

PRODUCTIVITY COMMISSION SUBMISSION – Regulation of Australian agriculture

**“Addressing ethical dilemmas in producing food and fibre: achieving a well-informed
community and rational discussions.”**

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BACKGROUND

1. Ethical duty of care to the animals that we use

Most of the animals in society are used by people for food, clothing or recreation and are dependent on people. As argued by Mellor et al. (2009), in using these animals for our purposes, we exercise varying degrees of control over the quality and duration of their lives, and, because most of the animals that society uses can suffer, this provides us, with the opportunity to manage them humanely. Moreover using them for our own purposes, not theirs, requires us to exercise an ethical ‘duty of care’ towards them and this translates into a practical obligation to keep their welfare at acceptable levels.

2. Community concerns about animal welfare

Public concerns and policy debates on livestock production generally centre on conditions that guarantee food security, public health, environmental quality, and animal welfare (Vanhonacker et al., 2012). Public attention on animal welfare appears to arise from concerns about the negative effects of intensification of livestock production on animal welfare. While individuals differ considerably, the concerns relate to restrictions in social contact, ability to exercise, and choice of stimuli (such as other conspecifics and additional features of the physical environment) to interact with (Barnett et al., 2001; Te Velde et al., 2002; Vanhonacker et al., 2009); Coleman et al., 2016).

In general, societal concerns dictate the need for animal welfare standards and animal welfare legislation (Vanhonacker et al., 2014). While public concerns about animal welfare are

influential, the interest of individual stakeholders along the animal production chain in farm animal welfare and the influence that they can make to welfare improvements varies widely. For example, supermarkets, which control a large share of the livestock products' market, set the standards that products have to meet, control access to shelf space and influence consumer behaviour through shelf management, advertising and promotions and consequently have a large influence on production practices and consumer purchasing behaviour (Vanhonacker et al., 2014). Indeed, there is often a disconnection between official (governmental or inter-governmental) welfare standards and those developed in the private sector, for example, by food industry stakeholders or NGOs (Matthews and Hemsworth, 2014).

3. Animal welfare

Animal welfare is a state and it is generally agreed that animal welfare relates to experienced sensations, that is, how the animal feels (Mellor et al., 2009; Hemsworth et al., 2015). These experiences arise as the integrated outcomes of sensory and other neural inputs from within the animal and from its environment. These inputs are processed and interpreted by the animal's brain according to its species-specific and individual nature, and its past experience. The integrated outcomes of this processing represent the animal's current experience (its welfare status), and this changes as the balance and nature of the inputs change. These experiences are all subjective, varying in their affective or emotional contents and, based on human experience, are likely to include negative affective experiences such as thirst, hunger, nausea, pain and fear, and positive affective experiences such as satiety, contentment, companionship, curiosity and playfulness.

Animal welfare is more than the mere absence of negative experiences because animal welfare, as a state experienced by an animal, can vary on a continuum from very bad to very good. Most previous endeavours to address animal welfare have concentrated on preventing and ameliorating negative states, as reflected in welfare research, codes and legislation codes of welfare or practice. However, there is increasing societal interest in providing animals used by society with the opportunity for positive affective experiences and accordingly, the future management of sentient animals will also require the promotion of positive affective experiences.

3.1. Conceptual frameworks for assessment of animal welfare

There are basically three conceptual frameworks that are used to assess animal welfare, namely, biological functioning, affective state and natural living, and the following briefly describes these (more details on these frameworks for assessing animal welfare are reviewed by Fraser (2008) and Hemsworth et al. (2015)).

3.1.1. Biological functioning

The rationale for this conceptual framework is that difficult or inadequate adaptation will generate welfare problems for animals. This conceptual framework emphasises that animals use a range of behavioural and physiological responses to assist them to cope with challenges, and, while biological regulation in response to challenges occurs continuously, successful adaptation is not always possible. Marked challenges may overwhelm an individual's capacity to adapt and lead to its death. However, less severe challenges can still have significant biological costs, leading to growth, reproductive, health and other impairments, which may reflect and/or result in welfare problems for the animal. Thus animal welfare is at risk in environments to which adaptation is difficult given the animals' genetic background.

