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Cow welfare

This chapter presents an introduction to animal welfare, specifically for dairy cattle.

The main points of this chapter

- An animal is in a good state (that is, its welfare is good) if it is healthy, comfortable, well nourished, safe, able to express innate behaviour, and if it is not suffering from negative states such as pain, fear and distress.
- Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling, transport and eventually, humane slaughter.
- Examples of issues creating poor welfare on farms include morbidity and mortality, the existence of abnormal behaviours, poor housing, lameness, heat stress, tethering, painful husbandry procedures and poor calf management.

The welfare of an animal relates primarily to its ability to cope, both with its external environment – such as housing, handling by humans, weather and the presence of other animals, and with its internal environment – such as specific injuries or illnesses and nutritional status. Welfare refers not only to the internal and external environments of animals, but how they feel. These feelings can be negative, including pain, fear and hunger, or they can be positive, including calmness and happiness.

The health and welfare of an animal are closely linked with the health status of an animal influencing its welfare, and its welfare influencing its health. Cattle kept

in poor or chronically stressful conditions are more susceptible to disease, which usually reduces the quality of their end products. As well as a reduction in production, cattle in poor welfare states can be more susceptible to zoonotic diseases, such as tuberculosis, which can be transmitted in milk to humans. Cattle with illnesses and injuries, particularly chronic ones, are classified as having poor welfare. Production can also be included in this relationship, with healthy and contented cattle being more productive.

This three-way interaction is a complex one, for example the European Food Safety Authority (2009) states that long-term genetic selection for high milk yield is a major factor contributing to poor welfare. In particular, this refers to health problems in dairy cows such as lameness, mastitis, metabolic instability and longevity. In other words, we breed cows to produce more and more milk at the expense of their welfare. This is particularly relevant to poorly resourced dairy farmers and/or those who do not fully understand the impact these genetically selected high milk yields can have on the energy demands of cows. These nutritional deficits then infringe on their welfare, making them more susceptible to metabolic and reproductive problems.

While the welfare of an animal is a dynamic thing, dependent on changes in the animal's health and environment, some simple, fundamental features will guarantee good welfare. These are: good hygiene, having continuous access to clean water, stable social groups and the provision of preventative veterinary care. This chapter details what animal welfare is, the factors that affect it and how we can improve it.

2.1 What is animal welfare?

Animal welfare refers to an animal's physical and mental state, and how it is coping with its situation. According to the World Organization for Animal Health (Office International des Epizooties 2013) an animal is in a good state of welfare if it is healthy, comfortable, well nourished, safe, able to express its innate behaviour, and is not suffering from negative states such as pain, fear and distress. Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling, transport and eventually, humane slaughter. This definition and issues that surround it are the basis of this book. As well as cattle, these concepts about animal welfare apply to all animals that interact with humans, including agricultural, companion, circus and zoo animals and those used in science.

While this definition is accepted internationally, what people interpret to be acceptable animal welfare can be influenced by many factors including personal values, religion, nationality, gender, previous experiences, age, socio-economic status, education and so on. Throughout both this chapter and this book we

describe dairy cattle welfare to levels that are recognised internationally and are based on scientific research.

Animal welfare is directly related to the health of animals, sustainable livestock management and market assurances. As farm animal welfare is largely part of good animal and farm management, paying close attention to their day-to-day management is one of the most important factors when determining acceptable welfare.

Concern for and assessment of animal welfare generally falls into three categories (Fraser *et al.* 1997):

- Is the animal functioning well?
- Is the animal feeling well?
- Is the animal able to live a reasonably natural life?

The first category includes issues with the productivity and health of the animal, including whether or not it is free from illness and injury, and how well it is growing and producing. Concerns over whether an animal is feeling well refer to the animal's emotional state, as it is widely agreed that animals can experience fundamental emotions. Animals in a negative emotional state may be in pain, distressed or hungry. Positive states experienced by animals may include the pleasure associated with play, or contentment as all their needs are being satisfied. The third key concern is whether the animal is able to live a relatively natural life and can express natural behaviour, for example, the ability to lie comfortably or move freely. While these second two categories are less commonly thought of in production animals, they are important to consider because of the strong relationships between emotional state, the inability to express natural behaviours, stress and production (von Keyserlingk *et al.* 2009).

