AWIN welfare assessment protocol for

Sheep

awin
ANIMAL WELFARE INDICATORS

Acknowledgement

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- The photos and drawings included are examples to illustrate a specific condition; these must not be considered as the only representation of animal or farm conditions.

Safety and welfare are the first priorities. The assessor, the owner, the farm manager and the animals should never be put in danger. The animals should be handled gently and with consideration at all times. If it is not possible to complete all or part of the assessment without compromising the animal welfare through fear, discomfort, pain, or excessive restraint, the assessment should be stopped.

This document forms an integral part of the protocol.

No parts of the protocol may be copied without the permission of the authors.

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FOREWORD

The European Animal Welfare Indicators Project (AWIN) addressed the development, integration and dissemination of animal-based welfare indicators, with an emphasis on pain assessment and pain recognition.

AWIN research objectives were carried out in four complementary workpackages and focused on sheep, goats, horses, donkeys and turkeys, species that, although commercially relevant world-wide, have so far been overlooked in previous science-based animal welfare assessments.

Workpackage 1 developed practical, science-based, welfare assessment protocols, including pain indicators. AWIN also translated the welfare assessment protocols into interactive apps to facilitate data collection, data storage and data analysis.

Workpackage 2 studied the impact of diseases and pain on animal welfare and developed interactive apps to facilitate data collection, data storage and data analysis.

Workpackage 3 examined the effects of different prenatal social environments, social dynamics and prenatal handling methods on developmental and welfare outcomes of the offspring of sheep, goats and horses.

Workpackage 4 developed interactive learning objects to disseminate the scientific work developed in the AWIN project, and created the Animal Welfare Science Hub to promote transparency, establishing a global research and education repository in animal welfare science.

The AWIN project remains committed to promote solid science, which could be used in practical settings.

A list of partners of the AWIN project is reported at the end of the document.

Draft protocols were subjected to an extensive consultation process with interested parties, across many European countries, and the wider world. Stakeholders actively contributed to testing the draft protocols and offered useful feedback. In order to increase the feasibility of protocols, AWIN proposes a stepwise strategy of assessment, with a more detailed assessment dependent on the outcome of a smaller number of important first measures.

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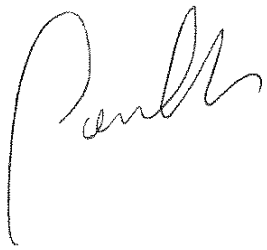

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HOW TO USE THIS DOCUMENT

This document presents the on-farm protocol to assess the welfare of sheep developed by AWIN and is divided into three parts:

- **Chapters 1, 2, 3** – preliminary information relevant for applying the protocol.
- **Chapters 4, 5** – flow of the first and second level welfare assessment; description, assessment and scoring of the welfare indicators (presented according to the four principles and twelve criteria of Welfare Quality®); description of the outcome of the assessment.
- **Appendix A, B, C** – recording sheets to collect data.

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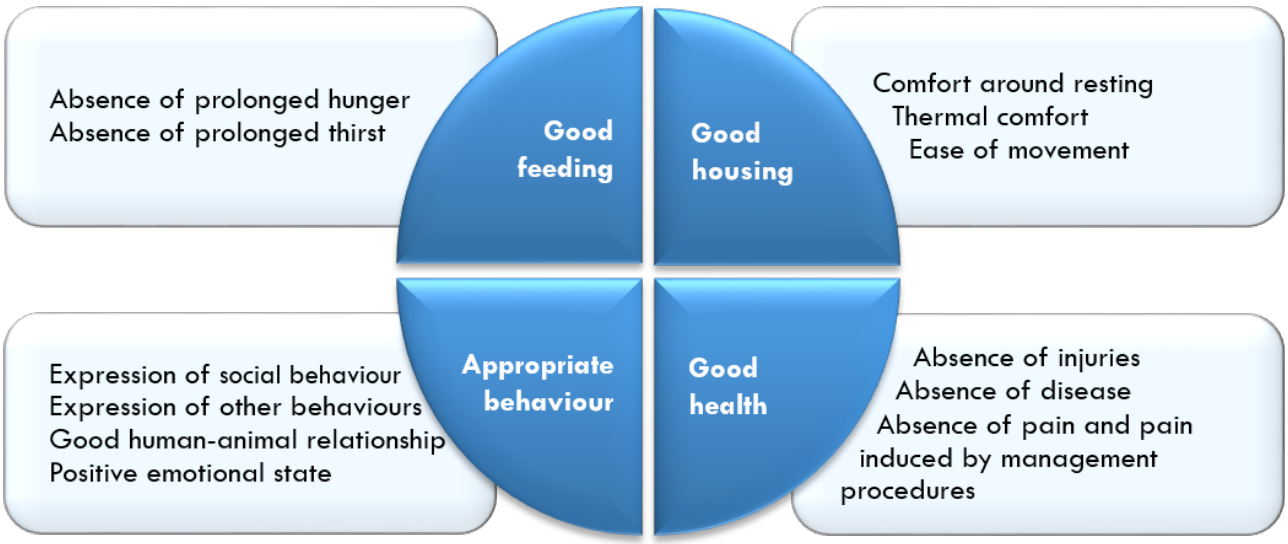
1. INTRODUCTION

Good animal welfare is a prerequisite for high-quality and sound farm animal production. Providing environmental and management conditions that favour animal welfare is not only expected by consumers and the general public, but is also related to achieving system-appropriate levels of performance and profitability. Animal welfare assessment is thus one of the pillars of productive, efficient and sustainable production systems.

In order to develop valid welfare assessment protocols it is important to remember that current, 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 (Hughes, 1976), and as its state as regards its attempts to cope with its environment (Broom, 1986). The physical environment, resources available to the animals and management practices of the farm can affect the welfare of animals, which adjust to these inputs with behavioural, and physiological responses. Since the beginning of the 21st century, on-farm welfare monitoring systems have been developed. Initially monitoring schemes were largely based on environmental assessments, such as design or resource indicators, which assess inputs that could affect animal welfare. These resource-based and management-based measures should be considered as risk factors that might affect welfare; however in order to assess animal welfare at farm level, it is crucial to develop and use animal-based measures. These indicators provide a more accurate welfare assessment as they give direct information about the response of, and the effects on, the animal. Animal-based measures are considered by EFSA to be “the most appropriate indicators of animal welfare and a carefully selected combination of animal-based measures can be used to assess the welfare of a target population in a valid and robust way“ (EFSA, 2012). The European Commission emphasizes the use of science-based animal welfare indicators as a possible means to simplify the legal framework and allow flexibility to improve competitiveness of livestock producers (EC, 2012).

The first welfare assessment protocols built on animal-based measures were developed by the Welfare Quality® project for pigs, poultry, dairy and beef cattle (Welfare Quality® Protocol, 2009a, Welfare Quality® Protocol, 2009b, Welfare Quality® Protocol, 2009c). This project, funded within the 6th EU Framework Programme, developed a scheme where the needs of animals are related to four principles and twelve criteria, considered necessary to cover all aspects of animal welfare (Fig. 1). This approach was the basis for future research on welfare assessment at farm level.

Figure 1. Welfare principles and criteria according to Welfare Quality®



After dealing with welfare assessment of some of the most common farmed species, in the 7th Framework Programme, the European Commission required the development, integration and dissemination of animal-based indicators, including pain, in commercially important husbandry species not yet covered in previous projects. In 2011 the AWIN (Animal Welfare Indicators) project was funded with the overall goal of improving animal welfare of sheep, goats, horses, donkeys and turkeys by developing, integrating and disseminating information about animal welfare indicators. These animal species offer challenges since they have been less studied and thus there is generally less information available on well-validated welfare indicators. In addition, the heterogeneity of the farming systems and environments in which these animals live may make the assessment more difficult. AWIN also puts special emphasis on the recognition and assessment of pain, as pain is an area that is frequently lacking from many animal welfare assessments and yet is often key when animal welfare problems arise.

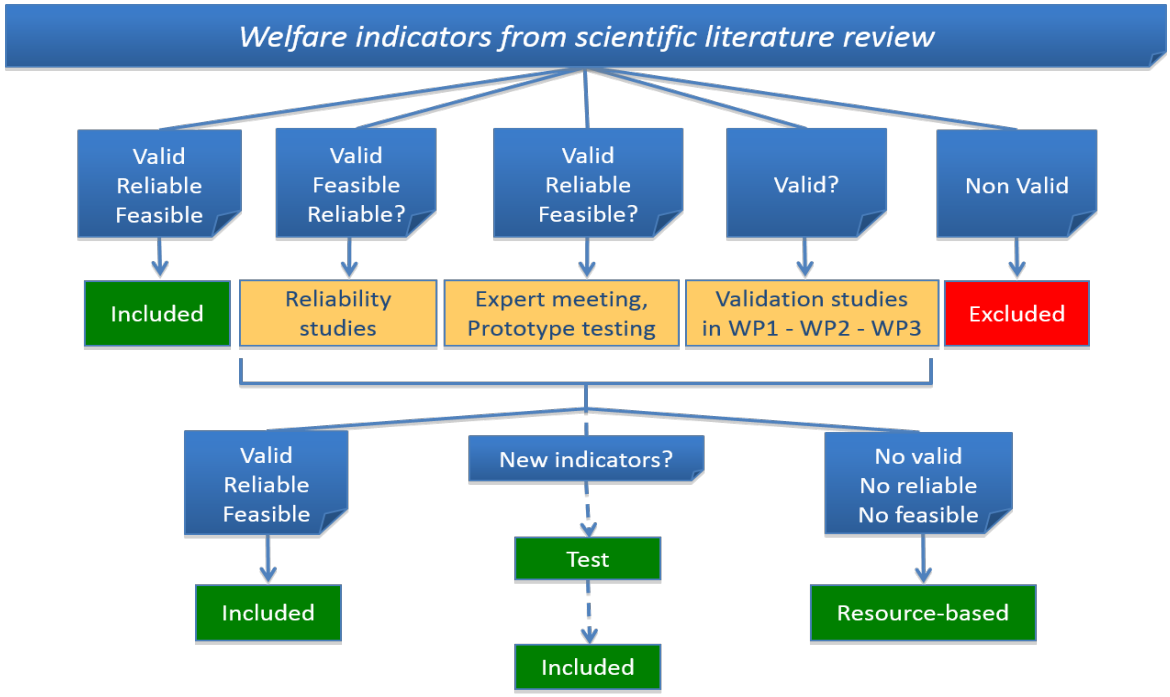
AWIN workpackage 1 (WP1) aimed to develop and refine welfare assessment protocols using animal-based indicators, including pain, in the above mentioned species. The welfare assessment protocols developed by AWIN are grounded on the four welfare principles and twelve criteria developed by Welfare Quality® and are complete but not complex, so that their application can meet current needs.

This Section briefly summarizes the principles and the rationale of the AWIN welfare assessment protocols for sheep, goats, horse, donkeys and turkeys**,** to be applied for on-farm welfare assessment; information about the animal based indicators, data processing and outcome will be presented later in the document.

As a starting point WP1 reviewed background scientific information to select promising animal-based indicators to be included in the protocols. Indicators were classified according to the 4 principles and the 12

criteria developed by Welfare Quality® (Fig. 1), and assessed for their validity, reliability and feasibility, identifying gaps in current knowledge (Fig. 2).

Figure 2. Characteristics and process to identify promising animal-based indicators



From this process, at least one indicator for each welfare criterion was selected to be included in the protocols. AWIN scientists developed a research action plan to address the lack of knowledge regarding the validity, repeatability and feasibility of single promising indicators where this was not present in the literature.

