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Farm animal welfare in the context of other society issues: toward sustainable systems

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Abstract

The measurement of farm animal well-being has evolved through several stages to return to the most agreed-upon system of evaluation that uses a multidisciplinary approach. The multidisciplinary approach includes measures of animal behavior, physiology, anatomy and health and immunity. However, the multidisciplinary approach must be used in the context of other important society issues including: food safety, environmental protection, worker health and safety, economics, international trade, domestic protection, public perception and consumer economics. Only by taking into account all society issues, can the multidisciplinary approach yield useful information to the modern consumer in a manner that can develop sustainable animal production systems.

Keywords: Animal welfare; Well-being; Farm animals; Sustainable

1. Introduction

Farm animal welfare is an important issue to members of society, particularly in developed countries, and to farmers, farm organizations and scientists. Both consumers and non-consumers (activists and advocates) of animal products are driving the issue in unique ways in different countries. Most everyone from legislators to activists to scientists to farmers are interested in providing for adequate animal welfare. The trouble comes in two main areas: (1) how to define and measure when animal welfare is adequate and (2) how to deal with farm animal welfare concerns when other issues compete (e.g., economics, international trade, environmental concerns, food safety, among others). This paper will attempt to shed light on both areas.

2. Measuring farm animal welfare

2.1. A brief history

Measuring farm animal welfare has always been a challenge. The challenge starts with our inability to define what we mean by animal welfare. Do we mean their physiology, behavior, psychology, pain experiences, health and immunity, stress hormone levels, brain development, perception of the world, cognitive experiences, mental state, anatomical problems (bone strength, foot lesions, wounds, etc.) or

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some other yet-to-be-defined term? Authors argue about what we mean by animal welfare, but in the end, it is the public's perception that will drive the issue.

In the USA, we have developed animal welfare legislation and regulation on a different track than in Europe. Within Europe, countries vary in animal welfare laws and regulations as well. In the USA, the US Congress was not stopped by not being able to define a term on this issue. For laboratory non-human primates, the 1985 revision of the Animal Welfare Act required that these more-developed animals have their 'psychological needs' met, even though they could not at the time, nor can we now, precisely define what is meant by psychological needs. So we can see that lacking the ability to precisely define a term does not preclude us from using the term in governmental actions.

Farm animal welfare in the USA became an issue around 1906 when Upton Sinclair published ''The Jungle''. After a few decades of debate, the Humane Slaughter Act became law. Interestingly, the issue was more related to food safety than to animal welfare. Food sanitation was the first problem addressed, then humane slaughter was tackled. Thus, in the early 1900s the USA linked food safety and animal welfare as issues arising from the same situation.

In the 1960s animal welfare on farms became an issue in the UK. The issue gathered steam in Europe from the 1960s to the present day. In the USA, the issue of farm animal welfare has been a part of scientific discussions since the late 1970s and a part of Congressional debate since the late 1980s. All the discussion in both Europe and North America have not been hampered by our lack of ability to define the key terms.

A conference was held with about 100 concerned people from several areas at the Wye Plantation in Maryland (USA) to define animal welfare (the proceedings were published in 1993; see McGlone, 1993). The plethora of definitions and perspectives was too much to develop a clear consensus on how to define animal welfare. Although the result of the conference was less-than-desired, the outcome remains today that we do not have to have a uniform agreed-upon definition of welfare to be able to measure and study animal welfare.

Among scientists, definitions have been offered for several decades. We started, more-or-less with well-known people (Sainsbury, 1972; Hughes, 1973; Wood-Gush, 1973; Dawkins, 1976; Fraser, 1980; Curtis, 1985; Ewbank, 1985 and others) offering a multidisciplinary approach to assessment of farm animal welfare. As time went on, some people, most notably Duncan, suggested that animal welfare had to do with how animals feel and by default, not with their physiology or other measures (Duncan, 1993). This view is consistent with the views of the public who have little understanding of physiology or other measures. At the time, this view was opposed by only a few authors some of which argued that physiological measures were useful in the assessment of animal welfare (Moberg, 1987; Barnett, 1987) and a minority that argued that physiological measures were preferred to behavioral measures in that they were more objective and less prone to indicate minor homeostatic adjustments (McGlone, 1993).

