

10

Addressing the problems of stock welfare

This chapter presents an overview on dairy cow welfare and how it can be assessed from cow behaviour. It also briefly discusses the management of stock surplus to the dairy herd.

Stock welfare is a key issue for both smallholder and large-scale dairy farmers, probably more so with smallholders because many of these farmers have had limited exposure to dairy cows, calves and heifers, hence are less aware of what constitutes normal and abnormal behaviour. With large-scale operations, when large numbers of stock are forced to coexist in close proximity, any key issues arising from poor stock welfare can be magnified and lead to even greater problems and usually lower productivity.

Clearly understanding and interpreting cow behaviour is the key to recognising existing and potential problems of cow wellbeing, comfort, and hence, welfare. The reader is directed towards one of the senior author's books on this topic, called *Cow Talk: Understanding Dairy Cow Behaviour to Improve Their Welfare on Asian Farms* (Moran and Doyle 2015).

10.1 What do dairy cows really want?

Not every aspect of their surroundings is equally important to the cow. Bos *et al.* (2009) list just nine key factors in any dairy husbandry system that have important impacts on dairy cow welfare, these being:

1. At least one comfortable and spacious resting spot for every cow: cows like to rest together as a group. Rest is a necessity of life for the cow.
2. Good feed and sufficient drinking water: the feed must enable the cow to maintain her body functions and produce milk. It must contain sufficient dry matter, energy protein, fibre, minerals and vitamins to allow normal rumen digestion. Cows are selective when it comes to food so it must be tasty, varied and fresh, and not contaminated with manure or saliva.
3. Complete freedom of choice to move within the area and within the herd: cows want to make up their own minds. They want to be able to get out of the way of higher-ranked animals and in large herds, they like to split up into smaller groups. Sometimes a cow wants to get away from the group. Yet, she still wants to be able to see and hear her herd mates.
4. Calm and predictable handling by people, so she can move at her own pace: cows like orderly lives and prefer to know what to expect. Driving them and other unfriendly treatment will cause stress.
5. No negative stimuli such as leakage of electrical current and cow trainers (electric wires placed on top of free stalls). Negative stimuli will cause (chronic) stress that adversely influences both health and welfare.
6. No impact of obstacles while getting up, lying down and during resting, as well as being able to lie down at some distance from other cows. Cows like to lie down in the way they would while at pasture. They want their own personal space, but may still like to lie close together.
7. A comfortable climate: this is one with a THI below 71, which is equivalent to 27°C at 30% relative humidity or 24°C at 70% humidity. This avoids the stresses from being too hot.
8. Passage ways and feeding areas with a nonslip, dry and clean floor without sudden changes in the level, texture or shadows. If the floor is too smooth, cows may slip; if too rough, they may damage their feet. Uneven, wet or dirty floors are detrimental to leg and hoof health.
9. Sufficient light during the day (more than 200 lux, which is equivalent to general home lighting rather than a well-lit office): cows must be able to see their surroundings properly, so they can recognise their herd mates, explore their surroundings or play with their companions. In addition, light is important for fertility, which in turn is in the farmer's interest.

Providing all these prerequisites will ensure a happy, contented and productive herd.

10.2 Problems of confinement

Dairy stock imported from Western countries have almost invariably been reared under grazing conditions, hence have not usually been exposed to a continual shed

environment, as is common on most smallholder and large-scale farms. Compared to grazing, confinement creates specific problems such as:

- restricting opportunity to seek comfort, for example, if cows are only provided with cement floors
- creating problems of high humidity, which can be more detrimental than high temperature
- limiting opportunity for exercise, hence the need for routine hoof trimming (see Figures 10.1 and 10.2)
- increasing exposure to infectious diseases
- other health issues, such as mastitis and uterine infections when hygiene is poor during milking and calving
- creating problems of heat detection for artificial insemination
- requiring greater efforts into sanitation
- magnifying problems of social dominance
- increasing capital investment.

It is essential that when designing housing systems, farmers keep the following key principles in mind:

- To achieve cow productivity, farmers must address the twin issues of cow comfort and health, where health is the freedom from infections, injuries, pain, stress and metabolic problems.

