overall AW score**.

The general principles of the AW assessment and then of the necessary aggregation of the corresponding measurements, at the level of animals on the farm or in the sector, require the following to be defined:

- the notion of indicator;
- the methods for validating the indicators;
- a description of the indicators to be measured for the AW labelling reference framework;
- the main aggregation principles for a multi-criteria assessment, leading to an overall AW score.

- **Notion of indicator**

Two main categories of indicators can be used in AW assessment:

- resource-based measures (RBMs), which assess the living conditions provided for the animals, the farming practices and the care given to the animals. These indicators are quick and easy for the assessor to use. For example, the available space per animal can simply be calculated by dividing the total surface area or volume by the number of animals. For a very long time, therefore, these indicators were preferred and are still widely used, whether in standards for specifications, regulations or recommendations to farmers for improving AW on their holdings. However, they are unable to assess the way in which the animal interacts with its environment, or whether this environment, in principle regarded as satisfactory, actually meets its needs and expectations. Objectively, therefore, they mainly assess humane treatment or animal protection (see ANSES's 2018 Opinion)[13].
- animal-based measures (ABMs), which directly assess the animal's welfare status. They correspond to an assessment of the result rather than the means: is the animal's welfare satisfactory under the conditions it is provided with? With ABMs, it is really the animal's welfare that is assessed, not the human perception of it. Although a rearing method corresponds to an AW potential, it must be validated using the animal-based measures. This approach corresponds to the definition of welfare, which must be understood as a reality experienced by sentient and conscious living beings in their constantly individualised relationship with their living environment, and an intuitionist ethical approach based on the concept of the animal's integrity.

Both types of indicators can be measured at the level of the individual, or the farm. They are complementary and not redundant in terms of welfare. **ABM indicators should always be given priority.**

- **Methods for validating the indicators**

To be scientifically validated, welfare indicators – whether ABMs or RBMs – must comply with six properties defined in the accompanying report: sensitivity, specificity, precision (repeatability and reproducibility), stability over time and feasibility.

- **Description of the indicators to be measured for an AW labelling reference framework**

The welfare of an individual corresponds to its perceived quality of life. To ensure a comprehensive approach, it is essential to define the indicators on the basis of a categorisation by AW aspect. The WG experts' proposed categorisation is based on risk factors. Each aspect must be assessed independently of the others. A total of six AW aspects are presented below for the three stages of an animal's life (rearing, transport and slaughter), whether it concerns an animal at the selection-multiplication level or at the production level (see Figure 5). Each aspect includes one or more AW criteria to be assessed. For this multi-criteria approach, 14 AW criteria were identified: integrity, feeding, watering, bedding, atmosphere, movement and displacement, environmental/social/occupational enrichment, injury, disease, pain, interactions with congeners, interactions with the environment, interactions with humans, and mental state. Each criterion is assessed by measuring at least one indicator, an ABM if possible.