2.2 Why animal welfare is important

Not only is it important to understand what welfare is, but we also need to know *why* it is of importance. Animal welfare is fundamentally linked to animal health and production (Moberg 2001). Both clinical and subclinical disease states will compromise the welfare of animals. For example, lameness causes a cow to feel pain, and as a result, this will impact on her ability to feed, rest, move and cope with other illnesses and stressful situations that she experiences. Poor welfare can also have a negative impact on the health of a cow. Stressful situations, such as negative treatment by a stockperson or ongoing aggressive interactions with other animals in the herd, will result in physiological and behavioural changes in the animal that are aimed at helping it to deal with the stress. If the stressor is prolonged, becoming chronic, these physiological responses can impact upon the

immunity of the cow, making her more susceptible to disease. Poor welfare is also linked to reduced productivity, inhibiting the capacity for the cow to reproduce, reducing milk yields and body condition. For example, illness can reduce feed intake and divert resources from production to fighting infection. Cattle that experience fear during handling will also have reduced milk yields. More details on the significance of this interaction and related behaviours are detailed in Chapter 4.

As well as the direct influence it has on animals and their health as part of sustainable livestock production systems, public perceptions of farm animal welfare issues have the potential to markedly affect the security/sustainability of livestock industries. Nationally and internationally, these societal pressures are playing increasingly significant roles in determining how animals are managed and products are marketed, while scientific findings assist development of welfare assessment, practice and improvement.

2.3 Common welfare issues on dairy farms

Generally, animal welfare is considered to be ‘good’ if the animals are healthy, comfortable, well nourished and safe and are not suffering from unpleasant states such as pain, fear and distress. Cows also need to be able to express basic behaviours including lying, turning around, scratching and displaying social behaviours to a reasonable degree. This idea of good welfare includes aspects from all three categories listed in Section 2.1. In contrast to these positive states are the environments or situations where cows are not functioning well, feeling well or able to have a reasonably natural life.

2.3.1 Morbidity and mortality

On farms, morbidity (sickness) and mortality (death) are the most fundamental welfare issues. High levels of illness and any subsequent deaths relate to the poor functioning of animals, and can also include the other two broad welfare categories, particularly if the illness is chronic and the animal has suffered for an extended period of time, or the illness is acute and painful.

2.3.2 Behavioural abnormalities

When a cow is in a state of poor welfare, her behaviour will indicate this. These behavioural changes may include a modified gait, signalling hoof pain and lameness and the duration of lying bouts and the position the cow takes to indicate the comfort of her environment. Social behaviours, or a lack thereof, can indicate issues with the ability to express normal behaviours. The existence of stereotypic behaviours, defined as a repeated sequence of behaviours that has no apparent purpose, is the result of frustrations and the inability to perform normal

behaviours. Full details on normal and abnormal behaviours are presented in Chapter 4.

2.3.3 Housing

Housing can have a significant influence on the welfare of cows, affecting all three welfare categories. Whether housed in tie stalls, free stalls or open lounging systems, in order to maximise performance and ensure satisfactory standards of welfare, the accommodation must provide for the animal's basic needs. As an absolute minimum, the housing must provide a comfortable, clean, and well-drained dry lying area that provides shelter from adverse weather. The space provided should be enough that the animal can express behaviours that will allow it to be comfortable including standing, turning, scratching and lying. Housing systems should also allow the animal to move without risk of injury. The provision of an environment that fulfils these criteria is a common theme in quantitative measures of dairy cow welfare, highlighting its importance.

Poor housing not only affects the day-to-day comfort of the cow, but also has flow-on effects to their health. Cows at pasture, which is one of the most comfortable environments for them, choose to lie down for 12 to 14 h each day. Reduced lying time is an indication of an uncomfortable lying area or potentially another compromised welfare situation, for example, increased vigilance and fear, with cattle feeling unsafe in their home environment. If cows spend less time lying down, they are likely to spend more time standing in loafing or feeding areas, which can adversely affect hoof health, leading to conditions like lameness (see Figure 2.1). Furthermore, housing and management influence the likelihood of animals experiencing heat stress, which is a significant issue in the tropics (see Figures 2.2 and 2.3).

The provision of pasture has been linked with reduced levels of mastitis, reduced levels of lameness and faster recovery from these issues (von Keyserlingk *et al.* 2009). When animals are allowed to spend time in an environment they prefer, their affective state is assumed to be more positive because they are provided with a situation they desire. Cows have a preference for lying at pasture rather than indoors, indicating they find it more comfortable. While cows prefer to be indoors, rather than in full sun when it is hot, providing cows with access to both environments will ensure positive welfare. Cows with access to pasture also display abnormal behaviours less frequently and more normal social behaviours than do cows continually kept indoors. Providing cows with pasture access then helps to promote good welfare across the three welfare categories and improves the productivity of the animal by reducing disease and aiding recovery.