Conceptualised in these terms, it is the biological cost of stress that is the key to understanding the associated welfare implications. How well an animal is coping with the challenges it faces will be reflected in the normality of its biological functioning and fitness, with severe risks to welfare associated with the most extreme coping attempts. The behavioural responses include stereotypies, redirected behaviours and displacement activities and the physiological stress responses to challenges, while also varied and complex, nearly always include activation of the sympatho-adrenal medullary (SAM) system and the hypothalamo-pituitary adrenal (HPA) axis, with the consequent increase in synthesis of catecholamines and glucocorticoids, respectively. The extent to which these coping attempts are or are not succeeding is reflected in the biological costs to the animal, such as deterioration in growth efficiency, reproduction and health (injury or disease).

This conceptual framework is useful in assessing risks to animal welfare, that is, negative welfare states. Indeed, the majority of studies on farm animal welfare, for example, have employed the biological functioning framework to infer compromised welfare on the basis that suboptimal biological functioning accompanies negative affective states, such as hunger, pain, fear, helplessness, frustration and anger. The measures used have included: behavioural

variables, such as aggression, physiological variables, such as circulating concentrations of cortisol, neutrophil:lymphocyte ratio and immunoglobulin A and fitness variables, such as lameness, skin lesions, liveweight change and reproductive performance.

3.1.2. Affective state

The second conceptual framework emphasises that the welfare of an animal derives from its capacity for affective (i.e. emotional) experiences. Thus, the welfare state is likely to be negative when the predominant affects experienced are unpleasant, and vice versa.

It is well recognised that affective experiences are generated both by inputs that reflect the animal's internal functional state (eg., water balance and thus thirst) and by sensory inputs that reflect the animal's perception of its external circumstances (e.g., fear). Preference research, in which the strength of the preference for a chosen environmental resource is measured by determining whether use of the resource is defended when access becomes more difficult or demands more energy, has been used by some scientists to make inferences about animal welfare. The rationale for these inferences is that preferences are influenced by the animal's affective experiences, which have evolved to motivate behaviour in order to avoid harm and facilitate survival, growth, and reproduction. Furthermore, others have suggested that animals make choices that are in their best interest: it is likely that animals will avoid aversive stimuli and choose positive stimuli.

Other approaches utilised in assessing affective experiences, particularly negative affective experiences, include measures of behaviour, such as fear, pain and illness behaviours, cognitive bias, such as deviation in judgment, and physiology, such as activation of the SAM system and the HPA axis as measured by hormone assays, as well as employing the intuitive perception of human observers using an approach known as Qualitative Behavioural Assessment. While there are inconsistencies in the literature, behaviours such as play, affiliative behaviours and some vocalizations appear to be the most promising indicators for assessing positive affective experiences in animals.

3.1.3. Natural living

This conceptual framework, albeit not often well enunciated in the literature, is predicated on the view that the welfare of animals is improved when they can express their normal behaviour. For some people this also implies that the animal should be raised in a "natural"

environment and allowed to behave in “natural” ways. However, the concept of natural is usually too poorly defined to provide a sound basis for animal welfare assessment, and thus when applied uncritically it may lead to poorer welfare instead of an improvement. There is a need to define natural behaviours that are desirable or undesirable in terms of animal welfare and to clarify the rationale for their inclusion or exclusion.

3.1.4. Utilising these conceptual frameworks to assess animal welfare

The biological functioning and affective state frameworks were initially seen as competing, but a recent more unified approach is that biological functioning is taken to include affective experiences and affective experiences are recognised as products of biological functioning, and thus knowledge of the dynamic interactions between the two is considered to be fundamental to managing and improving animal welfare (Hemsworth et al., 2015).

4. A contentious generic welfare issue - intensive livestock production systems

Intensification of livestock production in the last half century has consisted of two key elements: new confinement systems that generally kept animals in specialized indoor units that used hardware and automation instead of labour for many routine tasks and production that was concentrated on fewer farms (Fraser, 2005).

Intensive livestock production is not a recent development. For example, dairy cattle for centuries have been intensively housed (tethered) in barns within/beneath farmhouses during the winter, and calves have been intensively housed and fed surplus milk for veal production (Cronin et al., 2014). However, the main impetus for ‘modern’ intensive livestock production occurred after the Second World War, when Western governments developed policies to increase the availability of cheap and safe food, and especially protein. Through research and industry development, improved housing, management, health and animal genetics have increased productivity, improved the quality of food and lowered the cost of food.