[13] https://www.anses.fr/fr/system/files/SABA2016SA0288.pdf

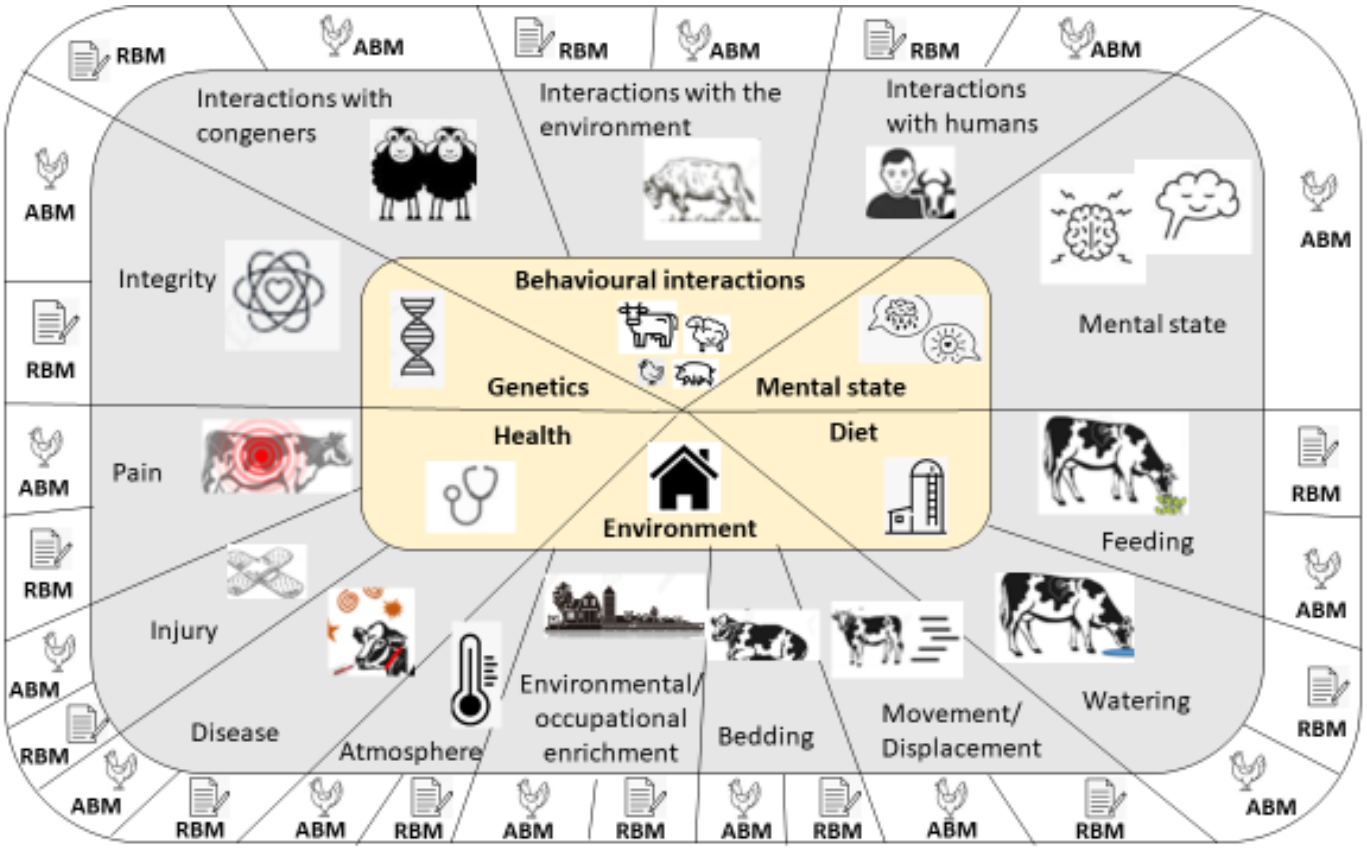

Figure 5: For the rearing stage, six AW aspects (in yellow) should be assessed by 14 criteria (in grey) associated with the ABM and RBM indicators measured

For the AW assessment protocol, the experts propose ABM and RBM indicators for each stage of the animals' lives, corresponding to the criteria in each AW aspect. The example of the rearing stage is shown in Table 2 of Annex 1. The AW assessment of the other two life stages (transport and slaughter) is covered in specific chapters in the report attached to this opinion, which detail the appropriate and necessary ABM and RBM indicators.

The list of indicators presented for each criterion is not exhaustive, and a choice can be made from among those presented, depending in particular on the sector in question. Consequently, it is not systematically necessary to assess all the indicators in order to assign a score to an aspect. The choice of indicators, made when drawing up or amending the assessment protocol, should always give priority to ABMs. This choice of indicators, selected by the scientists and stakeholders who draw up the assessment protocol and adapted to the animal category concerned and the life stage being assessed, must also be presented and justified in the labelling reference framework.

- **Aggregation principles for the AW assessment of a group of animals using a multi-criteria assessment protocol**

The scores in the six aspects obtained for each life stage of the farm's animals are then used to classify the farm according to an AW level. By describing the entire process, this transparent approach also shows that establishment of an AW labelling reference framework comprises several components, including aggregation and the formalisation of reasoning. The experts referred to the multi-criteria assessment model developed by the Welfare Quality® project:

- the data from measurements of indicators relating to the same criterion are interpreted and summarised to produce a score for the criterion in question, indicating the farm's degree of compliance with that specific criterion. The way in which scores are calculated varies according to the number of measurements, the scale on which the data are collected and the relative importance of the indicators for this criterion (notion of score weighting);
- the criteria taken into account for a given aspect are aggregated to calculate the scores for each aspect;
- the assessment score for each of the six aspects is independent of the other aspects: there can be no offsetting of scores between aspects.

The scale of the system being assessed should be specified: the individual animal, all the animals on the farm, or even the entire farm with all its activities. The number of successive aggregation steps will depend on this. Similarly, the interval between successive assessments should be defined: one-off assessment or at a frequency tailored to the animal's life cycle. Scores should be aggregated in a way that gives as accurate a picture as possible of the welfare of all the animals on the farm, while striving to lose as little as possible of the information gathered at individual level. The average situation of the animals at the farm level should not divert attention from substandard criteria or animals with a poor welfare score. A good understanding of the aggregation principles is fundamental because the choice of aggregation processes will determine the final score, while the formalisation of the processes guarantees the traceability and therefore transparency of the process of establishing the AW labelling reference framework.