The work involved collaboration with workpackage 2 of the AWIN project, which addressed the relationship between disease, pain and animal welfare and with workpackage 3, which examined the effects of prenatal social environments, social dynamics and prenatal handling methods on the development and welfare of the considered species. Workpackage 4 maximised the effective translation of WP1 scientific results into learning objects. New indicators were developed and results were published in peer reviewed journals. Welfare assessment protocols were developed using animal-based indicators, although some resource-based indicators were included when no animal-based indicator were available to assess specific aspects.

To develop the welfare assessment protocols, stakeholders' perception of the selected indicators was taken into consideration. The purpose of involving the stakeholders was to increase the acceptability of the project outcomes through stimulation of a multidisciplinary dialogue, and identify solutions to potential barriers to the application of the protocols in practice. Stakeholders' opinion and farmers' experience were crucial for the successful implementation of the protocols. An on-line questionnaire in five languages was developed with the aim of understanding the current opinion of various stakeholders (farmers,

veterinarians, owners) on welfare evaluation of the different species. In addition, the welfare assessment protocols for horses, donkeys, sheep, goats and turkeys were discussed with a network of stakeholders in several meetings, gaining feedback on their acceptability and feasibility, and facilitating the experimental phases of the project through practical support for the on-farm testing of the protocols.

The protocols were refined according to the results of WP1 studies and the feedback from the stakeholders favouring the use of indicators with the highest acceptability.

A two level approach is adopted for animal welfare assessment at farm level to increase feasibility and acceptability without losing scientific validity. The protocols offer, as a first level, a quick screening, consisting of a selection of robust and feasible animal-based indicators, which can be readily applied and require no or minimal handling of animals. Depending on the outcome of the first level assessment, a second level, consisting of more comprehensive and in depth assessment, may be recommended. In the second level protocols animals are often handled, but the welfare assessment is still feasible and can be conducted in a reasonable amount of time.

The outcome of the protocols aims to give a clear and immediate visual feedback to the farmers about the welfare of the animals on the farm, highlighting positive conditions and enabling comparison with a reference population.

AWIN protocols are designed to enable comparisons among similar production and management systems and are intended to assess animal welfare in order to guide its improvement throughout Europe and elsewhere in the world. It should be underlined that this document presents the first version of the assessment protocol for goats on March 2015 and that scientific research will progress, refining indicators such that AWIN protocols could be updated according to new scientific knowledge. It should also be highlighted that proper training and adequate knowledge are essential to apply the protocols.

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2. AIMS

AWIN aimed to develop welfare assessment protocols that provide a toolbox of sound, feasible and practical animal-based indicators to assess animal welfare in order to promote improvements in animal production systems throughout Europe. The protocols were developed for species with broadly different rearing systems, ranging from very intensive to pasture based systems, and different production settings, ranging from intensive milk production to extensive meat production or working animals.

The welfare assessment protocol is intended for adult female sheep (older than 1 year), kept for milk and/or meat where the protocol has been tested. The protocol has not been tested for female sheep kept primarily for wool production, or dual purpose meat and wool production, but it is expected that the protocol may also apply. The protocol applies, and has been tested, on adult ewes kept in indoor and outdoor environments.

As the indicators are based on sheep biology, many of the indicators may also be relevant to adult male sheep, but the protocol has not been tested yet for use in male animals.

3. PRELIMINARY INFORMATION

The objective of this section is to ensure that assessors know how to organise a visit, how to behave when at a sheep farm, how to approach the farm manager and how to present the protocol, so that results are reliable and useful to all.

Before contacting the farm manager, assessors should be sure that they have a good knowledge of:

- how the protocol works;
- possible constraints in the protocol application;
- farm practices and husbandry features for sheep and the production system being evaluated;
- sheep behaviour and the behaviour of the specific breeds on farm;
- market and production strains, local production details, sanitary rules and common diseases.

3.1 Contact the farm manager

It is essential to contact the farm manager and plan an appointment to visit the farm taking into account the timing of the farm routines.

When talking to the farm manager, assessors should discuss and agree the objectives of the visit, timetable and methods. It should be made clear that special arrangements and changes in routine will be kept to a minimum.

It is important to underline that the welfare assessment is not dangerous for the sheep or for the people involved. All procedures conducted as part of the welfare assessment are non-invasive and routine operations that any good farmer would conduct as part of daily checks. How and for how long the farmer may be involved should be specified. Assessors should explain that they may need to enter the fields or pens where sheep are housed for the first level welfare assessment and the sheep will need to be gathered in the second level welfare assessment, if this assessment level is required.

3.2 Equipment required

Useful materials for the welfare assessment are: recording sheets, tablet or smartphone, paper, pens/pencils, binoculars, camera, measuring tape, laser range-finder or other means to measure distance, safety shoes/boots, overalls and disinfectants, thermometer and hygrometer.

3.3 Biosecurity

Biosecurity is a crucial issue. Welfare assessors should never be a potential disease-spreading source, or be seen as such. The assessors must remember that many infectious agents are very resistant in the environment and almost impossible to eradicate once inside the farm (e.g. *Dichelobacter nodosus* (foot rot); enzootic abortion of ewes). For this reason, in order to avoid spreading diseases, the assessors should always wear disposable cover boots on safety shoes/boots.

Clean clothes and safety shoes/boots are essential even if additional disinfection will be performed on the farm premises. Clothes or disposal overalls should be of the same colour as those normally used by the farmers (e.g. dark green or blue), to avoid the sheep changing their behaviour in response to novelty. Assessors should check with the farmer for their preference as to which clothing and footwear is preferred.

Always ask for the sanitary rules for vehicles accessing the farm.

3.4 Arriving and working

On arrival, assessors should look for the farm manager and/or stockperson in charge of the animals and ask them to briefly present the farm safety rules. This should include areas to be aware of from a hazard point of view such as vehicle paths, dangerous machinery, guardian dogs.

During this conversation, the welfare protocol should be presented, including the objectives, the approximate assessment duration, the assessors' schedules and activities and the order in which the indicators will be collected. This will provide the farm manager with information on where the assessor will be at any time. The assessors should keep this conversation as brief as possible, so as to avoid any subjective influence on the results. Although the flow of the welfare assessment protocol can not be changed, the plan should be discussed so that the assessment is conducted without interfering with routine work. When walking around the farm, assessors should be discreet. Any disturbance to people working on the farm or to the animals must be kept to the minimum possible.

Knowing how sheep behave is crucial when entering the pens or fields where animals are kept. This will not only ensure adequate assessment but will also allow the assessor to identify aggressive, threatening or fear signs. For dairy sheep: if some indicators are to be collected inside the milking parlour the assessor should be sure to interfere as little as possible with an activity that is usually fast-moving and demanding for the milkers. Some animals may distrust strange people and refuse to enter so the assessor should keep quiet and out of sight as much as possible.

Other advice on how to move around and behave on the farm:

- leave all gates in fields as you found them; they may have been left open to allow the animals to access other areas;
- avoid talking too loudly and making sudden movements;
- do not leave any object accessible to the animals;
- avoid being licked on the hands;
- avoid touching the animals if it is not necessary;
- keep focused on the work at all times.

If records are to be consulted, assessors should always ask for permission and, if possible, do it with the farm manager or whoever is responsible for the record keeping.

3.5 Safety handling

The present welfare assessment protocol is designed for use by trained assessors. Safety and welfare are of prime importance. The assessors, the farmers or the animals should never be put in danger.

3.6 Sampling

3.6.1 First level welfare assessment

The first level welfare assessment should take place without the need to gather or handle the sheep. Animals should remain in their home areas (fields/paddocks/pens) without restraint throughout.

Assessors should aim to sample sub-groups* of sheep across the different animal management or housing types used on the farm (e.g. housed, in fenced fields, on open unfenced pastures), with one representative sample selected from each of the different types of ewe management on farm. For small farms it should be feasible to sample animals in all management types on the farm. For very large farms, with diverse animal management or more than one flock, it may be unrealistic to sample from all management types and a maximum of 4 sampling groups is sufficient. Assessors should choose the sub-groups to sample, and the order of sampling, following the initial discussions with the farmer. First sub-groups to be sampled should be taken from the most distant/highest parts of the farm where it is feasible to collect data. Record the order of planned sampling, why not all parts of the farm are sampled (if this occurs) and any plans that were subsequently not feasible to perform. Infirmary, culling, quarantine or maternity pens should not be considered in the assessment. Pens or fields where rams are present should also not be assessed.

**A sub-group is defined as a number of animals in fields or in unfenced pastures with at least 20 animals present. The maximum size of the sub-group will be dictated by the normal behaviour of the sheep, but assumes that all animals can reasonably be observed without moving more than 100 m in any direction. For indoor housed ewes a sub-group of sheep should generally be defined as a pen as long as at least 20 sheep are in a pen. If animals are housed in small pens of less than 20 animals then a pair (or more) of pens should be considered together if they can be readily observed at the same time.*

3.6.2 Second level welfare assessment

Assessors should specify, following the first level welfare assessment, whether a second level welfare assessment is required, and which animals, and how many, should to be assessed. Animals for the second level welfare assessment must be chosen by the assessor and not by the farmer. Ideally a sample of animals should be inspected from all animals on the farm. In reality, on large farms, it may be impossible for the farmer to bring sheep from all areas of the farm and if this is the case then animals should be sampled from the area of the farm, which was considered to have the worst scores from the first level welfare assessment.

In order to select the number of animals to be individually assessed, it is important to know the number of adult ewes on the farm. The number of animals to be sampled is determined from that information, according to the following scheme:

Farm size – number of adult ewes	Suggested sample*	Minimum sample**	Farm size – number of adult ewes	Suggested sample*	Minimum sample**
< 15	all animals	all animals	300-349	73	56
15-19	13	13	350-399	76	57
20-24	17	16	400-449	78	57
25-29	20	19	450-499	80	58
30-34	23	21	500-599	81	59
35-39	26	24	600-699	83	60
40-44	29	26	700-799	85	61
45-49	31	28	800-899	86	62
50-59	33	29	900-999	87	63
60-69	37	32	1000-1099	88	63
70-79	41	35	1100-1199	89	64
80-89	44	37	1200-1299	89	64
90-99	47	39	1300-1399	90	65
100-124	49	41	1400-1499	90	65
125-149	55	44	1500-1599	91	65
150-174	59	47	1600-1699	91	65
175-199	63	49	1700-1799	91	66
200-224	65	51	1800-1899	92	66
225-249	68	53	1900-1999	92	66
250-299	70	54	>2000	92	66

** Assuming a 50% prevalence, IC 95% and accuracy 10%*

*** Assuming a 50% prevalence, IC 90% and accuracy 10%*

4. AWIN WELFARE ASSESSMENT PROTOCOL FOR SHEEP

4.1 Welfare indicators divided by principles and criteria

The AWIN welfare indicators for sheep are listed according to WQ® principles and criteria. In order to highlight the association between welfare indicators and principles throughout the document, different colours are used to identify each principle.

