

Welfare Quality and AWIN welfare assessment protocols for ruminants

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Accepted definitions of animal welfare are based on a multidimensional concept, defined as a state of complete mental and physical health where the animal is in harmony with its environment.

Sustainability, animal welfare and environmental concerns have increased consumers' interest in knowing how, where and by whom food is produced and handled from "farm to fork". Even if farmers do not agree, food animal production will be unsustainable if this demand is not addressed (as the saying goes – the customer is always right).

In response to this demand assurance schemes and welfare legislation have multiplied all over the world in order to guarantee high quality animal products, in terms of health, safety and respect for animal welfare. Thus, animal welfare assessment should be considered one of the pillars of productive, efficient and sustainable production systems. In this paper we will go through the process of building welfare assessment protocols, and will discuss the different options and the most common constraints.

Different ways of assessing animal welfare

Because animal welfare is not limited to one feature or component, assessment requires a multidimensional approach corresponding to a multi-criteria evaluation. To develop a practical tool that delivers an overall view of welfare, different specific indicators need to be integrated and tested as prototypes. The final result is an assessment protocol or an assessment system composed of sequential protocols.

Accordingly to Main, there are four categories of applications for animal welfare assessment systems: research, legislative requirements (non-voluntary), certification systems (voluntary) and advisory/management tools.¹

So assessment protocols can be used to monitor law compliance. In the EU animal welfare legislation has grown significantly in the last few decades. There are two main ways in which EU legislation regarding animal welfare is formulated. The first one is via the General Directorate for the Health and Consumer Protection (DG SANCO), a department of the European Commission. The DG SANCO scientific committee (a panel of experts working with the European Food Safety Authority – EFSA), delivers recommendations on how to ensure farm animals' welfare. These recommendations may be drafted into directives that are submitted to the Council of Ministers of the EU and are adopted as Directives if approved. The EU directives are then transposed into national laws in each EU country. For farmers and law regulators it is crucial to have a tool that allows for quick and efficient appraisal of the welfare situation.

The other way in which legislation might arise is via specific initiatives that are formulated by institutions, such as the Council of Europe, to which the EU is a signatory member. For example, the Council of Europe published the European Convention for the Protection of Animals kept for Farming Purposes, which was translated into an EU directive (Directive 98/58/EC) and that covers the minimum animal welfare standards

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The majority of legal documents being produced consider farm animal species together, not making differentiation between specific needs, and usually relying on minimal requirements. In the case of small ruminants, particularly goats, there is a lack of specific legislation. This can be identified as an opportunity for research projects, and may be one of the reasons for the AWIN project success.

The outcome of the protocols also aims to give a clear and immediate visual feedback to the welfare of the animals on the farm, highlighting positive conditions and enabling comparisons with a reference population. The benefits of welfare assessment protocols as a management tool in farming will be addressed in a different talk (see “Welfare and profitable farming” in these Proceedings).

Voluntary certification schemes are now very common in most European countries. These are generally steered by a NGO pursuing the improvement of animal life conditions in European farms. Voluntary schemes normally have requisites that surpass legislation. When complying with their rules producers are certified and this certification is used by retailers to attract consumers or at least a particular niche of their clients. In Portugal we are starting to see some effort to promote these schemes, but welfare is still very much seen as equivalent (and limited) to naturalness.

Consensual protocols are also useful for researchers carrying out studies on health, welfare or production issues, making it easier to compare their results with the results collected by other scientists.

As already said, during the last few decades several animal welfare monitoring systems have been developed in Europe, such as an ethical account in Denmark, systems based on minimum requirements, as Freedom Food farm assurance and food labelling scheme by RSPCA, index systems of welfare assessment, as ‘Animal Needs Index (ANI) 35 L’ and ‘ANI 200’, and an operational decision support system (relational database) established to assess the welfare state of pregnant sows. More recently, there has been a growing interest in measuring how resources truly affect the animals, with several protocols being developed, aiming to deliver a more holistic animal welfare assessment at farm level. Additionally, an on-farm assessment method that considers the fulfilment of dairy cattle needs as the fundamental principle for the evaluation of animal welfare status, and the animal-based welfare assessment protocols for dairy cattle, pigs and laying hens proposed by the University of Bristol, were created. All these systems are based on the logic of the ‘Five Freedoms’ first proposed by the Farm Animal Welfare Council, providing a comprehensive framework for assessing animal physical and mental welfare and being mostly focused on resource and management-based indicators (see other paper in these Proceedings).

However, it was in this last decade that two very large European projects brought some new light to the welfare issue. These projects studied and integrated welfare indicators to produce a pan-European, science-based and practical assessment protocols for ruminants: the Welfare Quality® project,² for both dairy and beef cattle, and the AWIN® project, for sheep and goats. These are presented in more detail.