In the context of AW labelling, and in order to reflect the varied situations on farms, a high number of levels are needed to qualify the final result (at least four: low/normal/good/excellent).

The aggregation process begins with individual measurements of the animals on the farm and ends with an AW score for all the animals. It comprises five steps (see Figure 6), which involve (i) combining the data collected individually to obtain an AW score for the farm's animals for each indicator, (ii) combining the scores for indicators defining the same criterion, (iii) combining the scores for criteria defining each aspect, bearing in mind that each aspect must be checked independently of the others, then (iv) combining the aspects to obtain an AW score for the farm for a life stage and, lastly, (v) aggregating the scores obtained for each of the three life stages to obtain an overall score for the animals at the level assessed.

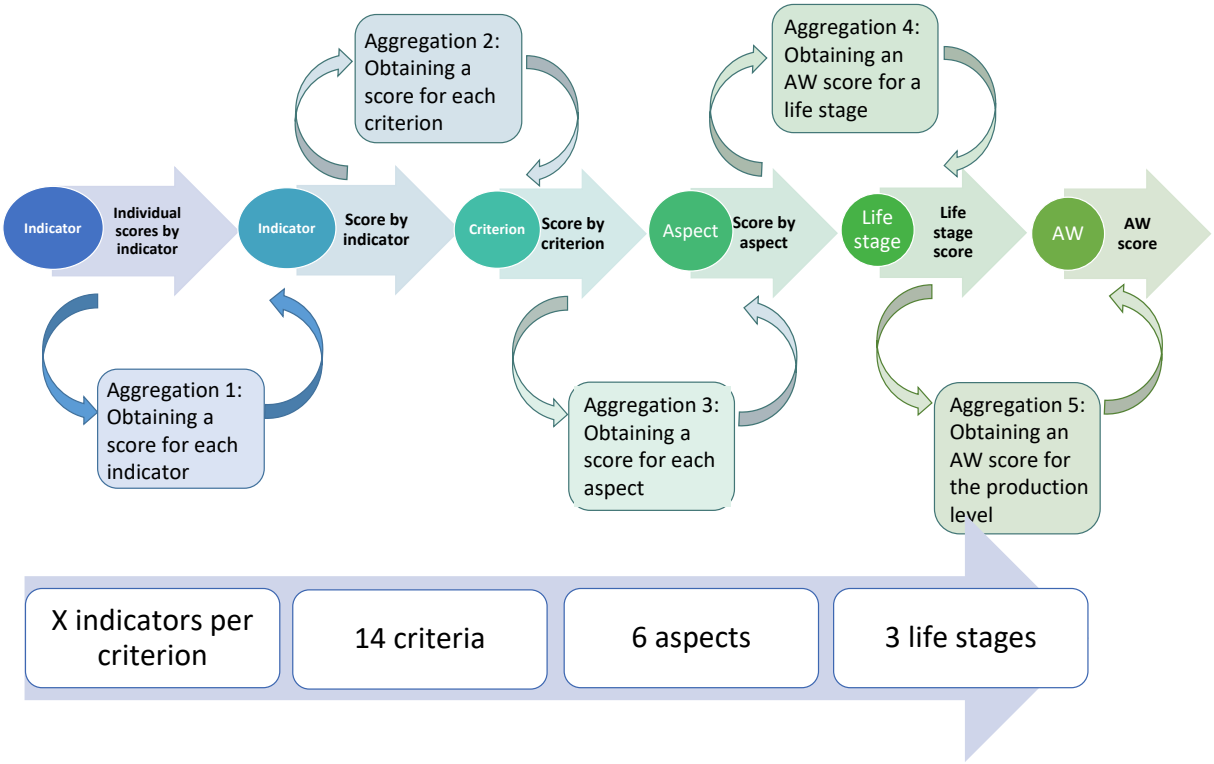

Figure 6: Aggregation principles for the AW assessment of the three life stages of a given farm. The number of indicators taken into account for each criterion is decided by the scientists and stakeholders who drew up the assessment protocol

3.3.3. Obtaining an overall AW score by aggregating the scores obtained for the selection-multiplication and production levels

The final aggregation process involves combining the two AW scores obtained separately on farms at the selection-multiplication and production levels.

