8

Auditing cow welfare

This chapter presents a series of frameworks to help assess the state of a cow's welfare.

The main points of this chapter

- The five basic freedoms for good animal welfare are freedom from hunger and thirst, discomfort, pain, fear and distress as well as the freedom to express normal behaviour. These form the basic elements of many animal welfare protocols.
- Direct animal measurements are good indicators of an animal's current wellbeing and help identify longer-term animal welfare problems. These should integrate long-term consequences of past husbandry practices, be non-intrusive, and free from observer bias.
- A generic welfare assessment protocol is presented and can be used to evaluate the welfare practices on small holder dairy (SHD) farms.
- This chapter also presents two case studies. The first, evaluating animal welfare at 53 large-scale dairy farms in the UK, clearly demonstrates the enormous ranges in quantifiable cow welfare indicators, highlighting lameness to be a significant issue on most farms. It also shows that

while some farms were obviously worse than others, overall there were no thoroughly 'good' or 'bad' farms.
- The second case study, which investigates 112 SHD farms in Kenya, attributes many of the observed cow welfare problems to poor housing design and farmer ignorance.
- The second study also highlighted the farmers' very poor perception of cow welfare with most believing that animal suffering and its alleviation was not important and that animal comfort was unnecessary.

Traditionally, farm animal welfare audits have focused on the measurements of resources provided to the animal such as housing-related facilities, management practices and human–animal relationships. These are often difficult to quantify and may not necessarily result in improved standards of animal welfare although they can indicate risks or reasons for the animal's welfare. More direct animal measurements, such as behaviour and health, can be taken as better indicators of their current wellbeing and help identify longer-term animal welfare problems.

8.1 Indicators of animal welfare

Many different methods can be used to measure an animal's welfare, and a balance needs to be sought so that enough measures are taken to be rigorous, that the measures are scientifically based and that the data can be collected in a timely manner. When choosing direct measures of welfare, several factors need to be considered. Indicators should integrate the long-term consequences of past husbandry practices. They should be non-intrusive, so as to cause minimal disturbance to the animal's natural behaviour. They must be reasonably free of observer bias. They should highlight welfare problems and identify failures in farm management that contributed to such problems.

Welfare observations should then be centred around three aspects:

- Validity. *What does this indicator tell us about the animal's welfare state?*
- Repeatability. *Do different observers always see the same problem?*
- Feasibility. *How easy is it to record this indicator?*

Most approaches to welfare assessment are based on indicators of reduced welfare. Understandably this is because the greatest compromise to welfare lies with negative situations. However, it is also worthwhile putting more emphasis on indicators of *good* welfare. Farmers providing a non-stressful environment for the cows to live in and positive social interactions would be considered the main components of good welfare. Social and non-social play in calves or social licking in adult cows are examples of positive social activities, and stock are only

motivated to perform such behaviours once the animal's primary needs are satisfied. Animal welfare research and assessment are moving in this direction, and more objective indicators of positive welfare will be developed with time.

8.1.1 Five basic freedoms of livestock

The welfare requirements of cattle can best be summarised in the 'five freedoms' (Farm Animal Welfare Council 2009). These were originally developed by the UK government as a part of a report into farm animal welfare (Brambell 1965) but are now applied to all animals under the care of humans. These five freedoms are as follows:

1. Freedom from hunger and thirst, through ready access to fresh water and a diet to maintain full health and vigour.
2. Freedom from discomfort, through provision of appropriate shelter and comfortable resting areas.
3. Freedom from pain, by prevention and, when sick, rapid diagnosis and treatment.
4. Freedom from fear and distress by ensuring the animal lives in conditions that avoid mental suffering.
5. Freedom to express normal behaviour by providing adequate space, proper facilities and the company of other animals.