In general, these improvements in animal nutrition, health and reproductive management, environmental control and genetic selection of better performing animals have reduced or eliminated a number of welfare problems, such as predation, thermal stress, some infectious diseases and nutritional stress. However, these changes in livestock production methods have exacerbated or created other welfare problems. The modern indoor intensive production system, particularly for pigs and poultry, is intensive and thus considered today by some

sectors of the community to inherently 'bad' because of lack of space, 'barrenness' of the environment, and the reliance on technology (Barnett et al., 2001). In contrast, outdoor housing is typically extensive and so considered by some to be inherently 'good' because it provides a more 'natural' environment and choice for the animal in performing a number of behaviours over a relatively large area, and the lower technological inputs provide for fewer equipment breakdowns that may adversely affect welfare (et al., 2016).

While extensive livestock production systems are generally not considered to involve 'housing', extensive systems do impose restrictions on animals, albeit with considerable freedom and there are different welfare risks including frequency of inspections, climatic conditions and natural disasters. Nevertheless, the main focus of welfare concerns has been on intensive production systems. While the major responses to these concerns have varied, a typical response has been the development of alternative systems, sometimes based on previous, more traditional farming practices, such as free range pig and poultry systems. Often these systems have merely replaced one set of welfare problems with another.

One reason for this substitution of welfare problems when a new housing system is developed is that there is insufficient understanding of the animals' requirements, including those for space and social contact, and without this understanding it is difficult to design appropriate housing systems. For example, the publicly engaging concepts of 'free range' and 'capacity to express natural behaviour' among domesticated animals can lead to compromised welfare when implemented in circumstances which, on the face of it, suggest that welfare would be improved. For example, in a study of 1,486 UK flocks, Weeks et al. (2012) found that mortality of hens over a 52-week laying period was 9.5% for free-range hens compared to 5.4% for hens in cages.

5. Important determinants of farm animal welfare

5.1. Animal management

The principle that management, including supervising and managing animals, affects farm animal welfare is widely recognised within the livestock industries. However, the manner in which management affects animal welfare, both directly and indirectly, is probably not fully appreciated (Hemsworth and Coleman, 2009, 2011).

5.1.1. Management at the farm level

At the level of farm management, human resource management practices, including employee selection and training, and animal management practices, such as best practice in housing and husbandry, and implementation of welfare protocols and audits, all impact on farm animal welfare. Implementation of welfare protocols and audits will be considered under assurance schemes.

5.1.2. Management at the stockperson level

At the stockperson level, together with the opportunity to perform tasks well, stockpeople require a range of well-developed husbandry skills and knowledge to effectively care for farm animals. Appreciating the factors that affect work performance, as well as where deficiencies exist at the levels of both the stockperson and the farm, is the first step in developing a strategic program to ensure that stockpeople have well-developed husbandry skills and knowledge, as well as access to the appropriate facilities and opportunity to use these skills and knowledge to effectively care for and manage farm animals (Hemsworth and Coleman, 2009, 2011).

Knowing and being skilled at the techniques that must be used to accomplish a task are clearly prerequisites to being able to perform that task and thus these job-related characteristics will be limiting factors on job performance in situations where specific technical skills and knowledge are required to perform the tasks. Most stockperson training programs target husbandry competencies rather than application of these competencies. This may mean that knowledge and skills do not necessarily translate into practice, especially in the face of years of experience and habitual management behaviour.

There has been an ever-increasing body of evidence accumulating since the 1980s of the effects of human interactions on farm animal fear and stress responses. This body of research has been recently reviewed by Hemsworth and Coleman (2011) and Coleman and Hemsworth (2014) but is briefly summarised here.