Welfare principles	Welfare criteria	Welfare indicators
Good Feeding	Appropriate nutrition	Body Condition
		Score lamb mortality
	Absence of prolonged thirst	Water availability
Good Housing	Comfort around resting	Fleece cleanliness
	Thermal comfort	Panting
		Access to shade/shelter (outdoors only)
	Ease of movement	Stocking density (housed animals only)
		Hoof overgrowth (housed animals only)
Good Health	Absence of injuries	Body and head lesions
		Leg injuries
	Absence of disease	Lameness
		Faecal soiling
		Mucosa colour
		Ocular discharge
		Mastitis and udder lesions (lactating ewes only)
		Respiratory quality
		Fleece quality
	Absence of pain and pain induced by management procedures	Tail length
Appropriate Behaviour	Expression of social behaviour	Social withdrawal
	Expression of other behaviours	Stereotypy
		Excessive itching
	Good humant animal relationship	Familiar human approach test
	Positive emotional state	Qualitative Behaviour Assessment

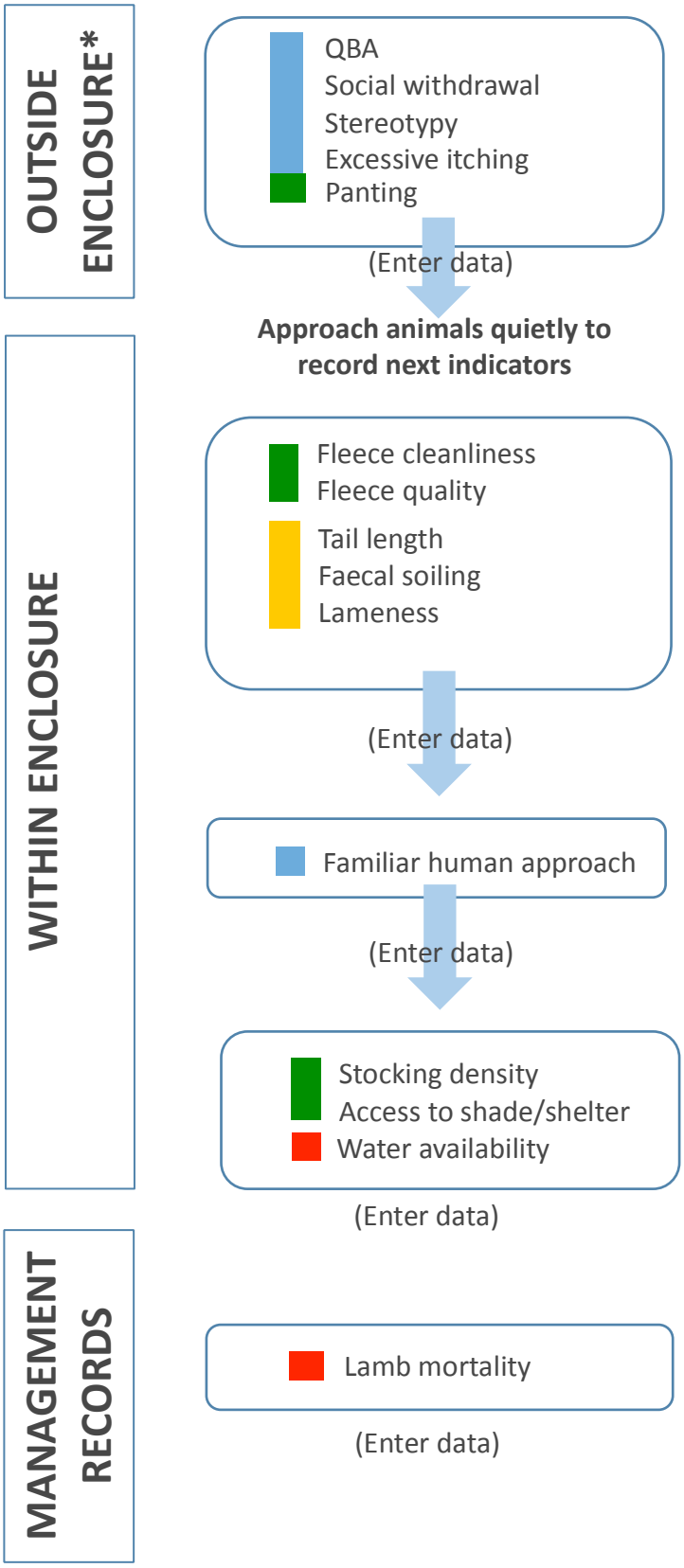
As there is a logical order in which the different indicators should be collected, Sections 4.2 and 4.3 report the flow of the first and second level welfare assessment. The description, assessment and method of

scoring of each AWIN welfare indicator for sheep are reported in Section 4.4; it is always specified if the indicator should be assessed at individual or group level, or if it is resource based.

4.2 Flow of first level welfare assessment

The first level welfare assessment should be applied in the order outlined below. This is important as some indicators (in the first box) will be influenced by the collection of later indicators. After applying the protocol, the farm manager will be asked to answer a questionnaire. The aim of the questionnaire is to gather general information about the farm. It is mandatory that the farm manager is interviewed at the end of data collection, to avoid the assessor being influenced by the farm manager's attitude during the collection of the indicators.

Assessment of a sub-group of sheep should take approximately 40 min. The time taken for the whole assessment will depend on the number of sub-groups of sheep to be assessed, and the time taken to move between different sheep management types.


OUTSIDE ENCLOSURE*
QBA
Social withdrawal
Stereotypy
Excessive itching
Panting
(Enter data)
Approach animals quietly to record next indicators
WITHIN ENCLOSURE
Fleece cleanliness
Fleece quality
Tail length
Faecal soiling
Lameness
(Enter data)
Familiar human approach
(Enter data)
Stocking density
Access to shade/shelter
Water availability
(Enter data)
MANAGEMENT RECORDS
Lamb mortality
(Enter data)

**Depending on size of enclosure/field – in a large field animals can be observed from inside the field but at a distance where the animals are unaware of, or undisturbed by, the assessor presence. Binoculars can be used to facilitate observations.*

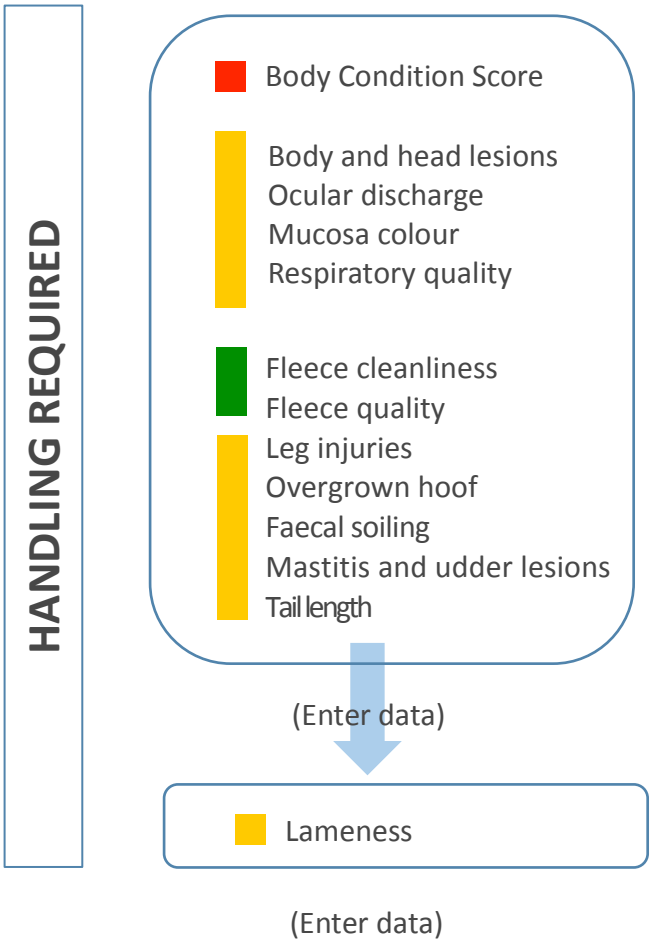
N.B. Stocking density applies only to housed sheep; presence of shade or shelter applies only to outdoor managed sheep.

4.3 Flow of second level welfare assessment

The second level welfare assessment is recommended when the conditions listed in Section 5.2 are satisfied.

Sheep for the second level welfare assessment should be presented in a handling system, pen or race where animals can be caught and inspected individually. This level of assessment would require the presence of two assessors, or one assessor and a stock handler, as the assessment will require the assessor to view the animal from front and back.

Assessment of each individual ewe should take approximately 2 min.



4.4 AWIN welfare indicators for sheep

BODY CONDITION SCORE

GOOD FEEDING

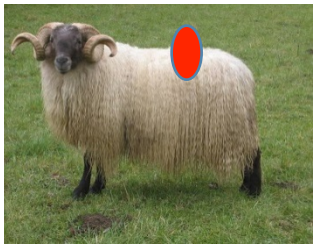
APPROPRIATE NUTRITION

Description

Body condition scoring is a standardized method to estimate the amount of fat on a sheep's body. The body condition score measures the balance between intake and expenditure of energy, and is known to be related to feeding motivation. Body condition can be affected by a variety of factors such as food availability, reproductive or productive status, weather conditions, parasites, dental problems, diseases and feeding practices.

How to assess [Individual]

Body Condition Score (BCS) should be assessed in a restrained sheep in a race.
Body condition is assessed by palpation of the spine in the lumbar region just after the last rib (see figure). Feel for the horizontal and vertical processes, and assess the amount of fat and muscle overlying the bones.



How to score

The BCS described by Russell et al. (1969, J Agric Sci, 72, 451-454) can be used. For welfare purposes animals are considered thin if they score below 2.0 on this scale, emaciated if they are at or below 1.0, and fat if they are above 4.0. This system is used for all sheep breeds and all purposes of use.

Emaciated (<= 1.0)

All parts of the spine can be easily felt with little or no pressure, fingers can be easily inserted under the transverse processes. There is no fat cover and very little muscle tissue can be distinguished.

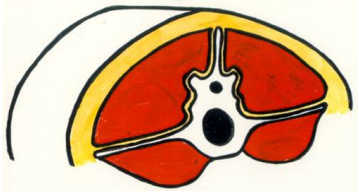
Thin (< 2.0)

The horizontal and vertical processes can be easily felt without pressure, fingers can pass under the ends of the transverse processes. There is a small amount of muscle tissue under the skin.

Good (>2.0, <4.0)

Spine processes can be easily distinguished with light pressure, clear muscle and fat cover.

Fat (>4.0)



Transverse spine processes cannot be felt, vertical processes distinguished only with pressure if at all. Full and rounded muscle and fat cover.

SCORE LAMB MORTALITY

GOOD FEEDING
APPROPRIATE NUTRITION

Description

Although not restricted to conditions of poor nutrition, lamb mortality is increased where ewes or lambs are undernourished. This indicator assesses actual mortalities where that data is available, or production cycle information if this is all that is possible. Production data is only relevant where it is lower than expected; high productivity is not considered an indicator of good welfare.

How to assess [Flock level]

Ask the farmer to provide the required records for the last complete breeding season.
The gold standard is accurate records of lamb mortalities collected contemporaneously at lambing. Where these are not available, other estimates of reproductive outputs and losses can be used. Suitable records are: numbers of ewes mated, scanning information, numbers of lambs produced (sold for finishing or slaughter, sold as store or fat lambs, sold for breeding or retained on the farm as ewe replacements or other purposes).

How to score

Lambing records available	Record: a) number of lambs born alive, b) number born dead, and c) losses to weaning.
Scanning records available	Record: a) number of ewes mated with a breeding ram in the last breeding season, b) number of lambs scanned, c) number of lambs reared (include all lambs produced: those sold for finishing, as store lambs, sold for breeding and retained on the farm).
Minimal records available	Record: a) number of ewes mated with a breeding ram in the last breeding season, b) number of lambs reared (include all lambs produced: those sold for finishing, as store lambs, sold for breeding and retained on the farm).

WATER AVAILABILITY

GOOD FEEDING

ABSENCE OF PROLONGED THIRST

Description

Assessing the availability of water includes checking the presence of water points and evaluating their functioning, accessibility and cleanliness. Water is essential for life; each animal should have access to a water point. Sheep must be fully hydrated to help preventing the development of health and welfare problems.