These five freedoms address both physical fitness and mental suffering and are best viewed as a practical, comprehensive checklist to assess the strengths and weaknesses of any husbandry system. There is a hierarchy of needs in cattle and the five freedoms should not be taken to imply that all animals should be free from exposure to any stress, ever. The aim is not to eliminate stress but to prevent suffering and to progress towards improved welfare by providing for the animal's needs. Suffering occurs when animals fail or have difficulty in coping with stress. All dairy cattle management and housing systems should be designed, constructed, maintained and managed to assist with these 'five freedoms'. In addition, they provide the framework of the recommended protocol for welfare of dairy stock on tropical SHD farms detailed in Chapter 10 of this manual.

8.1.2 Key Performance Indicators of cattle welfare

Key Performance Indicators (KPI) can act as a guide to help farmers diagnose the strengths and weaknesses in their dairy enterprise. In simple terms, KPIs are then diagnostic tools to help identify weaknesses adversely affecting farm performance. Farmers can use these indicators to identify areas of animal welfare weaknesses, and help to give them an idea of their performance in relation to other farms.

Comparing between farms can be a useful way to bring about changes, as farmers are more likely to try to improve their management practices if they can identify where they are compared to others in terms of welfare and productivity. There are various KPIs available for SHD farmers that cover health, productivity and welfare, and many of these have been highlighted by Moran (2009b).

The Welfare Quality (2009) project has listed 12 such KPIs that relate to animal welfare. This is specifically for the first four 'basic freedoms of livestock', as the fifth freedom, to express natural behaviour, should be assured if all else is satisfied (see Figures 8.1, 8.2 and 8.3).

1. Animals should not suffer from prolonged hunger.
2. Animals should not suffer from prolonged thirst.
3. Animals should be comfortable, especially within their lying areas.
4. Animals should be in a good thermal environment.
5. Animals should be able to move around freely.
6. Animals should not be physically injured.
7. Animals should be free of disease.

Figure 8.1: These free stalls are too short and have no soft bedding.

Figure 8.2: These cows are permanently tethered with appalling hygiene.

Figure 8.3: A very common problem in many tropical small holder farms, no clean drinking water, only mixed in as a slurry with the concentrates and only offered twice each day.

8. Animals should not suffer from pain induced by inappropriate management.
9. Animals should be allowed to express natural, non-harmful, social behaviours.
10. Animals should have the possibility of expressing other intuitively desirable natural behaviours such as exploration and play.
11. Good human–animal relationships are beneficial to the welfare of animals.
12. Animals should not experience negative emotions such as fear, distress, frustration or apathy.

It is noted that these KPIs are without quantitative descriptors, making it difficult to ensure repeatability of measures if using this list alone. Full details on how these KPIs can be measured are available online, and the reference for this is given in the list of References at the end of this book.

8.1.3 A simplified scoring system for assessing dairy cow welfare

We have developed the key issues highlighted above into a simplified 'farmer friendly' scoring system to assess dairy cow welfare (presented in Table 8.1) that we believe is well suited to the thousands of SHD farmers throughout Asia. It contains 36 questions or observations, is based on the 'five freedoms of animal welfare' and addresses both tethering and loose housing. The questionnaire is a combination of different auditing systems for dairy cattle, including those from World Society for the Protection of Animals (WSPA) (Blaszak 2011), AssureWel (2010), Welfare Quality (2009) and Food and Agriculture Organisation (2011). It has been developed to focus more on good rather than poor animal welfare, so the higher the score, the better the welfare for the animals. Because many SHD farmers have few milking cows, we have used 0%, 30% and 90% of the herd as criteria of good stock welfare practices. Tables 8.1 and 8.2 have also been presented as Appendix 5 for ease of copying for distribution to other dairy stakeholders.

How to use this scoring system

1. Complete the details on farm. Animal numbers are important for score calculations.
2. Each of the 'five basic freedoms of animal welfare' is assessed.
3. Each measure is assigned a total of 1.0. The total for each freedom is scored according to the number of measures answered. If the measure does not apply to that particular farm (for example, it may not have any young calves), this should not be taken into account in the total.
4. For each measure, when 'yes' applies to more than 90% of animals, 1.0 points are scored. When 'yes' applies to 30% or less of animals, 0.0 points are scored. When 'yes' applies to 30–90% of animals, 0.5 points are scored.