Field studies on farm animals, including pigs, revealed variation in fear of humans by farm animals that could not be explained by farm characteristics or animal genetics. The variation in behavioural fear responses was strongly related to increased stress responses and reduced productivity (Hemsworth and Coleman, 2011). This led to the hypothesis that this variation in fear was caused by human factors, giving rise to investigations directed towards identifying

the human characteristics responsible for these effects. Laboratory studies and correlational and intervention studies in commercial settings on a number of farm animal species provided consistent evidence of causal relationships between stockperson attitudes (based on beliefs), stockperson behaviour, animal fear responses, animal stress physiology and animal productivity, and provided evidence of causal relationships between these variables (see Hemsworth and Coleman, 2011). A key advance in understanding opportunities to manipulate human-animal relationships in the field was that the antecedents of stockperson behaviour are their attitudes and in particular their beliefs about their behaviour, their animals' behaviour, fear and stress and the effectiveness and appropriateness of specific handling behaviours.

The efficacy of cognitive behavioural interventions was demonstrated by the finding among dairy and pig stockpersons that cognitive-behavioural training can improve attitudes and human behaviour towards animals, with consequent reductions in animal fear and improvements in productivity (Coleman et al., 2000; Hemsworth et al., 1994, 2002). Cognitive-behavioural techniques basically involve changing a person's behaviour by first targeting both the beliefs that underlie the behaviour (attitude) and the behaviour in question, and second, maintaining these changed beliefs and behaviours. This process of inducing behavioural change is a comprehensive procedure in which all of the personal and external factors that are relevant to the behavioural situation are explicitly targeted. This includes addressing common perceived barriers to change, addressing defensiveness about previous behaviour, changing habits, providing follow-ups to reinforce changes as well as changing the relevant attitudes and behaviour. This approach to training was also shown to be practical and effective among a wide range of stockpersons working in a variety of situations, providing strong evidence for introducing this type of training into the livestock industries.

The training programme used as an experimental tool during research in the pig industry has been commercialised for on-farm use, and is called 'ProHand' (a contraction of the 'Professional Handling of Pigs Program', Animal Welfare Science Centre, 2005). Furthermore, as part of the European Union Sixth Framework programme, ProHand principles guided the development of the Welfare Quality training packages for stockpeople working in the European pig industry (Ruis et al., 2010). An important characteristic of this programme is that it is based on scientific research and their effectiveness in improving welfare has been demonstrated by properly designed intervention studies.

Technical skills and knowledge are important attributes of the work performance of stockpeople and clearly training targeting these attributes is important in improving animal welfare. Furthermore, training programmes that target the attitude and behaviour of stockpeople offer considerable opportunity to improve pig welfare. Improved human-animal interactions may also enhance job-related characteristics, such as job satisfaction, motivation and commitment, thereby potentially improving the stockperson's job performance and career prospects (Coleman and Hemsforth, 2014). Thus, including training targeting the attitudes and behaviours of stockpeople towards pigs in conjunction with the technical skills and knowledge of stockpeople, is likely to not only reduce the stress associated with handling and husbandry procedures involving humans, but also improve the motivation in stockpeople to learn new technical skills and knowledge and to apply these competencies to the management of the animals under their care.

5.2. Design of the housing system

While there is a focus in intensive animal production on housing systems, research indicates that the design of the housing system is probably more important for animal welfare than is generally recognized (Barnett et al., 2001; Rushen and de Passillé, 1992). For example, research on the design features of group housing of sows such as the amount and quality of space and protection of sows at feeding, clearly indicate that variations in design may produce substantial variation in risks to welfare.

The focus on different housing systems ignores many of the important factors that can affect animal welfare, such as the design of the system *per se* and the quality of management, particularly stockpersonship. Research on animal welfare in new and modified housing systems, as well as current but contentious systems, needs to be attentive to the design contributions of these systems to animal welfare.

5.3. Welfare monitoring in the field

The assessment of welfare in a livestock enterprise can be used to demonstrate compliance with policy, law, and regulatory standards, and to assure both consumers and non-consumers that certain welfare standards are being met. Welfare assessment in a livestock enterprise can also be used to assist owners and managers to monitor and improve the welfare of their livestock. Welfare assessment in the field requires practical and effective welfare measures

and two types of measures are used: environmental and management components (input measures); and validated, repeatable and feasible animal-based welfare indices (outcome or output measures).

In recent years, the assessment and monitoring of animal welfare has shifted from the conventional approach of evaluating the environment and resources required to ensure good welfare, and instead has focused on animal-based measures of welfare. An example of this is the animal welfare assessment at a farm or on-site level in the European Union Welfare Quality® project (Boutreau et al., 2009)).