Certain particularities related to how the selection-multiplication level is organised may prevent an assessment as exhaustive as the one conducted for animals at the production level. For example, trade in semen takes place at an international level and it is impossible to assess animals that cannot be visited and observed in France. The accessibility of information is a constraint for the AW assessment of animals at this stage. At present, two issues of lack of information sometimes prevent the assessment protocol from being completed:

- in France, selection-multiplication farms are rarely visited due to:
  - their specific nature: they are subject to confidentiality and business secrecy because of the stakes in terms of industrial property;
  - their closed nature, with the application of reinforced biosafety measures due to the health risk to animals that are important assets with a very high economic value;
- internationally: for reasons of genetic diversity or corporate strategy, the selection-multiplication farms from which the production level farms are likely to be supplied are not all located in France or Europe.

Greater transparency, with wider access to this information, should in the future help compensate for the current lack of data. Contractual rules on the AW of animals not located in

France or the EU could be a way of achieving improvement. Operators should grasp this opportunity for progress.

Nevertheless, traceability and the ability to document a product's history are the foundation of any quality certification system. The labelling of a process is a reflection of this history. An AW label should include a minimum amount of information on the welfare of the animals at the selection-multiplication level. The labelling reference framework should therefore specify this minimum level of information to be obtained (for the selection-multiplication level) in order to classify the farm being assessed.

The labelling reference framework established by the scientists and stakeholders should describe how both types of information are to be taken into account and combined. The AW score obtained at the selection-multiplication level may lead to an increase or decrease in the AW score for the production level. In order to aggregate the AW scores obtained for the animals at these two levels, the authors of the reference framework will need to observe the following two points:

- obtaining an AW assessment score for the selection-multiplication level means collecting the information for this assessment on the basis of the protocol described;
- the two highest levels of the ranking system (A and B) should incorporate information from the selection-multiplication level in a significant and discriminating way. They are the hallmarks of an ameliorative approach. If there is not enough information to obtain an AW score for the selection-multiplication level, the overall score cannot be either of the top two levels of the ranking system, which represent the best AW. These two "green" levels indicate a form of positive claim, suggesting overall a continuous improvement approach overall. This claim would be unfounded or even misleading if there were no AW information for animals at the selection-multiplication level.

Because of the considerable differences in the way animal production sectors are organised, the same aggregation approach cannot be used for all sectors. A prospective debate is also needed to determine whether it will be possible to obtain the same level of information for both levels of every production sector.

3.3.4. Ranking of the overall AW score obtained for the animals on a farm in a five-level system

The choice of a five-level ranking system for the overall AW score (see Figure 7) is justified by:

– the opportunities offered by each level for producers to progress (improvement gradients);
– the goal of providing consumers with information that is reliable, easy to understand and measurable.

The stakeholders and scientists responsible for drawing up the labelling reference framework should propose and define the rules adopted for classifying the overall AW score in one of the five levels, and for moving from one level to another in the system.

Whenever the assessment protocol is used, and for each new overall AW score obtained, the farm's ranking in the system should be reassessed.