In 2004 the Welfare Quality project set out to produce an integrated standardized methodology for the assessment of welfare in cattle, swine and poultry from farm to slaughter and to determine the way in which the measurements should best be integrated.² One of the first steps was to re-elaborated the concept of the traditional “Five Freedoms” and defined the four main areas of concern (“Welfare Principles”), that were then split into twelve criteria each of which corresponded to a key welfare dimension: 1) Good feeding (appropriate nutrition, absence of prolonged thirst); 2) Good housing

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(comfort around resting, thermal comfort, ease of movement); 3) Good health (absence of injuries, absence of disease, absence of pain and pain induced by management procedures); 4) Appropriate behaviour (expression of social behaviour, expression of other behaviours, good human-animal relationship, positive emotional state). It should be clear that because animal welfare is a multidimensional concept, all criteria are important, so the ability to exhibit appropriate behaviour does not compensate for poor health, and good health does not compensate for behavioural problems.³

The project started with the aim of re-thinking on-farm welfare assessment schemes so as to build them mainly around animal-based or out-put indicators (for definitions see other paper in these Proceedings). When a criterion was not satisfactorily addressed by an animal-based indicator, environment or management measures were used. It should be added that the indicators' integration method needs to be clear in the sense that it can be easily explained to stakeholders and is repeatable in a way users trust their results and are encouraged to improve animal welfare. Additionally, the method should be feasible to be able to be used routinely on large number of animal units.⁴

The WQ protocol (Welfare Quality, 2009) consists of thirty measures that assess a range of health and welfare indicators for the individual animals and for the herd as a whole (e.g. lameness, body condition score, integument alterations, dirtiness, flight distance). The sample size on each farm is selected according to established rules, being determined by herd size. Cows are first selected randomly and identified in the milking parlour. Several indicators are then collected at the milking parlour and the rest in the pen.

Criterion scores are calculated differently depending on the measures and combinations they are based on. They can be calculated through decision trees, weighted sums, or by comparing measures with alarm thresholds. The criterion result is expressed on a 0 to 100 value scale, in which 0 corresponds to the worst situation, 50 correspond to a neutral situation and 100 is the best situation. The final welfare score of a farm depends on the classification of all four principles. It is "Excellent" if it scores more than 55 on all principles and more than 80 on two of them; it is "Enhanced" if it scores more than 20 on all principles and more than 55 on two of them; "Acceptable" if three of the principles have a score higher than 20 and the other has more than ten – the welfare of animals meets minimal requirements. When the farm does not achieve any of the classifications mentioned above, the welfare is low, and the farm is "Not classified". To a better understanding of the welfare assessment and final score calculations, we suggest further reading at <http://www.welfarequality.net/network/45848/7/0/40>.

However, some problems usually arise when scoring farms with the WQ protocol. For example, the data collected is often expressed on ordinal scales, which limit the use of weighted sums to aggregate them. Also, as welfare measures may vary in precision, relevance and their relative contribution to an overall welfare assessment, aggregation procedures should be aware that principles may not be equally important. To complicate things further it is recognized that the weight assigning is not merely a technical process, but should also take into account ethical assumptions and societal concerns and values.⁵

One other major disadvantage of the Welfare Quality assessment protocol for dairy cattle, in which the majority of indicators is animal based, is the reduced feasibility. Because it can take about 4.4 to 7.7 h for herds of 25 to 200 cows, it may prove to be unrealistic to try and apply it to all farms in a region or country.² Possible solutions are presented below.

The AWIN protocols

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The AWIN - Animal Welfare Indicators was another European Commission financed project that involved 11 institutions from nine European countries, Brazil and EUA. It started in 2011 and ended in May 2015. The project title perfectly displays the main objectives: "Development, integration and dissemination of animal-based welfare indicators, including pain, in commercially important husbandry species, with special emphasis on small ruminants, equidae and turkeys". In the end four welfare assessment protocols were developed for the farm species not included in the Welfare Quality project. We will focus mainly on the ones for goats (intensive systems) and sheep (extensive systems).

Although Europe's goat population is relatively small (16.5 million corresponding to 1.6% of world goat population), it includes advanced programs for selection, processing and commercialization of goat milk, producing approximately 15% of the world's goat milk. Thus, dairy goat farming is of paramount importance to the economies of the Mediterranean countries, like, France, Greece, Italy, Portugal, and Spain. Most goats farms are based on extensive systems, but there is an important increase in very intensive systems for dairy goats and very little is known about the welfare problems of this population. Moreover, this is the system where concerns from consumers more frequently arise, so AWIN was tackling and anticipating future demand.

As we coordinated the studies leading to the protocol for lactating dairy goats in intensive or semi-intensive production systems, our presentation will focus mainly on the approach and the methodology followed for this specie.