Chapter 7, 'Cow comfort', is dedicated to types of housing systems, the benefits and disadvantages of each for a cow's health and welfare, and ways to assess the appropriateness of this housing.



Figure 2.1: An old cow with permanent skeleton deformities as a result of a lifetime of tethering.

2.3.4 Lameness

Lameness is a major problem on dairy farms, both from the point of animal welfare and farm profits. Lameness can result from infectious diseases or from lesions/injury to the hoof. Management factors have a significant influence on the number and severity of lameness cases. The design of facilities, including uneven concrete floors and uncomfortable stalls with no bedding, are important risk factors for lameness, as is the structural integrity of the cow's hoof. Stockperson ability to identify lameness is also very influential, with farmers/stockpeople only recognising 40 to 50% of lameness problems, and only being able to identify these issues when they become severe (von Keyserlingk *et al.* 2009). These cases of lameness are often well advanced once they are identified for the first time, meaning that the animal is suffering for a long period of time and making the condition difficult to treat. Lameness can be even more difficult to detect in tethered systems and often remains as a shifting lameness condition, misinterpreted or undetected and untreated. Factors that increase the likelihood of a cow developing lameness are discussed in Chapter 5. Methods of identifying and scoring this common issue are presented in Chapter 6.

2.3.5 Heat stress

Heat stress can be common, particularly in high yielding cows in the tropics. Cows experiencing heat stress will show a variety of symptoms including discomfort and distress, that affect their wellbeing. An increased core body temperature, increased



Figure 2.2: A milking cow in very poor health, probably suffering from poor management and welfare as well as disease.



Figure 2.3: Tethering stock under the tropical sun is poor stock welfare.

respiration rate, drooling and sweating are all signs of their functioning being compromised. General abnormal behaviours include reduced feed intake, agitated and restless behaviour, and standing for long periods of time, rather than lying down. Weather and climate are the driving factors behind heat stress. However, with the correct management and facility design, heat stress can be dealt with effectively, reducing the physiological stress on the animal. Details on the detection and management of heat stress can be found in Chapters 5 and 6.

2.3.6 Tethering

Tethering is a common practice in Asian dairy farms. This type of environment can cause significant welfare issues as it is closely associated with high levels of disease, discomfort and abnormal behaviours in dairy cows (Blaszak 2011). Animals that are continuously tethered are more likely to be dirty than animals that are kept in tie free housing (Figures 2.4 and 2.5). This is important as dirty cows have a much greater risk of mastitis and lameness, and are more likely to pass diseases on to calves as well as zoonotic diseases to humans through their milk. Cows in tie stalls also display both restless behaviours and abnormal behaviours more frequently than cows that are not tethered (Figure 2.6). Several sections in this book have been dedicated to these important topics. Further details on health and welfare issues that are generated by tethering are outlined in Chapter 7. The issue of abnormal behaviour and examples of this are provided in Chapter 4. Details on why clean and comfortable housing are important are outlined in Chapter 5 and ways to identify the cleanliness of cows are outlined in Chapter 6.

The welfare of tethered cows can be greatly improved by maintaining a clean environment, ensuring that the flooring they have is comfortable, providing water *ad libitum*, and giving them access to pasture and/or the ability to walk around freely for a few hours each day. These simple changes can significantly improve the milk yields, health and welfare of animals. For example, in a study with shedded cows in Pakistan, the provision of water *ad libitum* compared to only twice daily, increased milk yields by up to 1.5 L/cow/day.

2.3.7 Painful husbandry practices

Some management practices cause pain to animals. These practices should be avoided where possible, or if they are necessary, they should be performed by a well-trained technician or veterinarian. It is important to consider ways to limit the pain an animal may experience during these processes. Pain can be significantly alleviated by the provision of pain relief. When pain relief cannot be administered, some methods are considered to be less painful than others. Recommendations on both situations are outlined below.

Tail docking can be a common practice performed on dairy farms that causes significant pain to the animal, but there is no evidence of practical benefit. In the

short term, the procedure of tail docking causes significant pain to the cow along with leaving an open wound. In the long term, this can lead to chronic pain, the same way a person with an amputation experiences pain (known as phantom limb pain). Tail docking is practised because it is thought to improve hygiene of the udder, but there is no research to support this (Schreiner and Ruegg 2002). Tail docking, therefore, is an example of a practice that causes unnecessary pain to the animal, without any management benefit and so it should not be performed.