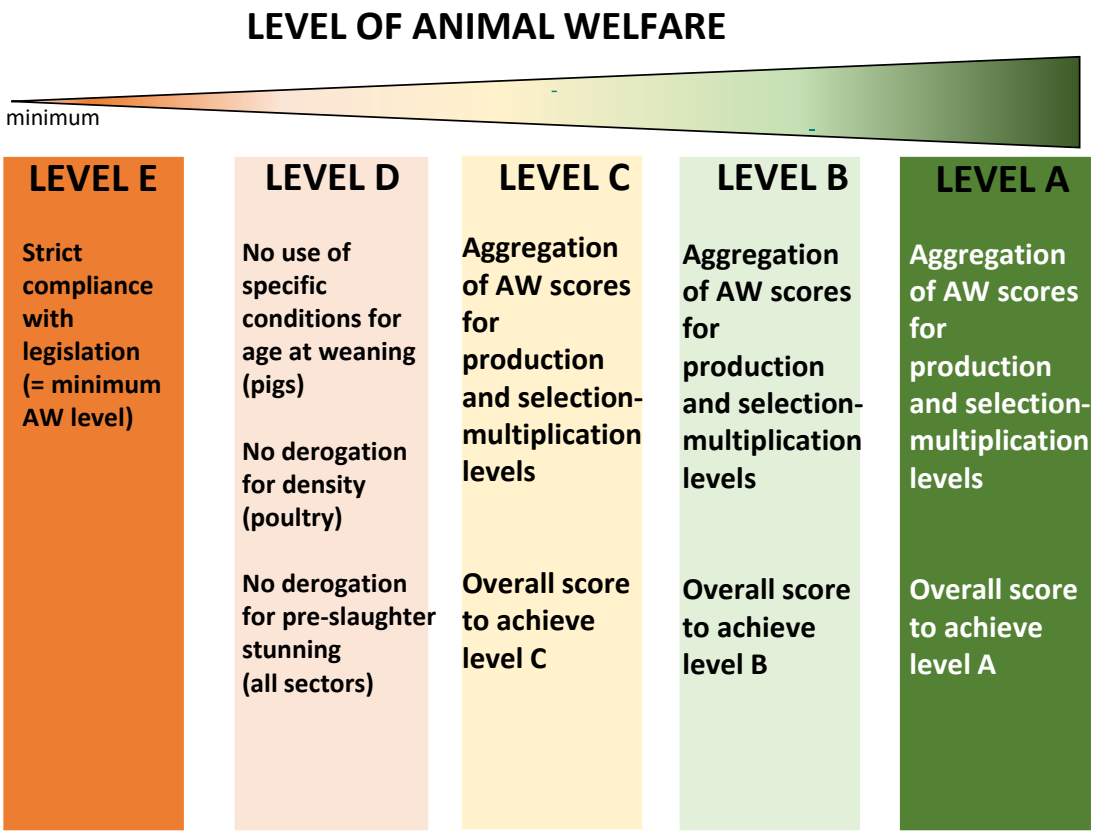

Figure 7: the labelling reference framework proposed by the experts has five levels of AW (five levels for compulsory application and four – from level D – for voluntary application). The division into five levels ensures that it is progressive

Specific consumer information on AW is subject to a national and European legal framework. If application of the label is compulsory, the lowest level of the reference framework (E) should correspond to strict compliance with the legislation. If application is voluntary, the lowest level should propose regulatory improvement measures in light of current legislation. Therefore, in the case of labelling that is:

- compulsory: the experts propose a five-level reference framework, the lowest level of which (E) corresponds to strict application of the legislative and regulatory provisions relating to AW (see Figure 7);
- voluntary: the experts propose a four-level reference framework; the lowest level of which (D) proposes application of the legislation without any possible derogations or specific conditions[14], as an ameliorative approach (see Figure 7).

[14] Level D of the reference framework excludes the use of three derogations with major consequences for AW:
Derogation from Regulation 1099/2009 on the protection of animals at the time of killing: Derogation from stunning in case of religious slaughter taking place in slaughterhouses was granted by Directive 93/119/EC. (...) it is important that derogation from stunning animals prior to slaughter should be maintained, leaving, however, a certain level of subsidiarity to each Member State. As a consequence, this Regulation respects the freedom of religion and the right to manifest religion or belief in worship, teaching, practice and observance, as enshrined in Article 10 of the Charter of Fundamental Rights of the European Union.
Directive 2008/120/EC laying down minimum standards for the protection of pigs. Annex I, Chapter II, point C: No piglets shall be weaned from the sow at less than 28 days of age unless the welfare or health of the dam or the piglet would otherwise be adversely affected. However, piglets may be weaned up to seven days earlier if they are moved into specialised housings which are emptied and thoroughly cleaned and disinfected before the introduction of a new group and which are separated from housings where sows are kept, in order to minimise the transmission of diseases to the piglets.
Council Directive 2007/43/EC laying down minimum rules for the protection of chickens kept for meat production: Article 3: Requirements for the keeping of chickens, paragraph 2. Member States shall ensure that the maximum stocking density in a holding or a house of a holding

The AW label should display only information on the overall result from the AW assessment of the two levels of selection-multiplication and production.

3.4. Checks and developments

Whether it concerns self-checks or checks by an authorised third party, the control plan describes the actions (measures, inspections, quality checks or monitoring of parameters) required at each step of the process to enable AW labelling. For each production sector (or animal category), the control plan defines the frequency with which checks are carried out at the various steps of the production process (from selection to slaughter) and the procedures for managing non-compliance. At the very least, an annual check should be carried out and penalties or incentives should be planned in the event of non-compliance. Resources should be allocated to the authorities tasked with these checks, whether labelling is voluntary or compulsory.

The reference framework should be able to evolve in line with progress in farming practices, and according to the areas for improvement in all sectors and advances in scientific knowledge. A prospective debate is needed to determine whether it will be possible to obtain the same level of information for both levels of a production sector.

4. AGENCY CONCLUSIONS AND RECOMMENDATIONS

Given the growing interest among European citizens in animal welfare and AW labelling on foodstuffs of animal origin, as well as the EC's Farm to Fork Strategy, which provides for a revision of legislation on AW and the possibility of AW labelling, the French Agency for Food, Environmental and Occupational Health & Safety issued an internal request. In view of the proliferation of labels making claims about AW, the Agency deemed it necessary to formalise the scientific foundation on which a labelling reference framework and the associated AW assessment protocol should be based.