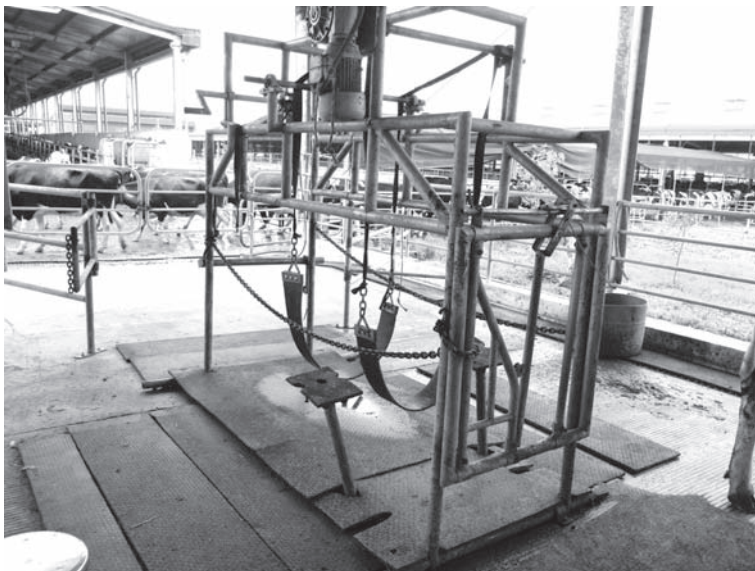


Figure 10.1: A cattle crush specifically designed for hoof trimming.



Figure 10.2: Hoof trimming, halfway through the operation.

- To achieve cow wellbeing, farmers must address the twin issues of housing and management, where management covers all the normal farm practices associated with dairy farming.
- Addressing cow comfort and housing, means that the farm's physical facilities must be optimised before putting cows in sheds.

Cows grazing in a paddock have access to forages virtually all the time and to concentrates at least twice per day, at milking. These feeding goals should also be the aim when cows are maintained in sheds. They should be encouraged to make at least 12 trips each day from their place of rest to the feed and water troughs. This will only occur if cows 'feel good', have healthy legs and feet, and the route is safe and comfortable.

10.3 The basic elements of dairy cattle welfare

Stock welfare in the dairy herd can be broken down to six basic elements, namely:

1. **Facilities and equipment.** These should be well designed, maintained and operated to ensure a high level of animal welfare, minimal stress or chance of injury.
2. **Provision of feed and water.** These should be provided with consideration of environment, age, body condition and stage of lactation that ensures their health, wellbeing and productivity.

3. ***Herd management.*** Dairy cattle should be routinely managed in social groups, handled to minimise stress, injuries and disease and to promote good health and welfare. Environmental conditions should also be such that the cow is comfortable.
4. ***Humane destruction.*** Weak, ill or injured cattle and calves should be identified and treated appropriately or humanely destroyed using approved methods.
5. ***Staff competency.*** All staff responsible for managing and handling dairy stock should be competent in their tasks and aware of their responsibility for good animal care.
6. ***Preparation, selection, sale and transport of stock.*** Stock should be selected and appropriately prepared for transport to ensure they are fit for the intended journey.

10.3.1 Other general principles of animal welfare

Whether housed in cubicles, straw yards or cowsheds, in order to maximise performance and ensure satisfactory standards of welfare, the accommodation must provide for the livestock's basic needs. As an absolute minimum, the housing must provide a safe, comfortable, clean, well drained and dry lying area together with shelter from adverse weather. It must allow the animal to move around freely without risk of injury.

Cows at pasture choose to lie down for 12 to 14 hr each day, so a similar target should be achieved with stock in sheds. If cows spend less time lying down, they are likely to spend more time standing in loafing or feeding areas that can adversely affect rumen function and hoof health. Sheds should provide a minimum loafing area of 3 m² per cow with at least 3 m between rows of cubicles.