Table 8.1. A simplified dairy farm animal welfare assessment form.

Details of farm	
Farm location	
Cooperative or feedlot	
Date and time of visit	
Owner/person responsible	
Total number of milking cows on farm	
Total number of calves on farm	
Measure	**Score**
1. Freedom from hunger and thirst	
Do all animals (including calves) have continuous access to water?	
Are all feeders and drinkers functional?	
Are feeders and drinkers clean?	
Are cows in a body condition score between 2 and 4 out of 5 (Chapter 6.1)?	
Do cows have a rumen score appropriate to their point of calving (Chapter 6.6)?	
Are calves fed colostrum?	
Are cows fed a quality mixed ration?	
TOTAL	
2. Freedom from discomfort	
Do cows have a cleanliness score of 2 or less out of 5 (Chapter 6.5)?	
Is bedding provided?	
Is bedding clean and deep enough for cows to lie comfortably?	
Can animals lie down and get up easily?	
Is there shelter from extreme weather?	
Are cows free from hock sores?	
Are cows free from pressure sores?	
Are cows free from any signs of heat stress (< 70 breaths per minute)?	
TOTAL	
3. Freedom from pain, injury and disease	
Are cows free from injuries on their bodies?	
Do cows have a locomotion score of 2 or less out of 5 (Chapter 6.2)?	
Are cows free from clinical disease?	
Do cows have healthy hooves (e.g. no incidences of the diseases described in Chapter 6.3)?	
Do cows have clean, healthy-looking udders?	
Do cows have teat scores of 2 or less out of 4 (Chapter 6.8)?	
Do cows have their tails intact?	
Have calves been disbudded (not dehorned)?	
Have male calves been castrated at 3 months of age or less?	
TOTAL	

(Continued)

Table 8.1. Continued

4. Freedom from fear and distress	
Do cows approach the stockperson?	
Do calves approach the stockperson?	
Will the cows let the stockperson approach within 3 m?	
Can cows be moved gently, without hitting, yelling?	
Will cows walk slowly, not run, when encouraged to move by the stockperson?	
TOTAL	
5. Freedom to express normal behaviour	
Are cows free to move (untethered)?	
If tethered, are cows given access to move freely each day?	
Are calves housed in appropriate groups (between 2 and 8)?	
Can animals turn around fully in their cubicle?	
Is there a minimum of dry lying area of 3.5 m^2 for adult cattle/bulls and 2.5 m^2 for growing heifers?	
Is there evidence of normal social behaviours (limited aggressive interactions during feeding and resting)?	
Are stereotypical behaviours minimal?	
TOTAL	

5. Methods for scoring body condition, rumen fill, cleanliness, locomotion, hooves and teat scores are provided in Chapter 6.
6. Appendix 5 presents a second copy of the scoring system for copying and use on farm.

Once this form was developed, the next step was to make a value judgement as to the quality of animal welfare on that particular farm. This step is still evolving because we first need to collect sufficient on-farm data to quantify the range of farm assessment scores likely to be encountered; this may lead to some modifications and improvements in the type of data collected. Not every question can be answered for every farm, so it is not possible to develop an identical generic summary form for every farm visit. Table 8.2 provides a framework to calculate the animal welfare status of each farm visited. It is based on calculating a single value for each of the five freedoms then developing an overall stock welfare index based on equal weightings of each of these five freedoms. This makes a value judgement that the five freedoms are of equal importance and so have equal impact on the cow's wellbeing. This assumption may require further discussion and feedback from some of the world's animal welfare experts. So Table 8.2 is a 'work in progress' but we believe it forms the basis of a relatively robust, yet quick, assessment of animal welfare on an individual small holder or large-scale farm.