As for the WQ work, animal-based indicators were preferred for inclusion in the AWIN protocols.⁶ The reasons for opting for animal based measures are presented in another paper in these proceedings. Nevertheless, some resource-based measures were also included when specific aspects were not covered by animals' derived indicators.

The starting point was to identify promising animal-based indicators that could be included in a practical welfare assessment protocol. This was done through a comprehensive review of the existing scientific literature.⁷ After drafting an initial list of over 50 relevant indicators, consensus on the indicators' validity and feasibility was reached in several meetings with experts and stakeholders. The purpose of involving the stakeholders was to increase the acceptability of the project outcomes through stimulation of a multidisciplinary dialogue, and to identify solutions for potential barriers found in the subsequent application of the protocols in farms.

The final accepted 21 indicators covered all criteria and principles suggested by WQ work and were integrated into a welfare assessment prototype that was tested for its overall feasibility in 60 goat farms located in Portugal and Italy.⁶ Twenty farms were visited by two trained assessors at the same time, in order to check inter-observer reliability, whereas 20 farms were revisited (first in winter and then in summer) by the same observer, in order to check intra-observer reliability. For this work specific interactive learning material was prepared and used to provide full training of the future assessors. Assessments began immediately after feed distribution following a strict order, to ensure a continuous flow of collection, reducing the disturbance for both animals and farmers, and to guarantee that the results of the behavioural observations were not influenced by animal handling or other sources of disruption. A checklist was used to ensure that all the observations were completed in a standard order, and the time needed to collect each indicator was recorded. Overall, the mean time necessary to execute group-level observations and individual assessments was approximately 87 ± 33 min (1h 27 min \pm 33 min), ranging from 43 min to 154 min. The number of animals per pen, the stocking densities and the animals' behaviour affected the time required to collect each welfare indicator. The fact that some assessments had to be carried out at a pre-

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determined time (after feeding distribution) reduced flexibility. Finally, a questionnaire was delivered to the farmer to gather data concerning environmental-based indicators.

After conducting this study it was decided to propose a stepwise strategy for on-farm welfare assessment, with a first level entailing a quick screening comprising only a selection of robust and feasible indicators that could be readily recorded – severe lameness, queuing at feeding or drinking, hair condition, presence of abscesses etc. Those farms not fulfilling pre-determined conditions are then taken to a second level that included a much more comprehensive assessment. Whenever there is a noncompliance with the current legislation, or the within-farm proportion of animals with no signs of the most important or prevalent welfare problems (abscesses, improper disbudding, poor hair coat condition, severe lameness, queuing at feeding, queuing at drinking) is lower than the proportion of animals observed in the worst 5% of the farms of the reference population, the second level assessment is applied.⁶

This second level consists of a broader and detailed assessment that requires individual assessment (e.g. clinical examination...), but still trying to keep feasibility especially by ensuring that it is conducted in a reasonable amount of time. In this second level, 18 indicators are evaluated and, if more than one pen is present, additional pens should be evaluated.

After any of the assessments, the farmer is asked to fill in a questionnaire that will provide additional information and resource/management based indicators.

Our team also produced a specific app (AWINGoat, available on Google Play Store and App Store) for tablet or smartphone, in order to facilitate data collection and to provide a clear and immediate output. The AWINGoat app is the first tool developed to assess welfare of dairy goats on farm. It enables farmers, veterinarians and technicians to collect, store and download the indicators included in the "AWIN welfare assessment protocol for goats" (first level welfare assessment).

Although the sheep protocol is very similar in most ways (e.g. two-step approach) some important features arise from the fact that in Europe sheep are mainly farmed in extensive systems. Similarly to the goat protocol the first level welfare assessment of sheep should take place without the need to gather or handle the animals. Representative sub-groups of the different management types of ewes in the farm should be sampled. Assessment of each sub-group should take less than 40 minutes and includes the recording of animal based indicators (e.g. lameness, fleece cleanliness, social withdrawing, presence of stereotypies, flight distance from a familiar-human, stocking density and lamb mortality). Performance of the second level assessment is recommended when there is a noncompliance with current legislation or pre-determined conditions are not fulfilled. For the second step assessment a sample of animals should be selected by the assessor to be individually examined. Two assessors should be involved in this second stage and additional signs, such as lesions, discharges, BCS and tail length, should be sought.

Increasing feasibility

The two step approach described above is a good way to circumvent the reduced probability of applying very comprehensive, time-consuming and expensive protocols to all farms in a region. Another possible way is to identify umbrella indicators in regional or national databases (e.g. cattle births, deaths and movements), that may reflect the most important welfare problems. In Europe, animal and herd records have become more reliable and widespread since the Bovine Spongiform Encephalopathy crisis, and have shown to have the potential to be part of welfare monitoring systems. These

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indicators could be used to facilitate the identification of farms for which a complete welfare audit is necessary, reducing the number of farm visits needed for routine welfare assessments. This method could also allow for continuous and relatively inexpensive monitoring of farm animal welfare.