Animal-based measures can provide a direct assessment of the animal's welfare state, and while environmental parameters will offer information regarding potential or current welfare risks, they fail to directly reflect the welfare state of the animal (Colditz et al., 2014). Nevertheless, Main et al. (2014) suggest that outcome measures are unlikely to replace all environment measures, particularly where welfare science has shown that the resources provided contribute to genuine welfare benefits. Furthermore it is well recognised that there are some challenges in assessing some animal-based measures, particularly behaviour measures, in a reliable, consistent and time efficient way (Main et al., 2014).

Butterworth et al. (2011), Colditz et al. (2014) and Main et al. (2014) argue that compliance and market assurance schemes might measure compliance with certain aspects of the welfare of animals but they do not provide clear directions on how to improve animal welfare. Indeed these authors propose a continuous improvement approach utilising both regular monitoring of pre-defined welfare criteria (input (environmental and management) and outcome-based), benchmarking performance to identify targets for improvement and a management system to ensure preventive and corrective action to maximise levels of these criteria. Further, the authors suggest that such an animal welfare risk assessment and management scheme lends itself to providing evidence for compliance and assurance schemes. In addition, these authors propose utilising so-called production variables, many of which farmers already collect such as growth, reproduction, health, culling statistics and environmental measures. Thus this multi-pronged approach provides opportunities to benchmarking livestock welfare, both within farms and within the livestock industry for use by individual farmers, industry and stakeholders, to provide compliance evidence and market assurance and, probably most

importantly, to assess animal welfare and risk in order to continuously improve animal welfare.

6. Community welfare and public education

Most people accept that humans have a moral obligation towards farm, companion and laboratory animals. In addition to the undeniable benefits that these animals provide to humans, the domestication of these animals has increased their dependence on humans and thus necessitates this obligation. How individuals make decisions on the acceptability, or otherwise, of a specific animal use is not entirely clear, but these decisions appear to be affected by a number of considerations including scientific information on the harms and benefits to the animal caused by the animal use (Hemsworth and Coleman, 2011). However, what is at question for most people is the extent of this obligation, particularly in relation to the standards of welfare that society should provide to these animals.

Thus, ultimately the question of the acceptability of a specific animal use is an ethical one in which science can provide factual evidence that needs to be utilized to provide objectivity to the answer (Matthews and Hemsworth, 2012). However, the development of a clear consensus on an ethically and scientifically defensible philosophy on animal welfare is obviously difficult. A society's attitudes to the use of and obligations to farm, companion and laboratory animals are extremely disparate, influenced by demographic factors, religion and culture and vary over time with economic and ideological changes (Teutsch, 1987; Palmer and Sandoe, 2011).

The public is often a key driver of animal welfare change since public views affect decision makers at the political, regulatory, retail and industry levels. Furthermore, failure to meet the expectations of the public can lead to increased litigation, increased regulations, and increasing consumer demands, all of which hamper the success of the livestock industry (Arnot, 2009). However, public attitudes about animal welfare are often based on limited knowledge, and the public's beliefs are largely acquired from the mass media, perhaps filtered by opinion leaders (Coleman et al., 2015). Coleman (2010) concluded that to address both the mismatch between the public's perceived and actual knowledge of livestock practices and public welfare concerns, there needs to be accurate and reciprocal communication between the livestock industries and the community. Indeed, Coleman et al. (2016) have proposed that it is important that there be transparency to the public in farming

techniques and a clear articulation of the implications for both food quality on the one hand and animal welfare on the other, and that purely economic arguments are unlikely to be sufficient if the public cannot be reassured about welfare concerns. Furthermore, the fostering of a culture shift amongst the livestock industries is desirable to sensitize them to changing cultural values about animal quality of life. Industry responses need to be a balance between listening to community requirements and a preparedness to defend a practice if, on balance, it is considered the best in terms of healthy food (which is very prominent in consumer thinking), economics and welfare (Coleman, 2004; Martin and Shephard, 2011). This is essential for a well-informed community able to make rational choices and if industry is to respond appropriately to community expectations.

7. Conclusions

On-going improvements in farm animal welfare in the future are likely to occur through research and adoption in the areas of animal management and housing design. The focus of discussion on different housing systems tends to overlook the importance of the design of the housing system on animal welfare. Research indicates that the design of the housing system is probably more important for animal welfare than is generally recognized and clearly research on animal welfare in new and modified housing systems, as well as current but contentious systems, needs to be cognisant of the design contributions of these systems to farm animal welfare.