How to assess [Resource-based]

Enter the enclosure (pen, field, paddock, etc.) where sheep are located and check:

- the presence and types of water points (including natural water sources such as streams);
- their accessibility (e.g. can sheep access the water in a stream?);
- the functioning of all drinkers (are they all functioning?);
- the cleanliness of all water sources.

Record all these parameters separately.

How to score

Evaluate the presence and type (score the prevalent condition) of the water points.

No water point

Bucket/trough
Any water container which is manually filled by the owner and contains some water.

Automatic drinker
A water container connected with the water network, which is automatically filled at every use.

Natural water source
A pond, stream or river, which is accessible by sheep and contains clean water.

Evaluate if the automatic drinker is functioning and accessible (score the prevalent condition).

Functioning
Check if the automatic drinker is working properly.

Not functioning
Check if the water source is accessible (i.e. not overgrown or with steep banks) and showing evidence of use by sheep.

Evaluate the drinker cleanliness (score the prevalent condition).

Dirty	**Partly dirty**	**Clean**
Water points and water dirty at the moment of inspection. Natural water sources are stagnant or polluted.	Water points dirty but water fresh and clean at the moment of inspection. Water source may be contaminated (e.g. with rubbish) but water appears clean.	Water points and water clean at the moment of inspection. Natural water sources are clean and unpolluted.

FLEECE CLEANLINESS

GOOD HOUSING

COMFORT AROUND RESTING

Description

Comfort around resting relies on provision of a dry and comfortable place to lie down. Assessment of the condition of the fleece (cleanliness and wool cover) can provide information on whether sheep have been able to lie in comfort. This indicator is not restricted to resting in comfort, as fleece loss can indicate the presence of stress, ectoparasites or nutritional deficiencies. Assessment of fleece loss will be described under Good Health: absence of disease.

How to assess [Flock and Individual]

Assessment can be made in unhandled animals in their pens or fields (group, first level assessment), and verified in handled animals (individual, second level assessment). The cleanliness of the fleece should take into account the belly, legs, flanks, back and head but the cleanliness of the breech area should be assessed separately (see Faecal soiling). For the first level welfare assessment animals scoring 0 or 1 are considered clean, and only scores 2, 3 and 4 are made. For the second level welfare assessment all levels are used.

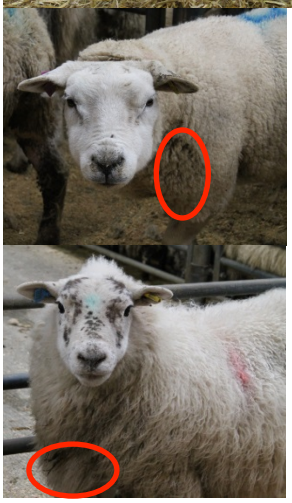
How to score

Fleece cleanliness is scored a five-point scale.

Score 0

Clean and dry. Fleece shows no sign of dirt or contamination.

Score 1



Dry or slightly damp due to current weather conditions. Slight mud/dirt on body attributed to handling or pen from that day (handled animals).

Score 2

Very damp or wet. Coat contaminated by mud or dung from fields/hill.

Score 3

Very wet. Very heavily soiled with mud or dung.

Score 4

Filthy, animal is very wet and coated in mud or dung, which may be on face and back as well as belly, flanks and legs.

PANTING

GOOD HOUSING

THERMAL COMFORT

Description

Although both extremes of temperature can cause distress, in practice only heat stress is considered an important welfare issue in adult sheep. An increase in respiration rate above the reference ranges for sheep at rest indicates that the animal is trying to disperse a thermal load. This can be readily observed in animals when lying or standing. Animals may be panting with a closed mouth (elevated respiration rate) or where more severely heat stressed with an open-mouth.

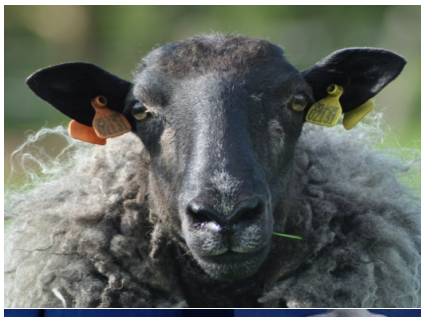
How to assess [Flock level]

The indicator should only be assessed in unhandled animals in their pens or fields as physical exertion or stress induced by gathering and handling may increase respiration rate and panting. The number of animals with a respiration rate of above 30 breaths/min with a closed mouth, and the number of animals with open mouthed panting should be counted.

How to score

Panting should be evaluated on one of three levels.

Normal respiration



Breaths are at a normal rate (approximately 20 breaths per min) and occur with the mouth closed.

Mild heat stress

Respiration rate is elevated above 30 breaths per minute but less than 40 and respiration occurs with the mouth closed. This condition is not scored as panting.

Panting

Respiration rate is elevated above 40 breaths per minute and/or occurs with the mouth open.

ACCESS TO SHADE AND SHELTER

GOOD HOUSING
THERMAL COMFORT

Description

An important component of the ability of sheep to maintain thermal balance is access to appropriate shade or shelter to avoid solar radiation, prevent sunburn and provide shelter from wind, rain or snow. In order for sheep to express these behavioural adaptations the environment needs to provide some opportunity for the sheep to seek shade or shelter. This can be through hedges, stone walls, rocks, trees, shrubs or other vegetation of sufficient height to cast a shadow over sheep, as well as artificial, man-made shelters.

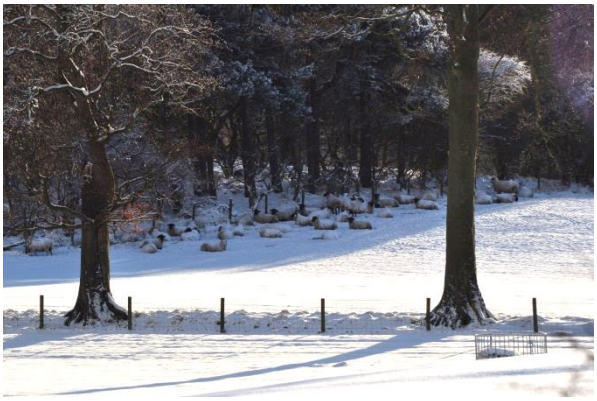
How to assess [Resource-based]

This indicator is only relevant to animals managed within an outdoor environment. Within the confines of the space available to the sheep, assess whether there is shade/shelter present that can be used by sheep to avoid exposure to climatic extremes.

How to score

Shade or shelter is scored as present or absent.

Present
Shade or shelter present



Absent
No suitable shade or shelter present

STOCKING DENSITY

GOOD HOUSING

EASE OF MOVEMENT

Description

Sufficient space should be provided to allow free movement, and to allow all the sheep to lie down at the same time should they so wish. Insufficient space increases the competition for personal space with an increase in aggressive interactions and displacements.

How to assess [Resource-based]

This indicator is only assessed in housed animals – it is assumed that all extensively managed animals will have sufficient space to move freely and lie simultaneously. Enter the pen and measure the width and length of the pen, discounting any space that may not be available to the sheep to lie (e.g. if occupied with feeders). Count the number of adult animals present.

How to score

Evaluate whether the pen/housing dimensions (m^2) are satisfactory.

Good

Adult ewes (without lambs) have at least 1.5 m^2 each, ewes with lambs at foot have at least 2 m^2 each.

Adequate

Adult ewes (without lambs) have less than 1.5 m^2 but more than 1 m^2 each. Ewes with lambs at foot have at least 1.5 m^2 but less than 2 m^2.

Poor

Adult ewes (without lambs) have 1 m^2 each or less. Ewes with lambs at foot have less than 1.5 m^2.

HOOF OVERGROWTH

GOOD HOUSING

EASE OF MOVEMENT

Description

In housed animals, kept on soft bedding, the natural wear of hooves that occurs when sheep walk on hard surfaces may not occur, resulting in overgrowth of the claws, such that the shape of the foot becomes distorted. This can lead to difficulties in movement and lameness, and can be prevented by regular hoof trimming or providing opportunities for natural wearing of the hoof horn (e.g. outdoor access).

How to assess [Individual]

This indicator is only assessed in housed animals – it is assumed that all extensively managed animals will have sufficient opportunity to wear hooves if walking normally and hoof overgrowth in these animals is as a consequence of lameness (see Lameness). Hooves should be inspected when animals are restrained on a suitable hard surface to permit the hooves to be properly observed. Each hoof should be inspected and overgrowth in any hoof recorded.

How to score

A sheep is considered to have hoof overgrowth when at least one hoof is scored as overgrown.

Overgrown

Hooves are overgrown.

Appropriate

Hooves show an appropriate length/shape.

BODY AND HEAD LESIONS

GOOD HEALTH

ABSENCE OF INJURIES

Description

Abraded or red skin patches, scabs, skin lesions, and wounds (current and healed) are all considered as part of this indicator. They may be present due to a variety of reasons: traumas, the type and quality of the equipment used during handling or housing, conflicts with other sheep, interactions with other animals (e.g. dogs) as well as the presence of diseases (e.g. ectoparasites).

How to assess [Individual]

Skin lesions should be assessed in a restrained sheep in a race, pen, milking parlour or feeding device to allow close inspection of all areas of the body. The animal is assessed to consider all lesions or damage to the skin of the head, ears, face, and body, including recent or healed injuries. Injuries to the eyes should also be included. Leg and foot lesions should be considered separately and are not recorded here. The location and severity of each lesion should be recorded for: 1) head and neck; 2) ears – include any rips or tears associated with lost tags (but clean holes indicating lost or removed tags should be omitted), and ear notches, marks or cuts even if healed; 3) eyes – injuries and lesions only, eye discharge is recorded separately; 4) body.

How to score

Count the number of lesions for each area (both sides).
Take into consideration only lesions larger than a 1x2 cm area (at widest part) or more than 4 cm length (for linear lesions).
If single lesions are not distinguishable and the area covered is bigger than a 1x2 cm area or more than 4 cm length (for linear lesions), score 1 lesion.

No evidence of skin lesions to any part of the body, head, eyes or ears.

No lesions

Hairless patches or scratches, or healed lesions, or ear notches or open wounds which do not reach the muscle layer, that are greater than 2 cm but less than 10 cm.

Minor

Open wounds that are greater than 10 cm and/or at a depth that reaches the muscle layer.

Major

Open abrasions with clear presence of maggots on any part of the animal.

Myiasis (flystrike)

LEG INJURIES

GOOD HEALTH

ABSENCE OF INJURIES

Description

The presence of swellings, hairless patches, callus, lesions or scabbed areas on the joints of the legs. These can indicate arthritis, injuries or trauma, or prolonged lying on hard surfaces.

How to assess [Individual]

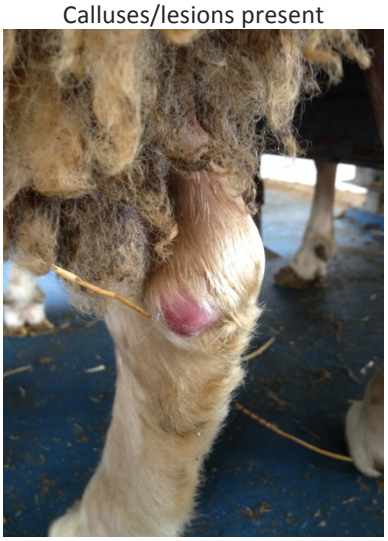
Skin lesions should be assessed in a restrained sheep in a race, pen, milking parlour or feeding device to allow close inspection of all areas of the legs. Count each swelling, lesion or injury on all four legs.

How to score

Assess the presence of swellings and other leg injuries.