A number of decisive points were highlighted by the expert appraisal of this internal request:

- the foodstuffs of animal origin concerned by labelling are derived from animals belonging mainly to the production level of the sector concerned and, to a lesser extent, to the selection-multiplication level. These two levels are linked and should be subject to the same assessment protocol, ultimately leading to an overall AW score. Until now, few or no AW labelling reference frameworks have taken account of animals at the selection-multiplication level, even though they are subject to particular rearing conditions;
- obtaining an overall AW score is achieved by measuring indicators on the animals concerned or their environment. The indicators to be used are selected and described in the AW assessment protocol. Measurements taken on animals (ABMs) **should be given priority consideration**, as they provide information on AW and not on the human perception of it. This approach corresponds to the definition of animal welfare. Indicators based on the environment can only be used to assess humane treatment or animal protection;

does not at any time exceed 33 kg/m2. Paragraph 3. By way of derogation from paragraph 2, Member States may provide that chickens be kept at a higher stocking density provided that the owner or keeper complies with the requirements set out in Annex II, in addition to the requirements set out in Annex I.

- indicating the rearing method on a label cannot be regarded as AW labelling. Although the rearing method corresponds to an AW potential, it must be validated by animal-based AW indicators;
- the ranking system for the overall AW score must be multi-level (with five levels), as proposed by the experts, in order to reflect the varied situations of farms and allow the system to be progressive, but also to provide consumers with information that is reliable, easy to understand and able to be ranked;
- the lowest level of the ranking system covers situations that depend on how the labelling is to be applied. If it is compulsory, the minimum AW level is defined by strict application of the legislation. If it is voluntary, the minimum AW level of the ranking system should propose measures to improve on this strict application of the legislation. The Agency proposes that, in the event of voluntary application, these ameliorative actions exclude application of the derogations offered by AW legislation;
- these guidelines are intended for **scientists and stakeholders planning to establish a labelling reference framework** including one or more AW assessment protocols for a given animal sector or category, with a view to labelling;
- a labelling reference framework comprises various parts for which transparency and accessibility are expected, in particular a description of the players responsible for jointly establishing it, the category of animals concerned, the risk factors, how the assessment protocol was drawn up and the choice of measurement indicators, the multi-step aggregation process, the final aggregation between the two levels (selection-multiplication and production) and the ranking process in the multi-level system.

The French Agency for Food, Environmental and Occupational Health & Safety recommends the use of these scientific guidelines for any label indicating an AW claim and based on a labelling reference framework including an AW assessment protocol.

The Agency recommends and encourages the prospective studies needed to obtain the same level of information for both levels of every production sector.

Pr Benoît Vallet

KEY WORDS

Bien-être des animaux ; étiquetage ; étiquette ; label ; labellisation ; animaux de production ; produits animaux de consommation ; volailles ; porcs ; ruminants ; poissons ; lapins

Animal welfare; label; labelling; livestock; animal meat products; poultry; pigs; ruminants; fish; rabbits

SUGGESTED CITATION

ANSES. (2022). Guidelines for the establishment of an animal welfare labelling reference framework. (Internal Request 2021-AUTO-0161). Maisons-Alfort: ANSES, 27 p.

ANNEX 1

For the AW assessment protocol of a labelling reference framework, the WG experts proposed ABMs (indicators recorded on the animal) and RBMs (indicators recorded in the animal's environment) for measuring AW. Table 2 below shows the experts' proposals for the "rearing" life stage of animals, for each of the 14 criteria of the six aspects of AW.

Table 2: Description of measurable ABM and RBM indicators for assessing the 14 criteria of the six AW aspects for the rearing life stage

Aspect	Criterion	ABM: animal-based measures	RBM: resource-based measures
1 GENETICS	Integrity	Functional integrity: – a production level (growth, milk, eggs) that does not compromise AW; – a natural reproduction rate (turkeys); – facility in calving (cattle); – pre-weaning mortality (pigs); – osteoarticular disorders (poultry).	Weighting of different criteria in programme selection indexes
		Longevity on the farm: average age at culling	Use of dual-purpose lines (egg-laying and broiler, or mixed breeds in the ruminant sector)
		Value all animals born (male chicks from the egg-laying sector, male kids from the goat sector, surplus rabbits): rate of animals eliminated...	*In-ovo* sexing, early sexing[15], gamete sexing[16]
2 DIET	Feeding	Body condition score (BCS) (for the species concerned)	Feeding plan: type, quantity, quality, frequency of distribution
		Solid consumption curves	Number and accessibility of feeding points
		Motivation to feed	
		Performance curves	
		Non-specific hunger indicators (e.g. vocalisation, aggressiveness, agitation, cannibalism)	
	Watering	Motivation to drink	Number, accessibility, flow rate and cleanliness of watering points
		Fluid consumption curves	Water meters

[15] Early sexing consists in eliminating individuals of one sex after birth. This practice should be prohibited.
[16] Gamete sexing aims to determine the sex of the future individual before fertilisation. This practice may pose ethical problems.