Table 8.2. Calculation of an animal welfare index following a farm visit.

1. Freedom from hunger and thirst	
Total number of measures recorded (A); maximum of 7	
Sum of scores recorded (B)	
% score for Measure 1 (A/B x 100)	
2. Freedom from discomfort	
Total number of measures recorded (A); maximum of 8	
Sum of scores recorded (B)	
% score for Measure 2 (A/B x 100)	
3. Freedom from pain, injury and disease	
Total number of measures recorded (A); maximum, of 9	
Sum of scores recorded (B)	
% score for Measure 3 (A/B x 100)	
4. Freedom from fear and distress	
Total number of measures recorded (A); maximum of 5	
Sum of scores recorded (B)	
% score for Measure 4 (A/B x 100)	
5. Freedom to express normal behaviour	
Total number of measures recorded (A); maximum of 7	
Sum of scores recorded (B)	
% score for Measure 5 (A/B x 100)	
6. Farm animal welfare index	
Mean value of all five % above	

8.2 Case studies of dairy cow welfare

This section outlines two examples of how on-farm welfare has been measured using case studies. One example is in large European dairies, and the other in small African dairies. Both studies detail what recordings were taken and the conclusions made following the assessment of welfare. Together, they provide some examples of animal welfare issues likely to be found on Asian dairies and ways that they can be assessed.

8.2.1 Results from a UK study of dairy cow welfare indicators

Work by Whay *et al.* (2003) developed an on-farm scoring system for dairy cattle welfare. Measurements were chosen based on the 'five basic freedoms of animal welfare' and they collected data through both direct observations of animals and from farm records. A summary of the welfare measures used and the data collected is presented in Table 8.3. A total of 53 farms were studied and the results were

divided into five bands, A to E, with the farms in the top 20% in band A and the worst scoring farms in band E. The allocation of a farm to a particular band was specific to each observation, and so each band would have contained different farms for each indicator.

There was a good association between levels of mastitis estimated by the producer and recorded incidences. This was not the case with lameness, however, with herd records for lameness being much lower than farmer perceptions, and farmer perceptions being much lower than levels of lameness scored in the on-farm assessment. (5.7 v 22.1%). These three sets of data have also been italicised in

Table 8.3. Results profile for welfare indicators on 53 dairy farms in United Kingdom. A, B, C, D and E refer to quintile bands of 20% of the farms.

	Unit	A	B	C	D	E
Production Annual milk yield	L/cow	8300–10 500	7789–8200	7118–7652	6500–7000	4275–6313
Nutrition						
Thin cows	%	0–6	6–11	13–21	22–31	33–62
Fat cows	%	0	0	0	1–6	5–28
Bloated rumen	%	0	3–6	7–17	18–24	25–47
Hollow rumen	%	0–6	7–14	14–21	21–31	32–82
Milk fever (Est) *	%/yr	0	0	0	1	1–31
Metabolic diseases (Est)	%/yr	0–3	3–4	5–7	7–9	10–19
Reproduction						
Conception to first service (Est)	%	68–80	60–66	56–59	49–55	28–48
Assisted calvings (Est)	%/yr	0	0	1	1–5	5–40
Disease						
Mastitis (Rec)	%/yr	0–9	11–21	21–34	41–46	47–120
Mastitis (Est)	%/yr	3–13	15–19	20–33	33–47	47–89
Lameness	%	0–14	14–18	20–23	24–30	31–50
Lameness (Rec)	%/yr	0	0	2–4	4–11	11–42
Lameness (Est)	%/yr	3–9	9–14	15–21	21–34	35–54
Claw overgrowth	%	0–12	12–25	27–34	35–46	46–76
Poor claw conformation	%	0	0	3–7	7–17	18–37
Dull/obviously sick	%	0	0	2–3	4–6	7–20
Sudden death/casualty (Est)	%/yr	0–1	1–2	2–3	3–4	4–16
External appearance						
Dirty hind limbs	%	65–85	90–96	97–100	100	100
Dirty udder	%	0–8	10–18	18–23	24–33	36–70
Dirty flanks	%	0	2–7	8–11	14–23	26–78
Hair loss	%	0	4–7	8–13	15–31	33–88
Environmental injury						
Hock hair loss	%	0–8	10–22	22–45	47–71	100
Swollen hock	%	0–11	11–28	29–36	37–68	70–97
Ulcerated hock	%	0	3–4	5–12	12–25	29–50
Non-hock injuries	%	6–43	46–59	59–66	67–79	80–100
Behaviour						
Average flight distance	m	0.6–1.1	1.2–1.5	1.5–1.7	1.7–1.9	2.1–3.4
Idle cows	%	0–3	3–4	5	6–8	8–25
Rising restrictions	%	0–10	12–20	30	33–40	50–78