Present

Calluses/lesions present



Absent

No lesions

LAMENESS

GOOD HEALTH

ABSENCE OF DISEASE

Description

Lameness describes an abnormality of movement and is most evident whilst the animal is in motion. Although lameness may be as a result of injury, the majority of lameness in sheep is a result of infections of the hoof. These can be assessed by examining each hoof for the presence of infection, but for welfare assessment purposes lameness is assessed by scoring gait. Lameness indicates that the sheep is feeling pain and is unable to bear weight completely on the affected limb. This reduces the ability to use one or more limbs in a normal manner, with severe cases reducing mobility or resulting in an inability to bear weight on the limb(s).

How to assess [Flock and Individual]

This indicator should be assessed in both the first and second level assessment. In the first level welfare assessment the flock is observed first in an undisturbed condition to identify animals that cannot bear weight on a foot when standing – they may either hold the foot off the ground, or be grazing in a kneeling position. Animals should then be gently encouraged to walk away from the assessor and gait is observed. In the second level welfare assessment individual animals should be encouraged to walk along a race, preferably on a hard, flat surface if this is available, and gait scored.

How to score

Lameness is scored on four levels

Not lame (0)

Movement is smooth, weight is borne equally on all four feet with no shortening of stride. Some minor head nodding is acceptable if walking on uneven ground.

Minor lameness (1)

Clear shortening of stride with obvious head nodding or flicking as the affected limb touches the ground.

Lame (2)

Very obvious head nodding and not weight-bearing on affected limb whilst moving, foot may be held up whilst standing, may be grazing on knees with front leg lameness.

Severe lameness (3)

Recumbency or reluctance to stand or move.

FAECAL SOILING

GOOD HEALTH

ABSENCE OF DISEASE

Description

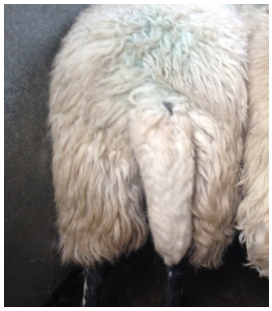
Faecal soiling is the presence of faecal material on the wool around the anus, breech area, tail and hindlegs. Dags are lumps of matted faecal material hanging from the wool. This is associated with diarrhoea, which can result from infestation with endoparasites or nutritional imbalance, and is a risk factor for cutaneous myiasis or flystrike.

How to assess [Individual]

This indicator can be recorded in unhandled (first level) and handled animals (second level), although the separation of minor categories is only possible in handled animals. The rear end of the animal is assessed and the degree of faecal soiling to the wool around the anus and tail, and whether it extends to the hindlegs and hocks is assessed (dag score). In the first level welfare assessment scores 0, 1 and 2 are considered clean, and only the numbers of animals scoring 3 or 4 are assessed. For the second level assessment all scores should be used.

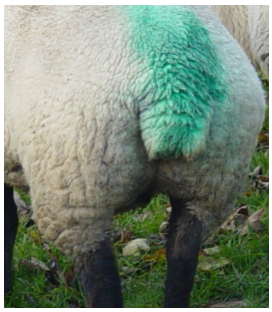
How to score

Not present (0)



No faecal soiling: the wool around the breech area and under the tail is clean.

Very light soiling (1)

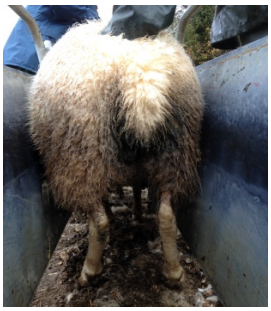


A small quantity of faecal matter in the wool around the anus.

Light soiling and dags (2)

Some soiling around the anus and dags (matted areas of faecal matter adhering to the wool) in this area only.

Soiling and dags (3)



Soiling and dags extending beyond the anus to the tail and onto the upper part of the legs.

Extensive soiling and dags (4)

Wider area of soiling with dags extending down the legs as far as the hocks.

MUCOSA COLOUR

GOOD HEALTH

ABSENCE OF DISEASE

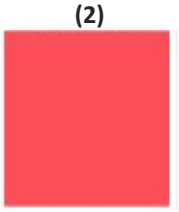
Description

The mucosa is the lining of the eyes and mouth, which is well supplied with blood vessels. A pale colour of the mucosa indicates the presence of anaemia. Very pale mucosa colour suggests the presence of blood-feeding endoparasites, such as *Haemonchus contortus*. Evaluation of the colour of mucosa is an accepted method for assessing anaemia from parasitic infestation (Bath et al., 1996, Proc 7th Annual Congress of the Livestock Health and Production Group of the South African Veterinary Association).

How to assess [Individual]

This indicator should be recorded in handled animals. The sheep should be gently restrained in a race, and the head held by the chin with one hand whilst the bottom eyelid is carefully pulled a little way down to expose the mucosa. The colour of the conjunctiva should be inspected and the colour evaluated.

How to score

Not anaemic (0)	Not anaemic (1)	Borderline anaemia (2)	Anaemic (3)	Severely anaemic (4)
				

OCULAR DISCHARGE

GOOD HEALTH

ABSENCE OF DISEASE

Description

Ocular discharge, or discharge from the eyes, can indicate the presence of eye disease.

How to assess [Individual]

This indicator should be recorded in handled animals. The sheep should be gently restrained in a race, and the head held by the chin with one hand whilst the eyes are inspected. The presence or absence of ocular discharge is recorded.

How to score

No discharge

Discharge present

MASTITIS AND UDDER LESIONS

GOOD HEALTH

ABSENCE OF DISEASE

Description

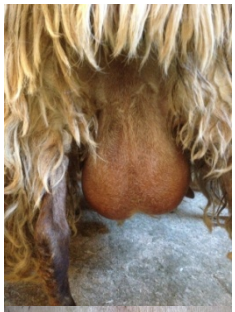
Mastitis is the presence of infections in the udder of lactating ewes. Udder infections can be acute or chronic and cause pain in the affected animal. Acute mastitis causes inflammation detected as heat, redness, hard areas and discomfort. Chronic mastitis can be detected by the presence of hard lumps or fibroids with udder palpation.

How to assess [Individual]

This indicator should be recorded in lactating ewes only, and requires that animals are handled. Ewes should be gently restrained in a standing posture and the udder inspected from behind for colour and symmetry. The udder is then gently palpated on both sides feeling for lumps, hardness and fibroids. Lesions to the udder or teats should also be counted.
N.B. – Note that udders may be asymmetrical in ewes feeding single lambs, only asymmetry associated with other indicators of mastitis should be considered.

How to score

Mastitis and udder lesions should be evaluated on three levels.



No mastitis or lesions present

Udder is soft and pliable at palpation, no redness or hardness is detected.

Mild mastitis and/or minor lesions

One or two small lumps felt, or an area of hardness in one half of the udder, small lesions (<10 cm at widest part) may be present.

Mastitis and/or severe lesions

Lumps or hardness on both sides, or larger lump on a single side, lumps or lesions >10 cm at widest part.

RESPIRATION QUALITY

GOOD HEALTH
ABSENCE OF DISEASE

Description

Respiration quality considers the ease with which the animal is breathing, and the presence of discharge from the nasal orifices. Sheep are susceptible to respiratory infection, which can cause laboured or hampered ability to breathe, possibly resulting in audible breath sounds, persistent coughing and/or discharge from the nostrils.

How to assess [Individual]

This indicator should be recorded in handled animals. The sheep should first be observed for hampered or audible breathing and persistent coughing. The sheep should then be gently restrained in a race, and the head held by the chin with the hand whilst the nostrils are inspected. The presence of any signs of audible breathing, persistent coughing or nasal discharge should be scored as respiratory problems.

How to score

No respiratory issues

Breathing is normal with no obvious effort to draw breath; no audible noise accompanying breathing; no coughing; no nasal discharge.

Respiratory problems

Present if any of the following are seen: breathing is occurring with obvious effort on inspiration; breath sounds are audible; persistent coughing is heard; nasal discharge is present.

FLEECE QUALITY

GOOD HEALTH

ABSENCE OF DISEASE

Description

Fleece quality refers to the degree of fleece cover over the body, noting any areas of loss, thinning, lumpiness, scurf or shedding. Loss of the fleece, particularly where this occurs in patches can be associated with ectoparasitism causing itching and rubbing at the fleece. In addition, stress or nutritional imbalance can cause weakness in the staple strength of wool resulting in breaks and shedding of areas. Wool pulls may also occur with rough handling. Fleece quality may also decline in aged ewes.

How to assess [Individual]

The indicator can be assessed in unhandled animals in their pens or fields (for obvious wool loss), and at close quarters in handled animals for the degree of wool loss. The sheep is inspected along the back and on both sides to identify areas where there is loss of fleece due to rubbing, wool pulls or where parts of the fleece are loose and dragging.

N.B. - For ewe with lambs at foot, fleece loss across the back/shoulders only, and not spreading down the shoulders, should not be considered as shedding as may have resulted from lamb interactions.

How to score

Fleece quality is evaluated on three levels

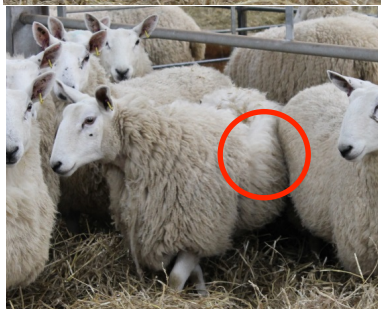
Fleece quality good

Sufficient fleece for breed and time of year with even coverage over the whole body, no trailing or over long patches of fleece (first level assessment); fleece is normal when parted with no scurf or lumpiness or evidence of ectoparasites, no bald patches or trailing areas of fleece, the body has even coverage of fleece (second level assessment).

Some fleece loss

Loose fleece in some areas but not shed, small shed or bald patches of no more than 10 cm in diameter, fleece when parted may have some lumpiness or scurf but little evidence of ectoparasites (in second level assessment only).

Significant fleece loss



Loose fleece and shed areas or pulls with bald patches of greater than 10 cm, some areas of fleece may be trailing (first level assessment), on inspection there may also be evidence of ectoparasites (second level assessment).

TAIL LENGTH

GOOD HEALTH

ABSENCE OF PAIN/PAIN INDUCED BY MANAGEMENT PROCEDURES

Description

Tail length considers whether the sheep have been tail docked (part of the tail removed for management purposes) or not, and whether any docked tails are an appropriate length. Tail docking in sheep is permitted, in some countries in the EU, as it is considered to reduce the risk of flystrike. Docking can be carried out without anaesthesia or analgesics at certain ages and the methods to dock tails are restricted in some countries. However tails should not be docked to a length where the residual tail does not cover the anus and vulva.

How to assess [Flock and Individual]

Tail length can be observed in unhandled animals (first level assessment) and verified in handled animals (second level assessment). Undocked sheep of most breeds have tails that extend approximately to the hocks or below. Docked tails should be shortened only to the point where the lowest point of the vulva is covered, ending approximately at the level of the buttocks. Tails that are docked too short will leave some parts of the vulva or anus exposed and visible.

How to score

Evaluate the length of tails on three levels

Undocked tail

Tail appears complete and extends to approximately the hocks or below.

Docked

Tail is shorter than a full tail but an acceptable length: the vulva is covered by the tail when held down.

Short docked

Tail is over-shortened or almost not present, the vulva and anus cannot be covered by the remaining tail.

SOCIAL WITHDRAWAL

APPROPRIATE BEHAVIOUR

EXPRESSION OF SOCIAL BEHAVIOURS

Description

Normal behaviour in sheep consists of resting, rumination and feeding behaviour in synchrony with other animals in the social group. Sheep should be alert and attentive to any disturbance in the environment. Behaviours involving withdrawal from the social group, showing disinterest in the behaviour of other sheep or unresponsive to environmental disturbance, is considered an abnormal behavioural response in sheep.