Most farmers believe that animal welfare is just good cattle husbandry. The major welfare issues facing dairy farming include:

- housing, movement and cow comfort
- lameness,
- castration
- dehorning
- branding
- transportation
- slaughter.

Lameness can be a major problem, both from the point of animal welfare and farmer profits. Farmers frequently only recognise 40 to 50% of lameness problems and these are often well advanced, making them difficult to treat. The cow's environment, both social and physical, and her ability to cope with it ultimately determine how bad lameness can become.

Early separation of calves from their dam is considered by some to be a welfare issue, even though it is practised for animal health reasons. That is, to improve the likelihood of calves receiving sufficient quality colostrum in their first 24 hr of life which will reduce the likelihood of future infection and disease.

It is important to maintain animals in a body condition that is appropriate for their stage of lactation, to house them in social groups in clean environments with adequate space to move around and rest comfortably, to maintain feed, medication and production records as well as compassionately handling any animals undergoing management practices such as dehorning or castrating and those that are injured or ill.

Most Western countries have strict codes of animal welfare covering transport, housing, handling and feeding. Farmers purchasing dairy stock from such countries may be expected to abide by the principles of that country's animal welfare codes. This is particularly the case with young stock.

10.4 Observing and learning from cow behaviour

There are five key comfort zones that cows interact with every day, particularly cows that are confined to sheds. Dairy managers and farm staff can learn a lot by observing cows, sometimes for quite lengthy periods, to interpret their level of comfort in each of these zones. Each is discussed below.

10.4.1 Stall area

The major goal of dairy farming is to produce as much high quality milk as possible and this is best achieved in a non-stressed cow with clean dry udder, that can rest for 10 to 12 hr/d and lie down, rise and move in and out of the stall area without fear of injury. The base of the stall and the bedding should be clean and dry and provide traction and cushioning for the cow. The cow should have lunge space to get up or lie down. The linear dimension of free stalls should be designed to fit the size of cows using them. When entering a cowshed, it is best to observe the cows before they are aware of your presence.

Cows need to lie down for at least 12 hr/d while high yielding cows would benefit from 14 hr rest/d. To evaluate if cows are comfortable or not, it is possible to use a **cow comfort index**. Whenever cows are not eating or being milked, at least 85% of the cows should be lying down in periods between milkings. A second index is useful in free stall sheds, namely the **stall standing index**. This is the proportion of cows standing that at least touch a free stall, such as standing with just two feet in the stall. Less than 20% of the cows should be in this group.

Look out for:

- *Stall use*. Is the free stall empty? Are cows standing with two feet in the stall (this is called perching)? Is the cow lying in the stall or the alleyway?

- *Cow's position when lying down.* Is she lying straight or diagonally? Are her feet outstretched? Is she curled up? Is she intruding into adjacent stalls?
- *Cow injuries.* What condition are her hocks in? Is there hair loss? Are there any swollen joints? Does she appear lame?
- *Cow cleanliness.* Are her feet, legs, flank or udder dirty?
- *Cows lying down or getting up.* Does she lunge straight ahead or to the side? Are there obstructions that she encounters? Does she bang herself abruptly?

10.4.2 Environment

Temperature, humidity and air quality all affect cow wellbeing and performance. To reduce heat stress in sheds:

- Ensure there is maximal natural ventilation, so reduce any barriers to air movement and check wall designs.
- Provide adequate water space and volume.
- Supply supplemental cooling with fans and sprinklers.

Behaviour to observe includes:

- *Air quality.* Does the air feel heavy or humid? Does it feel stale with little or no air movement? Is there a noticeable smell of ammonia or other gases close to the ground?
- *Cows panting.* Are cows panting or showing other signs of heat stress?
- *Cows bunching.* Cows may bunch when they feel air movement. They may also bunch to get out of direct sunlight.
- *Cows clustered around waterways.* Cows splash water to try and cool themselves. They may lie around waterers if water has been spilt.
- *Response to sunlight.* Cows avoid direct sunlight during hot weather. A wide free stall shed will keep direct sunlight out of stall areas.