*Est, estimated by the farmer; Rec, recorded by the farmer; all other data was observed by the research team during one visit.

Table 8.3. These results suggest that farmers are not detecting lameness, and this was highlighted as a major area where dairy cow welfare needed improving in the UK.

The research team also consulted experts to devise a threshold value, or a value at which experts believe action to address the issue should be taken. Whay *et al.* (2003) concluded that of the 53 farms, 32 needed to take action to reduce mastitis problems while 42 needed to actively reduce their feet and lameness problems. Furthermore, it was concluded that there were no consistently good or bad farms, rather that farms had different welfare strengths and weaknesses.

This experimental approach would have contributed to the formation of the protocols to measure welfare described above. This research could also be used as a blueprint to developing similar ways in small holder dairying to identify problem farms and second, to identify the farms with better stock welfare and herd performance.

8.2.2 Results from an African study highlighting poor cow welfare

Nguhiu-Mwangi *et al.* (2013) recently reported on a range of indicators of poor cow welfare on 112 SHD farms in Nairobi, Kenya. Like many Asian countries, the bulk (in this case 80%) of Kenya's domestic milk supplies originates from small holder farmers each with 2 to 20 zero-grazed milking cows. These small herds consist of mainly exotic European dairy breeds, making methods and results a useful point of comparison with Asian dairying systems.

The Kenyan study was directed towards two key aspects of welfare: first, the existence and degree of claw lesions, and second, body injuries, condition and body soiling. Both datasets were used to predict the welfare of zero-grazed dairy stock, accounting for different farm environments and management practices. While the study covered these aspects well, milk yields were not reported, and so an assessment of productivity was not performed.

A total of 300 cows, mainly Friesian crossbreds, on 32 farms were examined in the first study, following washing and trimming of their hind claws. For the second study, body condition, body soiling and signs of external body injuries were examined in additional 306 cows from 80 other farms. In both studies, herd sizes averaged 10, ranging from 5 to 20 milking cows, and a maximum of 5 cows per herd were examined.

In the first study, 88% of the 300 cows presented with claw lesions, of which 69% were subclinical and 31% were clinical through showing evidence of lameness. In the second study, 35% of the cows on 73% of the farms were clinically lame.

Superficial injuries to the neck were observed in cows on 65% of these farms. This was the result of poorly designed feeding areas, including low positioning of neck bars over the feed and excessive width of feed bunks. Other design issues with the feed bunk caused behavioural issues. Inadequate feeding space per animal

often led to intensive competition and aggressive behaviour at feeding time. Very few of the feed bunks were concreted with many made of iron sheets and timber, and often with sharpened edges, which predisposed the cows to injuries in the mouth, head and neck areas.