How to assess [Flock level]

The undisturbed flock is observed for 20 minutes. Count the number of animals showing signs of Social withdrawal: single animals that are clearly apart from the rest of the social group, often standing at the back of a pen, standing or lying apart from main body of the flock and not engaged in any maintenance activity and unresponsive to activity occurring around them.

How to score

Record total number of animals exhibiting social withdrawal in the observed sub-group.

Normal social behaviour in sheep

Social withdrawal

STEREOTYPY

APPROPRIATE BEHAVIOUR

EXPRESSION OF OTHER BEHAVIOURS

Description

Abnormal behaviour consists of behaviours that would not be expected to be expressed by a sheep showing normal functioning. Stereotypic behaviour is rare in sheep, although can be seen in housed sheep, where is consists of repetitive pacing, star-gazing, or wool pulling. This indicator is assessed only in housed sheep.

How to assess [Flock level]

The undisturbed flock is observed for 20 minutes. Count the number of animals showing signs of stereotypy: repetitive pacing or circling where the animal follows the same route back and forth or around the pen; repeatedly curving the head back over the shoulders and looking upwards; repeatedly pulling, biting or plucking the wool along the back of another ewe.

How to score

Record the total number of animals showing stereotypy in the observed sub-group

EXCESSIVE ITCHING

APPROPRIATE BEHAVIOUR

EXPRESSION OF OTHER BEHAVIOURS

Definition

Abnormal behaviour consists of behaviours that would not be expected to be expressed by a sheep showing normal functioning. Normal behaviour in sheep consists of resting, rumination and feeding behaviour in synchrony with other animals in the social group. Although sheep may rub or scratch themselves, on fence fixtures or with their hooves, excessive itching or rubbing that occurs for a prolonged period, suggests the presence of ectoparasites.

How to assess [Flock level]

The undisturbed flock is observed for 20 minutes. Count the number of animals showing signs of excessive itching: repeated or prolonged rubbing or scratching, which may be against pen or paddock fixtures or with the hooves. Sheep may also roll the head backwards over the shoulders in an attempt to scratch with the horns. Record if the activity occurs in the same animal for at least 5 minutes during the 20 minutes of observation.

How to score

Record the total number of animals showing excessive itching in the observed sub-group

Itching behaviour

QUALITATIVE BEHAVIOUR ASSESSMENT

APPROPRIATE BEHAVIOUR

POSITIVE EMOTIONAL STATE

Description

Qualitative Behaviour Assessment (QBA; Wemelsfelder 2007 Anim. Welfare, 16, 25-31) relies on the ability of humans to integrate perceived details of behaviour, posture, and context into descriptions of an animal's style of behaving, or "body language", using descriptors such as "relaxed", "tense", "frustrated" or "content". Such terms have an expressive, emotional connotation, and provide information that is directly relevant to animal welfare and may be a useful addition to information obtained from quantitative indicators.

How to assess [Flock Level]

QBA observations should be conducted prior to any other assessments.

1. Select the observation points. Up to 4 observation points should be conducted in animals kept outdoors (or a combination of indoor and outdoor housing) and up to 8 for animals housed indoors. The appropriate number of areas/pens can differ per farm/animal house, depending on their size and structure, but should not exceed 8. For each area or pen, the assessor should select a good vantage point from which all animals in that area or pen can be clearly seen. Decide in which order these observation points will be visited. When the route to be followed through the unit is clear, the assessor should leave the unit (or remain in a neutral location/position in a field situation) and wait for 5 to 10 minutes until the animals have gone back to normal undisturbed behaviour. In this time the information requested at the top of each form (name, date, housing system, etc.) can be completed.
2. Enter the unit again and closely watch how the animals behave for 2.5 to 10 minutes at each observation point, depending on their number (see table below). When the assessor first arrives at a new observation point the animals will be disturbed, but they should gradually quiet down and go back to what they were doing before. Include all these elements in the observations. Move quietly and slowly through the house or between observation points in outdoor locations. Do not score the animals during the observation.

Number of observation points	1	2	3	4	5	6	7	8
Duration of observation per observation point in minutes	10	10	6.5	5	4	3.5	3	2.5

How to score

For housed animals, when you have visited all observation points, find a neutral and quiet spot to integrate all your observations into one overall assessment of the farm you are visiting. For outdoor locations, if significant travelling time is required between different locations, score each group after it has been observed. Score all descriptors listed below on the form in the order that they are presented on the visual analogue scales (VAS). Do not skip any term; the animals that have been observed must be scored on all of the given terms.
Each VAS is defined by its left "Minimum" and right "Maximum" point. "Minimum" means that, at this point, the expressive quality indicated by the descriptor is entirely absent in the whole group under observation. "Maximum" means that, at this point, this expressive quality is dominant across all observed animals. Intermediate scores depend on:

- number of animals showing that descriptor;
- intensity of the descriptor;
- interactions with the rest of the flock.

The measure for that descriptor is the distance in mm from the minimum point to the point where the VAS is ticked.

Descriptor	Definition
Alert	Observant and vigilant.
Active	Animal is physically active. Engaged in task e.g. grazing, walking, or fighting.
Relaxed	At ease, free from anxiety, agitation or tension. The animal appears to be unthreatened.
Fearful	Attention is focussed on one specific object/being which is either a real or perceived threat. Animal may also be fleeing.
Content	Satisfied and at peace. The animal's needs are met, or the animal is successfully working towards their completion.
Agitated	Excessive cognitive and/or motor activity due to tension or anxiety. The animal is uneasy and if moving their actions are twitchy.
Sociable	Seeking and interacting with other sheep. The sheep appears to be enjoying/taking comfort from their contact. The sheep is choosing to be part of a flock and not fully isolate themselves.
Aggressive	Hostile and tense. Attacking/ready to attack, usually unprovoked or to compete for resource.
Vigorous	The animal is carrying out task in an energetic or forceful way. If stationary or moving slowly the animal expresses an inner strength and energy. May imply good physical health.
Subdued	Submissive and docile. Often removed from social group and self absorbed.
Physically uncomfortable	Giving impression of pain or other physical discomfort through posture/movement.
Defensive	Ready to potentially defend herself or lamb from harm/perceived threat.
Calm	Placid and sedate. If physically active the animal's movements are smooth and unhurried.
Frustrated	Dissatisfied. Unable to fulfil satisfaction and achieve goal.
Apathetic	Unresponsive and dull.
Wary	Shy, cautious, apprehensive and possibly distrustful.
Tense	Uneasy and/or on-edge. Posture may show physical tension.
Bright	Alert, lively and aware of environment.
Inquisitive	Curious, interested and intrigued by the environment or other animals.
Assertive	Displaying confidence or determination.
Listless	Lack of vigour and energy. Animal appears lacklustre.

FAMILIAR HUMAN APPROACH TEST

APPROPRIATE BEHAVIOUR
GOOD HUMAN-ANIMAL RELATIONSHIP

Description

Human-animal relationship tests are behaviour tests designed to assess the quality of the relationship between sheep and humans. The sheep perception of humans will affect the amount of fearfulness expressed by sheep towards humans. This may impede the ability of stockworkers to properly inspect animals, and may cause injuries if excessive panic responses are elicited. This test assesses the ability of a stockworker to properly examine the animals by measuring the response of animals to the normal method of approach.

How to assess [Flock level]

Farmer or main sheep stockworker should be asked to approach the sheep in the normal manner (so this can be on foot, on quad bike, in vehicle etc., record method of approach) as if s/he were inspecting sheep. The purpose of this assessment is to gauge whether stockworkers can feasibly approach their stock in order to carry out an inspection. Assessors should be as far away as is feasible to record the data without disturbing the sheep.

How to score [Flock level]

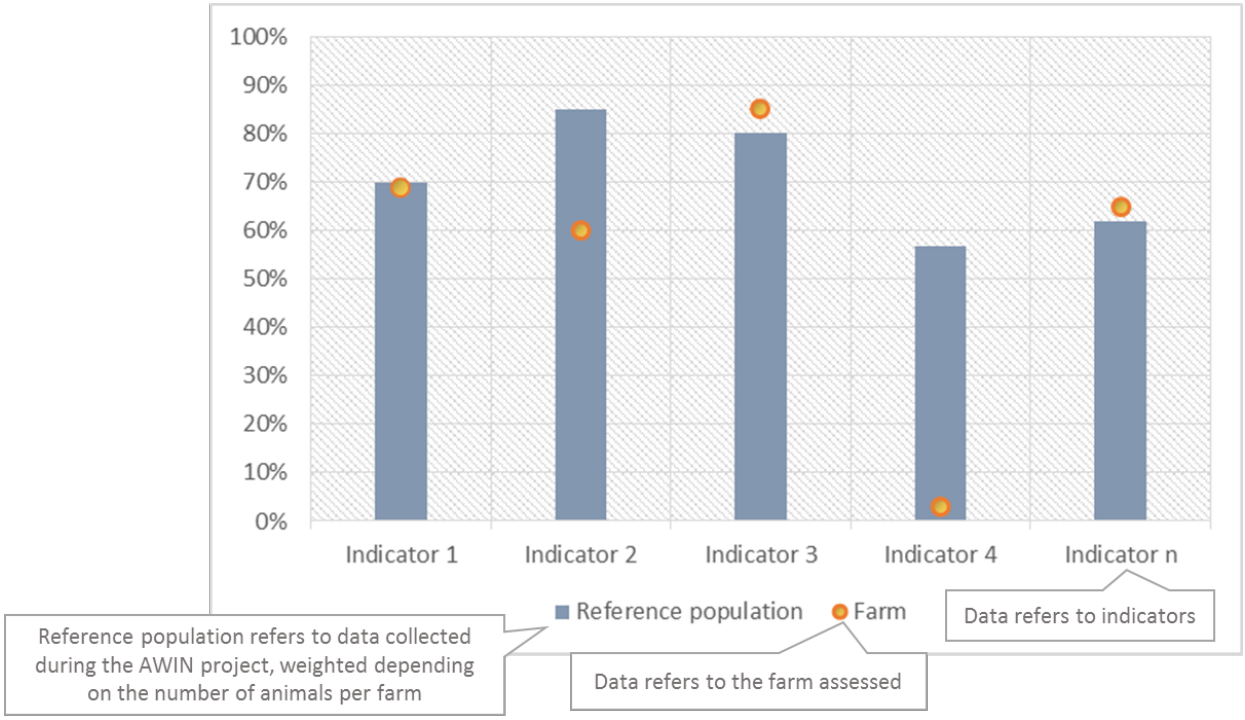
Record the closest possible distance of approach before a flight response is elicited. If no flight response is triggered (sheep remain motionless at human approach) this should be recorded as 0 m. If the sheep actively move towards (sheep walk directly towards the stockperson) and interact (sniffing, nosing) with the stockperson this should be also recorded.