10.4.3 Feed area

If cows are not comfortable while feeding, intakes and milk yields will suffer. The goal should be to provide unrestricted access for as long as possible. First, the feed should be on offer all the time, but this is very rare on most smallholder dairy (SHD) farms. Cows should have sufficient space to eat from a clean, durable, smooth surface and through an easily accessible feed barrier. Raising the feeding surface ~10 to 15 cm above where they are standing puts them at a more natural feeding position. Locating a pipe barrier ~120 cm above where the cow stands and 15 to 20 cm beyond where the cow is standing, provides extra reach without allowing the cow too much room to walk onto the feeding surface. In addition, cows should have unrestricted comfortable access to clean and good quality drinking water. Providing rubber matting next to the feeding surface encourages feed intakes because cows will stand there for longer periods.

Points to observe include:

- Do cows have bumps on their necks? (Bumps can indicate that the neck rail is too low or cows are straining to reach the feed.)
- Do they have swollen knees? (This indicates cows are reaching for the feed.)
- Is the feeding surface pitted and black with rotting feed?

10.4.4 Flooring

When cows are not eating, resting or being milked, they are standing or walking around the shed. Good traction is essential so they can move without slipping and injuring themselves, such as when they display heat. In addition, the merits of floor comfort are important around the feeding area, in any holding yards and in the milking shed. Floors should be designed to provide sufficient traction without being too aggressive, as well as cushioning where cows have to stand for lengthy periods.

Floor surfaces should have a finish with sufficient texture to provide traction as the cow walks but smooth enough to clean properly. There is a fine balance between traction and cleanability. A good floor surface should be finished with a texture, such as grooves formed in concrete either during construction or after it has cured. Manure removal equipment should not polish the surface. Rubber matting is often advantageous in high traffic and turning areas.

The condition of cow's hooves is also important, before they are put in the shed. They should not be newly trimmed just before being moved to a shed with new concrete floors, as they will still be tender.

Behaviour to observe includes:

- Do cows slip and slide? This is an indication of slippery floors.
- Do cows show caudal licking (to groom the fold between the udder and the legs)? This is an indication that cows are quite comfortable with their footings.
- Are regular heats not observed? This could be an indication that the floor is so slippery that cows do not exhibit normal behaviour.
- Do cows walk tentatively? The floor may be too slippery or if made of wooden slats, the slats may not be stable or cows have become lame because the floors are too rough.

10.4.5 Lighting

Increased lighting can increase milk yields; cows exposed to 16 to 18 hr/d of light followed by 6 to 8 hr/d of dark can increase their milk yield by 8 to 10%. In addition, animal movement can be distracted by shadows, light and dark areas or obstructed vision. Additional distractions affecting animal movement include:

- sparkling reflections on puddles or reflections of smooth metal
- chains that jingle or metal clanging and banging

- high pitched noises such as air hissing
- air draughts blowing towards approaching animals or fan blade movement
- clothing hanging on a fence or piece of plastic blowing
- people moving up ahead or small objects (such as a coffee cup) or a drain grate on the floor
- sudden changes in colour of equipment, particularly colours with high contrasts
- race entrances that are too dark, but stock will move from a dark to a brighter place. However, they will not readily move towards a blinding light such as the direct sun
- stock will balk at one-way and backup gates, which should be installed a few body lengths away from the crowd pen, and should be operated by remote control ropes.

In addition to the above five zones, there are other physical features around the shed that can affect cow behaviour, such as shed layout or effluent removal system. Dairy managers and staff should intuitively think about cow comfort in all these zones because seeing life ‘from the perspective of the cow’ is an essential attribute of a good dairy farmer. In other words a good dairy farmer develops the ability to ‘think like a cow’.

Appendix 2 presents pictures of a dairy cow in different health and behavioural states, first a healthy and happy cow and second a sick and distressed cow. In addition to the pictures, Appendix 2 includes a list of observations and interpretations of various parts of the cow’s anatomy.

10.5 Managing surplus stock to the dairy herd

Dairy farms can generate income additional to the sale of raw milk and value-added dairy products. These include:

- cull cows
- excess dairy stock, such as bull calves
- dairy stock specifically grown out for beef, called dairy beef
- manure
- excess fodder
- grass cuttings for planting material on other dairy farms
- biogas, from dairy effluent.