Dehorning and disbudding are common painful husbandry practices performed on dairy farms. Horns on a cow can pose a threat to the farmer and other cows that the horned animal interacts with, therefore dehorning is a necessary management practice. The age at which horn removal is conducted and the method used have an effect on the amount of pain and distress the animal experiences (Stafford and Mellor 2005a). There are several methods by which horns can be removed. Disbudding is carried out on young calves, before the horn has actually started to grow. Dehorning is the removal of the horn and horn-producing tissue. Cautery disbudding uses a hot iron to remove and burn the horn bud. This technique is suitable for calves 12 weeks or younger, and causes the least pain to the animal and the smallest wound area. This is the recommended method and timing of horn removal. While cautery disbudding is the best practice method for disbudding, it can be difficult to perform in SHD situations.

Caustic disbudding uses a paste to remove the horn bud. Along with being painful, this type of disbudding can cause irritation to the surrounding areas of the skin, can damage the eye if the paste runs down the calf's face, and can also cause irritation to other animals that the calf comes into contact with. As a result, calves should be housed by themselves in the hours after the paste has been applied, and the dehorned area must be kept dry. Pain management for caustic disbudding is difficult to manage and so is not recommended.

Amputation dehorning, conducted on animals at a later age, creates a wound that can open the frontal sinus of the animal. This procedure causes extensive pain, long wound healing times and significantly reduced weight gains. It also creates a large risk of infection. Pain relief using both a local anaesthetic and non-steroidal anti-inflammatory are highly recommended in this particular situation, and all animals treated with these alleviation methods have shown indicators of a reduced pain response. The wound site will also bleed significantly and clamps or tourniquets should be used to reduce bleeding.

Castration is less common in dairying than it is in beef production, as bull calves are usually sold or slaughtered before they reach sexual maturity. In small holder systems, it is more common to keep bull calves until they reach heavier slaughter weights, and so castration can be a usual procedure. There are several different methods for castration, and the age of the calf has a significant influence on which method is most effective and least painful (Stafford and Mellor 2005b).



Figure 2.4: Permanent tethering: typical management of too many cows on tropical small holder farms.

Calves at a younger age display less pain during castration than older animals. For calves younger than 3 months of age, rubber ring castration has a high success rate and has the best welfare outcome for the animal. As it does not involve a surgical procedure, there is no blood loss or evidence of acute pain, compared to calves castrated with a knife. Calves 3 months or younger are much easier to handle than older animals, making the castration procedure safer for both the handlers and the animal. Rubber ring castration is ineffective on older cattle. For these animals, surgical castration is the best option. It is recommended that older cattle be castrated using an emasculator, as this cuts the blood supply as well as severing the testes, and so reduces blood loss. It is strongly recommended that surgical castration be performed on older cattle following the administration of both a local anaesthetic and a non-steroidal anti-inflammatory (ketoprofen), in order to minimise pain.

2.3.8 Calf management

The provision of the right environment, food and health care to a calf are vitally important to their subsequent productivity and lifespan as an adult. From birth, colostrum needs to be fed and followed by mastitis-free milk in appropriate volumes to ensure the good health and growth of calves. Other factors that need to be managed appropriately to ensure good welfare and growth include care and



Figure 2.5: Permanent tethering restricts the animal's ability to rest comfortably.

monitoring of the newborn calf, the appropriate provision of forage for rumen development and a graduated approach to weaning. A detailed manual on the effective rearing of calves on tropical SHD farms is freely available (Moran 2012b).

Along with appropriate feeding and management to ensure good health, the environment in which calves are kept significantly affects their welfare and development. It is recommended that calves be housed in a way that they can easily stand, lie, turn around, rest comfortably and have visual contact with other calves (Vasseur *et al.* 2012). Further to this, housing calves in pairs or small groups has been associated with play in calves, which is an indicator of positive welfare and allows them to develop normal social behaviours. Importantly, keeping calves in small groups has not been linked to increased incidences of disease, which is a common argument against group housing (Svensson *et al.* 2003).

2.4 Animal welfare resources and international regulatory agencies

An example list of government and non-government agencies within Australia that are involved in cattle welfare, together with their websites, are included as Appendix 6. A total of 178 countries are currently members of the World



Figure 2.6: Permanently tethered dairy heifers are forced to lie down on hard concrete.

Association for Animal Health or the Office International des Epizooties (OIE) and the OIE website is included in Appendix 6. The OIE are in the process of producing animal welfare standards for animals used by humans. The OIE currently have guidelines that cover transport and slaughter that can directly apply to dairy cattle welfare. These standards act as a guideline from which management strategies and policies can be developed. At the time of printing of this book, work on a code for dairy cattle welfare had commenced.