Aspect	Criterion	ABM: animal-based measures	RBM: resource-based measures
3 ENVIRONMENT	Bedding	Use of lying area: occupancy rates and times for different areas	Type of housing: individual or collective, cages, tethering, surface area and volume tailored to the type of animal and its physiological stage
		Ease in lying down: movements and postures	Number of bedding places/lying area available per animal
		Use of the available volume in the pond (fish), herd aggregation rate	Floor: type (slatted, wire mesh, solid floor, litter), condition, quantity, quality
		Localised skin damage (shoulder, tarsus, knee, back) and cleanliness of the animals' legs, flanks and udders	
	Atmos-phere	Sneezing, coughing (irritation due to the quality of the litter and ambient air)	Environmental parameters: temperature, hygrometry, ventilation, light, noise, gases, dust, hydrology (temperature and oxygen) and hydrodynamics (for fish)
		Distribution in the pen (thermal comfort): animals packed together (hypothermia) versus spread out (hyperthermia); uniformity of water quality (fish)	Heat lamps for the young and bedding/insulating mats
	Movement and displacement	Musculoskeletal injuries (including lameness, fin integrity)	Indoors: floor quality and slipperiness of floor covering, presence of anything that could cause injury, upkeep of equipment in contact with animals
		Use of space/volume: occupancy rates and times for different areas	Outdoor access (e.g. runs, pasture, winter gardens, poultry yards): surface area/volume available, accessibility (easy, continuous/limited access), quality (type of ground, plant cover), hydrodynamics of breeding ponds.
			Suitable farrowing crate/pen (e.g. ease of movement, interaction with young)
	Environ-mental/ occupa-tional enrichment	Use of proposed enrichment materials (sensory, physical, occupational)	Availability, renewal, adaptation and diversity of enrichment materials
			Presence and layout of a waiting area before leaving the farm

Aspect	Criterion	ABM: animal-based measures	RBM: resource-based measures
4 HEALTH	Injury	Lameness, body integrity and fin condition	Infirmary designed to meet the needs of the animals (e.g. location, partition, surface area, bedding, heat lamp)
		Skin damage caused by equipment (e.g. hair loss, oedema, lesions, scabs)	Presence of suitable equipment (e.g. for restraining and treating animals, trimming chute)
		Record of treatments administered: livestock health record	Ergonomic equipment (e.g. bedding, feeding, displacement)
		Reasons for slaughterhouse seizures: type of lesions and organs concerned	Humane end of life for the animal: euthanasia/non-delayed killing or emergency killing according to an existing protocol
		Food Chain Information (FCI) declaration	Inappropriate management of social groups: social instability, available surface area/volume per individual too limited
		Damage caused by congeners (e.g. tail biting, pecking, scratching, fin erosion): necroses, knocks and bruising, oedemas, lesions, scabs	
		Culling rates and causes	
		Morbidity and mortality rates	
	Disease	Record of treatments administered: livestock health record	Infirmary that meets the needs of the animals through its design (e.g. location, partition, surface area, volume) and the presence of appropriate equipment (e.g. bedding, heating lamp)
		Annual health report for the species concerned	Farmer's proactive approach to animal care (training and appropriate equipment)
		Farm health report indicators	Health register, farm plan, records of animal movements, compliance with internal and external biosafety rules
		Culling, morbidity and mortality rates according to cause. Antibiotic use indicator	Annual farm health report and updated treatment protocols (e.g. vaccination protocols, parasite management and antiparasitic treatments, identified diseases and authorised antibiotic treatments excluding clinical examination)