This section deals specifically with managing stock surplus to the milking herd.

10.5.1 Cull cows

Milking cows are normally sold when the farmer considers them uneconomic to try and mate to produce milk in future years. For example, they could be culled

from the milking herd because of acute animal health problems, such as acute trauma or acute sickness. They could also be culled because of chronic disease problems, such as infertility, lameness or mastitis. They may be selected for sale because their milk production is minimal. They may be sold because the farmer needs the space or the feed for more productive stock. He may also need additional finances to purchase other stock or for personal reasons, such as a family celebration.

If they show symptoms of acute disease, care must be taken to reduce the likelihood of that disease spreading to other stock on the farm. They should be isolated from all stock and when transported to the saleyards, the vehicle should be thoroughly cleaned and sterilised. The major objective should be to remove them from the farm as rapidly as possible.

It is unlikely that farmers will want to improve the body condition of any cows culled because of chronic animal health problems, although the farmer may want to keep them on the farm if their sale price is likely to improve in the foreseeable future. If they are still milking, their diet should be that of other milking cows and for, say infertile, cows – they can be milked for as long as the farmer considers their returns from milk are greater than the feed and other farm costs they may incur. If non-lactating, they should be fed sufficient nutrients to at least maintain their body condition, so their sale price is still maintained.

If cows are culled because of acute injuries, such as a broken limb or dislocated joint, they should be sold quickly and with as little additional stress as possible to ensure their animal welfare is not compromised. Farmers should, and mostly do, fulfil their obligations to the wellbeing of their livestock.

Another class of cull stock are young calves that have a history of chronic or acute health problems and are unlikely to ever become productive cows in the herd. Such decisions are value judgements, but there is much evidence that such heifer calves are likely to be culled from the milking herd much earlier in their life than would calves that had not suffered growth setbacks in their early life. It is worthwhile recording which calves suffer from chronic disease in early life and noting their longevity in the herd. This information will assist farmers with their value judgements as to which of these calves should be culled. Selling them just passes the problem onto other farmers, so it would be better to euthanase them rather than transport them to the sale yards.

10.5.2 Excess dairy stock

Low-producing cows would also be classified as excess dairy stock, but this class refers more specifically to male calves and potentially poor-performing heifer calves. These are normally sold within a week or so of birth.

In Australia, animal welfare regulations stipulate that these animals must be more than 4 days old and should weigh more than 23 kg before they can be

transported. Newborn calf age is usually determined by the state of the umbilical cord, or ‘the string’ as farmers frequently call it. If it is moist, it is likely that the calf is less than 4 days old.

10.5.3 Dairy beef

Growing out bull calves for slaughter at 18 months or older, is frequently a major generator of income for many dairy farmers. These stock can be kept entire and grown out as bulls, or they can be castrated at an early age and grown out as steers. Bulls grow faster than steers but when they reach puberty, they can become a nuisance with milking cows on heat. Target growth rates should be at least 0.5 kg/day. There may be additional recommendations with regard to vaccinations and other health management issues, and such information should be sought from local animal health specialists.

Purebred or crossbred Friesians are preferred over Jerseys or local breeds and generally return more money per kg live weight when sold for dairy beef, so the breed type of the bull calf should be considered when deciding on its future fate on the farm. On the whole, milk generates more income per kg fresh grass grown on the farm than does beef, so it is important to ‘do the sums’ on dairy beef production when farm stocking rates are high. Acceptable growth rates are unlikely, if the major part of the ration is very low quality forages, such as rice straw. As with milking cows, green grass is the best forage to feed dairy beef animals.

It is important to plan the finishing (or fattening) strategy for dairy beef. Target live weights should be used in any feeding program, so using a chest girth tape to estimate live weight is worth considering. Friesians are later maturing than other dairy beef animals, meaning that a higher level of concentrate feeding will be required to produce a suitable sale animal, namely one with a good degree of finish (or some cutaneous fat cover over the ribs).