Sheep in flight at familiar human approach

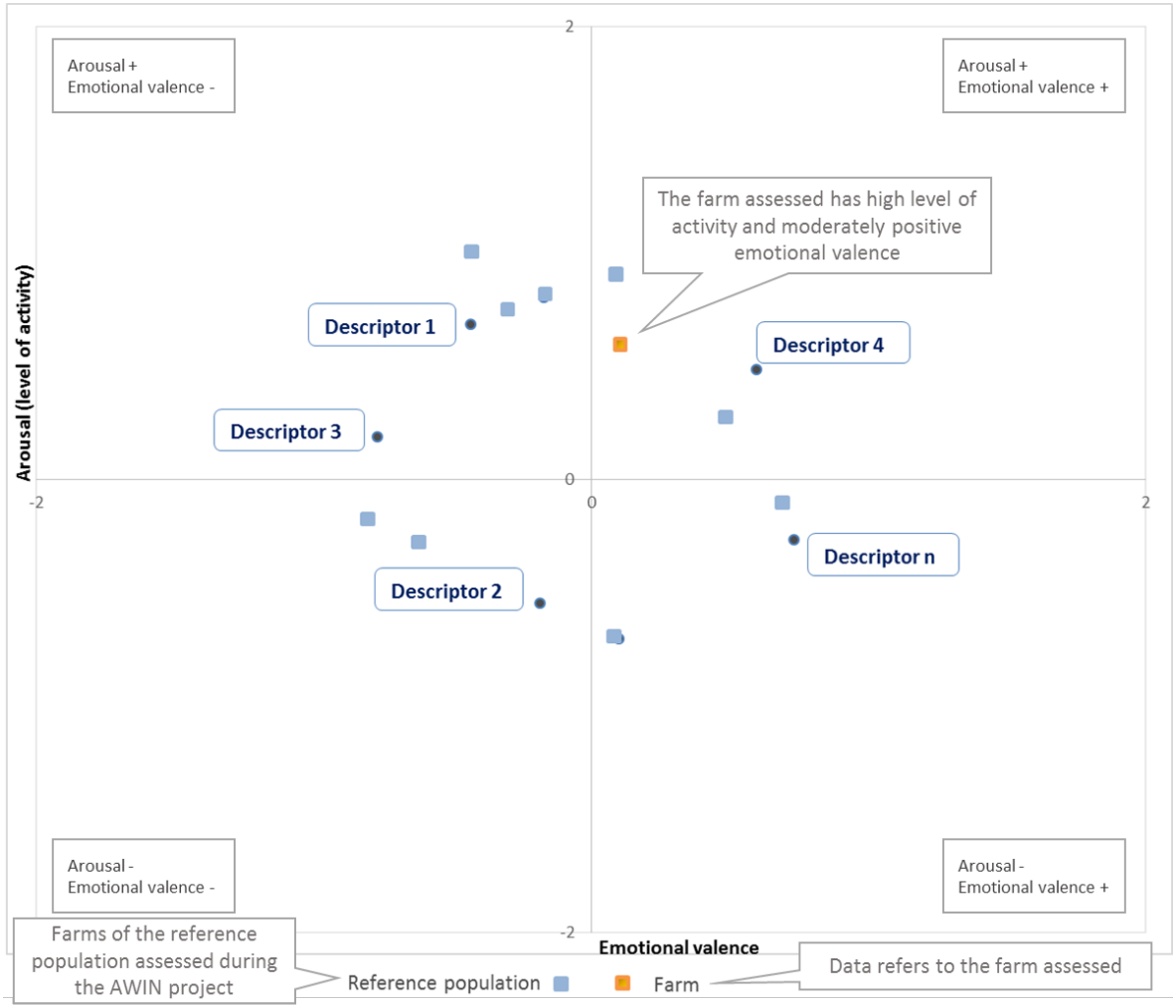
Sheep voluntarily interacting with farmer

5. OUTCOME OF THE ASSESSMENT

After the assessment, welfare data should be entered into a data set and an objective descriptive output should be generated. The aim of the output is to give a visual feedback on the welfare of the animals on the farm, to highlight positive conditions and enable comparison with a reference population. Currently, the reference population displayed in the output refers to data collected during the AWIN project (17 UK meat sheep farms visited in autumn/winter and 16 UK farms visited in spring/summer; 15 Spanish sheep farms [9 dairy sheep; 6 meat sheep] visited in autumn/winter and visited again in spring/summer). All the indicators are displayed in this output and the position of the assessed farm is highlighted in comparison to the median value of the reference population. All data used to calculate the proportion of each indicator is weighted according to the number of sheep on the farm. An example is given below:



QBA could be considered as an additional indicator that is a valuable tool when discussing the general demeanour of the animals with the farm manager. In the QBA output, a Principal Component Analysis (PCA) plot is generated from the data of the reference population and farm values are included with those of the reference population and shown in a different colour. An example is given below:


Arousal +
Emotional valence -
Arousal +
Emotional valence +
The farm assessed has high level of activity and moderately positive emotional valence
Descriptor 1
Descriptor 4
Descriptor 3
Descriptor n
Descriptor 2
Arousal - Emotional valence -
Arousal - Emotional valence +
Arousal (level of activity)
Emotional valence
2
0
-2
-2
0
2
Farms of the reference population assessed during the AWIN project
Reference population
Farm
Data refers to the farm assessed

5.1 First level welfare assessment

Indicators recorded in different areas of the farm should be summed and corrected for the total number of animals across the different groups. Exceptions are where animals are both housed and in fields/pastures on the same farm where indicators should be expressed separately for housed animals and animals maintained outdoors at the time of assessment.

First level indicators are expressed as follows:

Welfare Indicator	How to report data in the output
Lamb survival	1) Lamb mortality = (number born dead + losses to weaning) / (number of lambs born alive + number born dead) * 100 AND/OR 2) Scanning percentage = (number of lambs scanned / number of ewes mated) * 100. Lamb losses = (number of lambs scanned – number of lambs reared) / (number of ewes mated) * 100 OR 3) (Number of lambs weaned / number of ewes mated) * 100
Water availability	100% if all animals have access to a clean and adequate water supply 50% if all animals have adequate access to water but water is dirty 50% if water is clean but not all animals have adequate access 0% if water supply is inadequate and dirty
Fleece cleanliness	Proportion of ewes with clean fleece: scores 0 and 1 if the weather is dry at assessment; scores 0, 1 and 2 if the weather is wet.
Panting	Proportion of ewes that show normal respiration
Access to shade and shelter (outdoor animals only)	100% if all ewes have access to shade or shelter if required 50% if some but not all ewes have access to shade/shelter 0% if no ewes have access to shade/shelter
Stocking density (indoor animals only)	100% if assessed pens provide good space availability 50% if assessed pens provide adequate space availability 0% if assessed pens provide poor space availability
Lameness	Proportion of ewes that are not lame (scores 0 and 1)
Faecal soiling	Proportion of ewes that have an acceptably clean breech area (scores 0, 1 and 2)

Fleece quality	Proportion of ewes that have good fleece coverage
Tail length	Proportion of ewes that have full tails + ewes that have docked tails that are of an adequate length
Social withdrawal	Proportion of ewes that do not show social withdrawal during the 20 minutes of observation
Stereotypy	Proportion of ewes that do not show stereotypic behaviour during the 20 minutes of observation
Excessive itching	Proportion of ewes that do not show excessive itching or scratching during the 20 minutes of observation
QBA	PCA score plot
Familiar human approach test	Closest distance of approach of human to sheep Sheep initiated voluntary contact (Y/N)

5.2 From first to second level welfare assessment

Performance of the second level assessment is recommended when there is a noncompliance with the current legislation or at least one of the following conditions is present for any of the following indicators:

Welfare Indicator	**Condition**
Lamb survival Fleece cleanliness Lameness Faecal soiling Fleece quality Stocking density	The within-farm proportion of animals is equal to or lower than the proportion of animals observed in the worst 5% of the farms in the reference population.
Water availability	A score of 0% is given.
Tail length	The within-farm proportion of animals is equal to or lower than the proportion of animals observed in the worst 5% of the farms in the reference population, unless the farmer can provide evidence that the animals were bought in and were tail docked before arrival at the farm.
Familiar human approach test	The distance is equal to or greater than the distance recorded for the worst 5% of farms in the reference population.

5.3 Second level welfare assessment

Second level indicators are expressed as follows:

Welfare Indicator	How to report data in the output
Body Condition Score	Proportion of ewes scored as 'good'
Fleece cleanliness	Proportion of ewes with clean fleece: scores 0 and 1 if the weather is dry at assessment; scores 0, 1 and 2 if the weather is wet.
Fleece quality	Proportion of ewes with good fleece coverage and without evidence of ectoparasites
Hoof overgrowth	Proportion of ewes with appropriate length and shape of hooves
Head lesions	Proportion of ewes with no or minor lesions of head
Body lesions	Proportion of ewes with no or minor lesions of the body
Myiasis (flystrike)	Proportion of ewes with no evidence of myiasis
Leg injuries	Proportion of ewes with undamaged legs
Lameness	Proportion of ewes with no lameness (score 0)
Faecal soiling	Proportion of ewes with a clean breech area (dag score 0 and 1)
Mucosa colour	Proportion of ewes without anaemia
Ocular discharge	Proportion of ewes without ocular discharge
Mastitis (lactating ewes only)	Proportion of ewes with a healthy udder
Respiration quality	Proportion of ewes without respiratory problems
Tail length	Proportion of ewes that have full tails + ewes that have docked tails that are of an adequate length

TERMS AND DEFINITIONS

Animal-based indicator
Indicator that derives directly from the animal.

Assessor
Person in charge of collecting data using the welfare assessment protocol developed by AWIN on an individual animal or on the flock.

Ewe
An adult sheep of at least 1 year of age.

Ewe replacement
Female lamb retained on the farm after weaning to be used for breeding.

Farm/Holding
General designation for place/enterprise dedicated to animal production.

Farmer/Farm manager
Person in charge of the planning and daily management of the farm (usually also the owner of the animals).

Field
An outdoor fenced enclosure for keeping livestock.

Flock
Group of sheep kept under a common management system on the farm and for the same purpose.

Handling system
Series of gates and pens that allow for the movement and ease of handling of sheep.

Hill pasture
Area of rough grazing, usually at higher altitudes

Improved grazing
Pasture that has been re-seeded or fertilised or otherwise treated to provide higher quality nutrition for grazing livestock.

Infirmary pen
A pen for sick or injured animals.

Lactating ewe
Female sheep during the period of milk production, whether she is suckling a lamb or being milked.

Management-based indicator
Indicator which refers to husbandry procedures or decisions carried out by the farm manager or farmer.

Milking machine
Mechanical device used for milking sheep.

Milking parlour
Place where dairy sheep are milked.

Pen
Fenced or otherwise enclosed area where individuals or relatively small groups of animals are kept.

Quarantine pen
A pen housing newly acquired animals separately (to ensure that disease is not brought onto the farm), before they are mixed with existing animals.

Race
A narrow corridor, usually as part of a handling system, where animal can be moved in single file.

Ram
Male sheep. Typically refers to a breeding age male.

Reference population
Reference population is defined by the geographic area where the assessment occurred and/or the time period when the assessment occurred and/or the type of animals covered by the assessment. Throughout this document, the term "reference population" refers to data collected during the AWIN project (17 UK meat sheep farms visited in autumn/winter and 16 UK farms visited in spring/summer; 15 Spanish sheep farms [9 dairy sheep; 6 meat sheep] visited in autumn/winter and visited again in spring/summer).

Resource-based indicator
Indicator related to the environment or diet to which the animals are subjected.

Scan sampling
An observation strategy where a group of animals is scanned at set time intervals, and whatever each individual in the group is doing at the moment the scan is made is recorded (Martin & Bateson 2007 Measuring Behaviour: An Introductory Guide. Cambridge University Press, Cambridge, UK).

Scanned
Ultrasonic assessment of ewes to determine pregnancy and, in some cases, the number of foetuses being carried.