However, very few studies have proved this potential. In a study in Portugal we demonstrated that dairy farms with poor cow welfare could be identified using the national database.⁸ After applying the complete WQ protocol, dairy farms were classified as having poor, good or excellent welfare conditions. Fourteen million records from the national cattle database were then analysed to identify potential welfare indicators for cattle farms. Fifteen potential national welfare indicators were calculated based on these records, and the link between the results of the WQ evaluation and the national cattle database was made. From these potential national welfare indicators, two were significantly different between farms with good welfare and poor welfare: 'proportion of on-farm deaths' and 'female/male birth ratio' (suggesting poor record keeping). In Holland, de Vries used central welfare indicators to predict specific WQ measures (e.g. severely lame cows, avoidance distance, very lean cows). Overall, the best-performing prediction models were those using the indicators: access to at least 2 drinkers (resource based), percentage of very lean cows, cows lying outside the supposed lying area, and cows with vulvar discharge. In Sweden other studies used herd data to identify farms with poor or good welfare by grading them accordingly to their status for several animal-based indicators previously assessed.

It has also been suggested that abattoirs are ideal locations for a preliminary welfare assessment of production animals such as poultry and possibly sheep as most are slaughtered at abattoirs either as finished lambs or cull ewes. Llonch et al. suggest that data from abattoirs could provide benchmarks for welfare indicators at a national level, as well as demonstrating how these change over time.⁹

Applying protocols to other systems

All the protocols above are limited to one particular production system per specie. Alterations and adaptation have been tested for other production conditions.

Recently, EFSA developed a scientific opinion on the assessment of animal welfare in small scale low input dairy farming systems where animals are kept tied throughout the entire year or farms where animals are kept outside on pasture throughout the entire year or outside on pasture during the summer and inside during the winter. The on-farm data collection from, in total, 124 farms was conducted in four EU countries—Austria, France, Italy and Spain—which display a variety of farming systems.¹⁰

WQ cattle protocol was revised resulting in the removal of some indicators and the addition of others. For example, to obtain some animal-based information on resting comfort, the assessment of lying position (i.e. animals lying partly or completely outside the lying area) was retained for tie-stalls and a qualitative assessment of getting-up movements was added for cows at pasture. Moreover, age at culling reflecting longevity, as well as claw conditions and clinical mastitis, were added.

On average, the assessment of animal-based measures took in total about two hours, with clinical scoring of a sample of animals requiring the largest proportion of time. Variation between farms was high, specifically with regard to the herd size but also the housing and management features of individual farms. The average age at culling in low-input small farms was 89 months, the mean milk yield was 6,125 kg (with very high variation), 73% of the farms give less than 800 kg of concentrate/cow/year and 49 % of farms have more than 50 % of cows from indigenous breeds. Another interesting result was that there are more lean cows and more cows with bad claws in the category with less than 15 days on pasture.

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Although it was demonstrated that the WQ protocol (with adaptations) can be used in different systems it was concluded that some indicators are not easy to collect. For example, avoidance distance testing and clinical assessment is difficult and dangerous when animals are tied to the wall or too close one to another or if the feed bunk is too narrow. Data obtained from records is sometimes impossible to get in very small farms. Prevalence measures may also be difficult to interpret for small herd sizes (i.e. impact of single animals on prevalence at herd level).

Another two ongoing projects are looking at the usefulness and the modifications needed in the WQ and AWIN protocols, for ruminants with permanent access to pasture. One study is being conducted in the Azores Island as part of a project aiming called “Happy Cows”. The idea of the project is to certify farms where access to pasture and other welfare issues that consumers value, are guaranteed. This is a way to save milk producers from regions where competitiveness for low prices is almost impossible.

The AWIN protocol is at the moment being applied to small, family run ovine/caprine dairy mixed herds. These farms generally use mountain natural pastures with very little supplementation. Several changes were introduced to the original protocol – e.g. queuing at the feed trough was removed – but in general it was concluded that a modified protocol is acceptable and useful. These farms are most times cheese producing units, and consumers will gladly pay more to guarantee health and welfare conditions.

Finally a word on one other very important outcome of the AWIN project – the Animal Welfare Hub. The Animal Welfare Science Hub is a website which hosts and shares animal welfare information worldwide to stakeholders and parties, allowing them to use and add to animal welfare knowledge in a network of excellence. More information on the subject is available at www.animalwelfarehub.com

In conclusion, welfare assessment protocols are useful tools for supervising, certifying and monitoring ruminants’ farms. Currently available versions can be adapted to different systems but should be first validated through field tested prototypes. The suitability of a welfare assessment protocol is related to how well the combination of indicators reflects the global welfare of the animal and how practical the protocol is in the field.

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