Leg injuries, particularly of the front hocks (knees) were observed in 87% of the cows on 96% of the farms, while brisket injuries were observed in 44% of the cows on 64% of the farms. These were attributed to inadequate or no bedding in the stalls and the stalls simply being too small. Only 46% of the farms had any stall bedding, which varied from wheat straw, sawdust, wood shavings, plastic mats to bare wooden slats. In the remaining farms, cows either lay on dirt (53%) or concrete (47%). On 29% of the farms, the alleyways were not concreted, while in the concreted sheds, only 23% had good walking surfaces in which concrete was not too slippery or pitted with pot holes. Clearly hoof and leg health on many of these farms suffered due to the lack of soft, non-slip and washable floors with good drainage. In addition, the lack of comfortable bedding in the stalls discouraged the cows to lie down, this meant they had to endure long hours of standing in the alleyways.

Rib injuries were observed in 75% of the cows on 95% of the farms, as were hip injuries in 67% of the cows on 91% of the farms. Overstocking and poorly designed and maintained sheds were the major causes of these traumatic injuries. Teat, udder and thigh injuries were also prevalent, these being attributed to the roughness and bareness of the concrete floors and the stalls. The key predisposing factors to external body injuries clearly were the restrictiveness of housing types and the structures that affect cows' natural behaviour patterns. Even though the various injuries were the result of different risk factors, they were all due to the design, space and nature of the housing. With the key profit-driven objective of producing more milk, many of these farmers increased the size of their existing sheds or simply housed more cows. In both cases, without better strategic planning, cow welfare clearly suffered.

Low neck bars and high bunks in the feeding area increased the number of neck and brisket injuries, narrow alleyways increased hock injuries and poor quality, rough and pot-holed concrete floors increased the hip injuries. Teat, udder and thigh injuries all increased on farms where no bedding was provided. Lameness was closely associated with the quality of effluent management, such as the amount of slurry on alleyways. Small cubicles and overstocked sheds restricted movements and the expression of normal behaviour.

Cow body condition indicated moderate quality feeding management with very few cows being either too fat or too thin. Increasing the frequency and amount of concentrate feeding, mineral and protein supplements led to improved body condition scores. Surprisingly, 15% of the farmers did not feed concentrates at all, depending entirely on harvested forage to supply the nutrient requirements of

their milking cows. The forages ranged from Napier (*Pennisetum purpureum*), Kikuyu (*Pennisetum clandestinum*) and Rhodes grasses (*Chloris gayana*) and maize stover and occasionally banana plant stems. Concentrates were mainly commercially formulated (99%), fed mainly to the milking cows only (on 84% of the farms) with farmers feeding an enormous range in daily amounts; 32% fed from 2 to 4 kg, 29% fed from 5 to 7 kg, 24% fed from 8 to 10 kg while 14% more than 10 kg/cow/day. Mineral supplements were commonly fed (on 89% of the farms) whereas protein supplements were only fed on 36% of the farms.

Cow cleanliness was not good in that 97% of the cows had flank soiling and 90% had soiled udders. Only 55% of the farms removed slurry and cleaned and hosed down concrete floors each day. Cow cleanliness was closely associated with shed hygiene. Only 76% of the cows were milked outside their resting area, often in unsuitable improvised stalls. Only 12% of the farms had specific maternity stalls.

One of the more disappointing findings in this study was that farmers had very poor perceptions of cow welfare. Although across the two studies 99% and 89% of them agreed that milking cows should have ready access to feed and water, respectively, this was not always provided. Only 47% agreed on the need to alleviate unnecessary pain with prompt medical attention while just 25% shared the opinion that animals suffer when mistreated and they should be protected from conditions exposing them to distress. Only 29% considered that there was a need for good shelter and housing systems to avoid discomfort and physical stress while just 5% agreed to the need to provide sufficient housing space with adequate facilities to allow expression of normal behaviour patterns. The farmers and stockpeople also had poor human–animal interactions with shouting and whipping of cows commonly recorded.

In conclusion, substandard housing design, poor husbandry practices and farmer ignorance were the key factors leading to the poor cow welfare on these farms. Being aware of these issues is the first step to improving welfare.

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