Irrespective of the housing system, the skills, knowledge and motivation of stockpeople to effectively care for and manage their animals are integral to the standard of welfare experienced by the animals. Attitudes not only influence the manner in which stockpeople handle animals, but also their motivation to care for animals. Thus training targeting technical skills and knowledge as well as the attitudes and behaviours of stockpeople should be a primary component of the human resource management practices at a farm.

Welfare monitoring in the field is an important tool to continuously improve animal welfare. It allows benchmarking, both within farms and within the industry, for use by individual farmers, industry and stakeholders, provides compliance evidence and market assurance and, probably most importantly, offers the opportunity to incorporate animal welfare risk assessment and management in the routine management program of the farm.

The public is also a key driver of animal welfare change and thus there needs to be transparency to the public in farming techniques and a clear articulation of the implications for both food quality on the one hand and animal welfare on the other. However, industry responses need to be a balance between listening to community requirements and a preparedness to defend a practice if, on balance, it is considered the best in terms of healthy food, economics and welfare.

In a future in which the food supply may be limited as the world's population grows and land availability shrinks, intensive animal production is likely to expand, but at the same time ethical considerations surrounding intensive farming practices may also become more prominent (Cronin et al., 2014). However, as Fraser (2005) concludes, the most important determinants of animal welfare are not specific to any one production system. If we think of good animal welfare being influenced by key factors such as staff time and skill, flooring, feed quality and disease prevention measures, then animal welfare problems may be less a function of the production system – confinement, semi-confinement or extensive - but rather how well the system is operated.

RECOMMENDATION

1. Addressing ethical dilemmas in producing food and fibre: achieving a well-informed community and rational discussions.

Methods of raising farm animals for food and fibre are contentious for some. Concerns about animal welfare, food safety, biosecurity, genetics (GMOs), environmental impacts, and social effects are often prominent. The public is often a key driver of farm animal practices since public views affect decision makers at the political, regulatory, retail and industry levels. Furthermore, failure to meet the expectations of the public, can lead to increased litigation, increased regulations, and increasing consumer demands all of which hamper the success of the livestock industry. However, public attitudes about many of these issues are often based on limited knowledge, and the public's beliefs are largely acquired from the mass media, perhaps filtered by opinion leaders.

To facilitate a well-informed community able to make rational choices about food and fibre from farm animals, several steps are required. To address both the mismatch between the public's perceived and actual knowledge of livestock practices, which is common, and public concerns, there needs to be accurate and reciprocal communication between the livestock industries and the community. Furthermore, the fostering of a culture shift amongst the livestock industries is desirable to sensitize them to changing cultural values about animal quality of life. Industry responses need to reflect a balance between listening to community requirements and a preparedness to defend a practice if, on balance, it is considered the best in terms of healthy food (which is very prominent in consumer thinking), economics and welfare. Where scientific knowledge is lacking, research is required to inform policy and attitudes. Thus, ultimately, the question of the acceptability of a specific animal use is an ethical one in which science can provide factual evidence that needs to be utilized to provide objectivity to the answer.

One of the key approaches/steps in achieving a well-informed community and rational discussions around food and fibre is the establishment of an independent expert well-respected advisory committee (e.g., an advisory centre for food sustainability) that provides factual advice to the community and major stakeholders on science, philosophy and practices

around food and fibre production (e.g., animal welfare, environmental, food safety, genetics, human health and social implications and rationale).

It is recommended that a scoping, planning and feasibility project involving a broad consultation approach is taken to:

1. Identify the Advisory Committee's role.
2. Determine the acceptability of such an advisory committee by surveying the public, political, regulatory, retail and industry attitudes to the Committee, its role and their willingness to use the resource. This would require the appropriate research to be conducted.
3. Composition of Committee
4. How resourced (government, industry, etc., through cash and in-kind contributions)
5. Determine the terms of reference of the committee, including its role in coordinating available information (including production of position papers), recommending further research and gathering or facilitating required resources to carry out its brief.
6. Identify mechanisms by which advice/information is provided to all stakeholders.

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