Sheep farm categorisation
For the purposes of determining which reference population is most relevant, sheep farms are classified by type according to the classification given by EFSA (Scientific Opinion on the welfare risks related to farming of sheep for wool, meat and milk production, EFSA Journal, 2014, 12(12), 3933). Farms are classified on the basis of the degree of close contact with humans, whether housing is used, and the amount and quality of additional food that the animals are provided with as follows:

Shepherded: continuous presence of the shepherd with the sheep.
Intensive: permanently housed with no outdoor access.
Semi-intensive: sheep have outdoor access but are housed for some periods at night and part of the day.
Semi-extensive: sheep are not normally housed (except possibly for a short period around lambing) but are maintained in fenced fields (including movement between different pastures).
Extensive: sheep are normally not housed at any time of the year but are maintained primarily on unfenced pastures. They are provided with supplementary feed as required during periods when natural pastures may not provide sufficient nutrients.
Very extensive: as for extensive except that supplementary food would not normally be provided.
Mixed: a combination of any of the above systems where the sheep may move between different systems at different times of the year.

Stockworker/stockperson
Person who provides husbandry (feeding, bedding, inspection etc.) to the animals, usually under the direction of the farm manager.

Unfenced pasture
Area, usually of unimproved pasture, where animals are not confined by fences but are free to roam.

Unit of measurement
A quantity used as a standard of measurement.

Weaning
Point where young animals are permanently separated from their mothers and raised apart.

Welfare assessment protocol

A assessment protocol is a description of the procedures and requirements for the overall assessment of welfare (WQ®).

Welfare criterion
A welfare criterion represents a specific area of welfare, which indicates an area of welfare concern (WQ®).

Welfare indicator
An observation, a record or a measurement used to obtain information on animal welfare.

Welfare principle
A welfare principle is a collection of criteria associated with one of the following areas: feeding, housing, health and behaviour (WQ®).

Units of measure are abbreviated according to standard International System of Units usage.

APPENDIX A – GENERAL ASSESSMENT QUESTIONNAIRE

Background information

Date:	Assessor:	Farm:
Country:	Region:	Town:

ANIMALS

Numbers of adults: Considering the last 12 months/last complete breeding season how many animals of these different types were present on the farm:

Breeding ewes (female animals that were exposed to a ram)	Rams (entire male animals over 6 months of age kept for breeding)	Young stock (e.g. ewe replacements)

Numbers of lambs: provide as much of the following information as is available (where the accuracy of the records can be verified e.g. contemporaneous lambing records).

1) Were the ewes scanned in pregnancy for litter size determination: Yes ☐ No ☐

If yes, what was the total number of lambs scanned as conceived by the flock: ☐

2) Are contemporaneous records of lamb mortality made at lambing available: Yes ☐ No ☐

If yes, how many of these types of lambs were recorded on the farm:

(a) Lambs born alive (a)	(b) Lambs born dead (stillborn)	(c) Lambs born alive but died before weaning

Calculate:

Total number of lambs born (= a + b):

Number of lamb losses (= b + c):

Percentage lamb mortality: Number of lamb losses / Total number of lambs born x 100: ☐

If information from (1) and (2) are available: losses scanning to birth (total number of lambs scanned – total number of lambs born) x 100: ☐

3) Record the total number of lambs produced by the farm in the last breeding season (N.B. - This list should cover all lambs produced by the farm but with each lamb recorded only in one category to avoid double counting).

Lambs sold for finishing	Lambs sold for slaughter	Lambs sold for breeding	Lambs retained on farm for breeding	Other lambs produced not covered by previous columns	TOTAL

Calculate lamb survival as: (total number of lambs produced / total number of breeding ewes) x 100:

FARM CHARACTERISTICS

Production purposes

What is the main purpose of keeping sheep:

Milk	
Meat	
Wool	
Environmental management	
Other (specify)	

What is the main breed/ breed type kept on the farm

Ewes	
Rams	

Farm size/type

What are the main facilities (that are under the farm managers control) available on the farm for sheep (N.B. - For mixed species farms focus only on those that are used for sheep housing and grazing:

Sheds or housing for sheep (number/type)	
Area of fenced improved grazing (ha)	
Area of fenced unimproved grazing (ha)	
Area of fenced hill pasture (ha)	
Area of unfenced hill pasture (ha)	
Is common/shared grazing used?	

Are ewes ever housed:

Yes	
No	

If yes:

How many are housed (e.g. all, triplet-bearing ewes only, etc.)	
When are they housed (e.g. permanently, overnight, only at lambing etc.)	
For how long (weeks per year)	

Based on this information what type of sheep farm is this (see Terms and Definitions):

- Intensive ☐
- Semi-intensive ☐
- Semi-extensive ☐
- Extensive ☐
- Very extensive ☐
- Mixed (specify mix): ☐
- Shepherded ☐
- Other (specify): ☐

MANAGEMENT PRACTICES

Does the farm have a written health plan?

- Yes ☐
- No ☐

Are male lambs on the farm usually castrated?

- Yes ☐
- No ☐

If yes, what method is used to castrate lambs:

- Rubber rings (elastration) ☐
- Burdizzo or other form of clamp ☐
- Knife/surgical castration ☐
- Banding ☐
- Immunocastration ☐
- Other (specify) ☐

At what age are lambs usually castrated?

- At birth (<24 h old) ☐
- Older than 24 h but less than 7 days ☐
- Older than 7 days but less than 3 months ☐
- Older than 3 months ☐

Is any form of local anaesthesia or pain relief given at castration?

- Yes ☐
- No ☐

Is it clear that the farm manager has considered whether there are alternatives to physical castration to manage male lambs?

Yes	
No	

Specific for dairy sheep:

Please indicate whenever the farm takes part on or implements any of the following practices:

Breeding scheme			
Milk recording program			
Artificial Insemination		If yes, indicate the fertility achieved for the last year (%)	
Milking machine		If yes, indicate the frequency of technical revision	

Milking season and management practices:

Date of start of the milking season (month)	
Date of ending of the milking season (month)	
Sheep are milked just after lambing, and lambs are artificially reared (Yes/No)	
Teat cleaning previous to milking (Yes/No)	
Teat dipping after milking (Yes/No)	
Sheep are provided with an intramammary antibiotic treatment at drying-off (Yes/No)	
Number of sheep culled due to mastitis during the last year	

Milk production data:

Number of sheep milked during the last milking season	
Average annual milk yield per sheep (l)	
Average length of lactation per sheep (d)	
Somatic cell count (data from the last control available or average data from the last milking season)	

APPENDIX B – FIRST LEVEL WELFARE ASSESSMENT RECORDING SHEET (GROUP ASSESSMENT)

Background information

Date:	Assessor:	Farm:
Country:	Region:	Town:

GROUP OBSERVATION INFORMATION

Sub-group identity	
Sub-group location (housed/field etc.)	
Number of ewes in the sub-group	
Time of observation start	
Weather (outdoor observations only)	

UNDISTURBED/BEHAVIOURAL OBSERVATIONS

1) ***QBA*** conducted (see Appendix C)

Yes	
No	

2) ***Abnormal behaviour***

	Number of animals per group	% of group
Stereotypy		
Social isolation		
Excessive itching		

3) ***Panting***

	Number of animals per group	% of group
Mild heat stress		
Panting		

HEALTH OBSERVATIONS

1) ***Fleece cleanliness***

	Number of animals per group	% of group
Very damp/wet, soiled with mud or faeces (2)		
Very wet, very heavily soiled (3)		
Filthy, caked in mud or faeces (4)		

2) Fleece quality

	Number of animals per group	% of group
Significant fleece loss		

3) Tail length

	Number of animals per group	% of group
Undocked (full tail)		
Docked		
Short docked		

4) Faecal soiling

	Number of animals per group	% of group
Soiling and dags (3)		
Extensive soiling and dags (4)		

5) Lameness

	Number of animals per group	% of group
Minor lameness		
Lame		
Severely lame		

HUMAN-ANIMAL RELATIONSHIP

Familiar human approach test

Flight observed	Yes		Distance	
	No			
Sheep approached	Yes			
	No			
Sheep voluntarily contacted human	Yes			
	No			

Comments and notes

RESOURCE-BASED MEASURES

Housed ewes only: Pen dimensions	Length (m)		x	Width (m)	
			=	Area (m^2)	

Lambs present?	Yes	
	No	

Outdoor ewes only:

Accessible shade/shelter?	Yes	
	No	

All ewes – drinker availability

	Number available	Dirty	Partly dirty	Clean	Accessible/Functional	
					Yes	No
Bucket/trough						
Automatic drinker						
Natural water source						
Other (specify)						

Comments and Notes

QBA score sheet

Sub-group identity	
Sub-group location (housed/field etc.)	
Number of ewes in the sub-group	

Alert _____

Active _____

Relaxed _____

Fearful _____

Content _____

Agitated _____

Sociable _____

Aggressive _____

Vigorous _____

Subdued _____

Physically uncomfortable _____

Defensive _____

Calm _____

Frustrated _____

Apathetic _____

Wary

Tense

Bright

Inquisitive

Assertive

Listless

Comments and Notes

APPENDIX C: SECOND LEVEL WELFARE ASSESSMENT RECORDING SHEET (INDIVIDUAL ASSESSMENT)

Background information

Date:	Assessor:	Farm:
Country:	Region:	Town:

INDIVIDUAL ANIMAL INFORMATION

Ear tag/identity	
Breed/breed type	
Reproductive status (pregnant/lactating/dry)	

INDICATORS

Body Condition score

Emaciated	Thin	Good	Fat

Lesions to head/neck region

Give number of lesions of different severity types in each region, and whether myiasis is seen

Number	Ears	Eyes	Face/muzzle	Head/neck
Minor				
Major				
Myiasis (Y/N)				

Ocular discharge present

Yes	
No	

Mucosa colour

Not anaemic (0)	Not anaemic (1)	Borderline anaemic (2)	Anaemic (3)	Severely anaemic (4)

Respiratory problems present

Yes	
No	

Lesions to body, legs and udder

Give number of lesions of different severity types, and whether myiasis is seen

Number	Body lesions	Legs	Udders and teats
Minor			
Major			

Myiasis Y/N			

Fleece cleanliness	Clean and dry (0)	Dry or damp, light soiling (1)	Wet, soiled with mud or faeces (2)	Very wet, heavily soiled (3)	Filthy (4)

Fleece quality	Good	Some loss	Significant loss

Hoof overgrowth	Yes	
	No	

Faecal soiling	None (0)	Very light soiling (1)	Light soiling and dags (2)	Soiling and dags (3)	Extensive soiling and dags (4)

Mastitis and udder lesions	None	Mild mastitis and/or minor lesions	Mastitis and/or severe lesions

Tail length	Undocked	Docked	Short docked

Lameness	Not lame	Minor lameness	Lame	Severely lame

Comments and Notes

AWIN CONSORTIUM

AWIN partners	Country
Scotland's Rural College, Edinburgh	Great Britain
Norwegian University of Life Sciences, Ås	Norway
Università degli Studi di Milano, Milan	Italy
Neiker-Tecnalia, Vitoria-Gasteiz	Spain
Universidade Positivo, Curitiba	Brazil

UNIVERSITY OF CAMBRIDGE	University of Cambridge, Cambridge	Great Britain
FACULDADE DE MEDICINA VETERINÁRIA	Universidade de Lisboa, Lisbon	Portugal
INDIANA UNIVERSITY	Indiana University, Bloomington	USA
VÝZKUMNÝ ÚSTAV ŽIVOČIŠNÉ VÝROBY, v.v.i. INSTITUTE OF ANIMAL SCIENCE	Institute of Animal Science, Prague	Czech Republic
PFERDEKLINIK HAVELLAND	Pferdeklinik Havelland, Equine Clinic, Beetzsee-Brielow	Germany
UNIVERSIDADE DE SÃO PAULO FACULDADE DE MEDICINA VETERINÁRIA E ZOOTECNIA	Universidade de São Paulo, Pirassununga	Brazil

Colophon

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