Aspect	Criterion	ABM: animal-based measures	RBM: resource-based measures
		Condition of skin appendages: hair/feathers/scales	Presence of identified pathogens, archiving of laboratory or necropsy results
		Physiological parameters: body temperature, heart/respiratory/ruminal rate, colour of mucous membranes and gills	Environmental parameters: temperature, humidity, ventilation, light, noise, gases, dust, hydrology and hydrodynamics (fish)
		Clinical signs of respiratory system disorders (e.g. coughing, polypnoea and dyspnoea)	Compliance with animal housing criteria
		Clinical signs of digestive tract disorders (e.g. diarrhoea)	Feed quality and storage methods
		Cleanliness of hindquarters, condition of faeces	Feedback from the slaughterhouse to the farm and the attending veterinarian (this last point is still not effective, despite being compulsory)
		Clinical signs of genital tract disorders (e.g. vulval discharge, presence of discharge on the floor)	Account taken of pain associated with the disease and the prognosis, humane end of life for the animal
		Clinical signs of mammary disorders (e.g. clinical or sub-clinical mastitis, lumps in the milk), individual somatic cell count in milk	
		Rate of clinical mastitis, somatic cell count in tank milk, milk quality parameters	
		Clinical signs of musculoskeletal disorders (e.g. lameness of any origin, whether traumatic, infectious or degenerative)	
		Systemic disorders (e.g. septicaemia, severe puerperal infection, peritonitis, generalised omphalophlebitis, etc.)	
		Behavioural signs: social isolation, hyperactivity/apathy, impaired rhythm of activity and use of space, posture indicating discomfort	
		Reasons for slaughterhouse seizures: type of lesions and organs concerned	
		Food Chain Information (FCI) declaration	
	Pain	Behavioural and clinical signs: – anorexia, – social isolation, – hyperactivity/apathy, – impaired rhythm of activity and use of space, pain-relieving posture,	Infirmary that meets the needs of the animals through its design (e.g. location, partition, surface area, volume) and the presence of appropriate equipment (e.g. bedding, heating lamp)

Aspect	Criterion	ABM: animal-based measures	RBM: resource-based measures
		– self-directed behaviour (e.g. kicking in the stomach, self-licking, severe pruritus, rubbing), facial expressions of pain, – whimpering, groaning/complaining, teeth grinding (bruxism), – excessive sweating, – defensive behaviour (e.g. kicking), – increased respiratory rate.	
		Record of treatments administered: livestock health record	Protocols in place and followed for pain management during: – sickness (e.g. mastitis, abscess, pneumonia, etc.); – painful procedures carried out by the farmer (e.g. castration of piglets, disbudding, curative trimming, etc.); – veterinary procedures that cause pain (e.g. caesarean section, castration, amputation, etc.).
		Paraclinical or analytical indicators (e.g. inflammation markers, etc.)	Humane end of life for animals

Aspect	Criterion		ABM: animal-based measures	RBM: resource-based measures
5 BEHAVIOURAL INTERACTIONS	Interactions with the environment	**Positive affect**	Exploratory behaviour	Practice/equipment enabling the animal to act/control, predict/anticipate the environment
			Positive anticipatory behaviour	
			Individual play behaviour/interaction with the substrate, general enrichment	
			Self-grooming behaviour	
		Negative affect	Stereotypies	
			Anticipatory/frustration behaviour	
	Interactions with congeners	**Positive affect**	Grooming and other positive social interactions (e.g. licking, proximity)	Practice/equipment enabling the animal to act/control (seek/avoid), predict/anticipate interactions with its congeners
			Mother-young relationships	Practice/equipment linked to group management (e.g. cubicles, feed fences)
			Social play (behaviour and vocalisation)	Measures taken to maintain mother-young relationships
		Negative affect	Agonistic behaviour	Group management: appropriate group size and composition, limiting how often animals are re-grouped
			Lesions	
			Cannibalism (e.g. tail biting, pecking)	
			Melanisation (specific pigmentation of fish)	
	Interactions with humans	**Positive affect**	Positive interaction (acceptance/seeking contact with a human being)	Practice/equipment enabling the animal to act/control (seek/avoid), predict/anticipate interactions with humans
			Approach (approach time, approach distance)	Relational practice/equipment for managing the human-animal bond
			Play behaviour	
		Negative affect	Aggressive/threatening behaviour	
			Prostration/immobilisation (defecation)	
			Evasion/avoidance	

Aspect	Criterion		ABM: animal-based measures	RBM: resource-based measures
6 MENTAL STATE	The animal's mental state	Positive/ negative affect	Facial expressions (postures/movements of ears or feathers, skin pigmentation, etc.)	
			Various attitudes/body postures (e.g. position of tail/ears/head/legs/back)	
			Vocalisations (acoustic characteristics)	
		Positive affect	Exploratory behaviour	
			Play behaviour	
			"Normal" behaviour (with regard to the reference behavioural repertoire)	
			Seeking intra- and inter-species contact	
		Negative affect	Depressive/prostrate or hyperactive behaviour	
			Animal isolated from the group	
			Various stereotypies	