2.2. Farm animal welfare and other society issues: multidisciplinary approaches

All through the history of measuring welfare, authors have argued for a multidisciplinary approach to the measurement of animal welfare (Gonyou, 1986; Broom, 1991) and this approach is the safest and most reliable approach to the assessment of animal welfare. By using a multidisciplinary approach, if a reader wishes to put more weight on one or more measures, they can do so (Fig. 1). In a realistic multidisciplinary assessment of animal welfare, the following measures should be included:

- Level of productivity
    - Direct animal productivity
    - Human labor requirement
    - Cost of production
- Behavior
    - Maintenance behaviors (standing, walking, lying, feeding, drinking)
    - Abnormal behaviors, including stereotyped behaviors
    - Other appropriate behaviors such as reproduction, maternal–neonatal interactions or other site or age-specific behaviors
- Physiology

Stage of life	Anatomy	Physiology/Health	Behavior	Productivity
Neonate	□	□	□	□
Growing	□	□	□	□
Reproducing	□	□	□*	□
Lactating	□	□	□	□

Fig. 1. The animal welfare matrix. Animals would be expected to have good welfare if they receive a check in each box. If problems were identified uniformly over anatomy, physiology, behavior and productivity, most people would agree that the production method would be problematic. However, should the farm not qualify for an assurance that the welfare is adequate if there is a problem in just one cell (represented by the *)?.

  - Endocrine measures of stress (glucocorticoids and catecholamines)
  - Blood pressure, heart rate, respiratory rate

- Health and immunity
  - Overall incidence of disease
  - Level of immune protection (many measures; see McGlone et al., 1994; Morrow-Tesch et al., 1994)
- Anatomy
  - Bone strength and rate of injury
  - Wounding, especially of skin (e.g., bites or abrasions)

In addition to the above measures taken on the animals, we must, in today's society, take into consideration other society issues. Issues of importance to society today, that impact which production systems we use, include:

- Environmental impact, particularly of the soil, water and air
- Worker health and safety
- Farmer economics
- Consumer economics (cost to purchase such products)
- Public perceptions (including production systems and feed ingredients such as animal products or genetically modified feeds)
- Community interactions of the farm (related to pollution and other factors)
- Drug residues and animal-derived feedstuffs
- Food safety (microbes and genetically-modified feedstuffs)
- International trade and protection of local food production

The concept that ties together the most issues is the concept of sustainable agricultural systems. If our systems of production are in harmony with the environment, the animals, the workers and the community and if they are efficient and economically competitive then the system may be said to be sustainable. Attainment of sustainability is a tall order in today's world. It may mean that some animal products can not be produced in some locations at the present level (e.g., livestock-dense regions in wet climates near large populations of people).

The call for multidisciplinary evaluations both within the field of farm animal welfare and especially across systems of animal production is now recognized in the USA and in Europe. The USDA has new funding opportunities dedicated to multidisciplinary large-scale studies of animal systems with several areas of focus (www.reeusda.gov). In Europe, society issues have been a topic of discussion in recent years with a focus on whole-system's multidisciplinary evaluations (Sorensen, 1997).

On top of the consumer demands, historically, has

been the cost of animal products. Today, at least in developed countries, consumers demand a food that is first safe and second protects the environment. Consumers can not confirm that the food they eat has any sort of environmental protection in most cases, but they can sense fairly quickly if certain food safety safeguards have broken down (e.g., food microbes). The only way to assure environmental or animal welfare protection is through national legislation or assurance schemes developed by a third party (other than the farmer or the consumer). The challenge for animal agriculture is to provide public assurances, at what ever level they desire, with minimal cost to the consumer. Too much cost, and some consumers will stop purchasing the more expensive product.

If additional assurances are put in place, the consumer can pay for it now or they can pay for it later. If they insist on assurances (as we expect they will), they can do so by purchasing assured products (where available). If the entire industry is required to make a change that costs the farmers real dollars, it will drive some farmers out of business and those that remain will be paid more and therefore the consumer will pay more. This is a painful experience for the farmers as the higher requirements are put in place. The real danger to a local economy, however, comes with the ability of certain countries to produce assured products with less cost thereby shifting domestic consumption towards foreign products. Consumers can not have it both ways in the long-run — they will have to accept that with society demands, there will be cost and with free markets, the production will move to places where the assured animal products can be produced with the lowest cost.

3. Farm animal welfare and sustainable systems in balance with society issues

3.1. Farm economics and community health

Farms that produce animal products can only do so in the long term if the farm is profitable. If demands are made by society for animal welfare or other assurances, the consumer must pay or the producers will go out of business. The banner scheme for animal welfare assurance is the RSPCA's Freedom Food concept. In this scheme, one motto that has been used is ''animal welfare at no extra cost''. This is a dangerous precedent because if the farmers are asked to produce food at a higher cost (abandoning battery cages for hens, for example), then the participating farmers are at an economic disadvantage. This can not go on for very long.

While some production systems that might be compatible with public perceptions about good animal welfare might not cost the consumer more, the general idea that animal products with greater animal welfare assurances will cost more is accepted. A report that examined the major animal production systems concluded that provision of more space and enriched environments would cost more to produce (Council for Agricultural Science and Technology, 1997). The cost could be borne by the farmer for a while, or by the market chain, but with thin profit margins at each level of the market chain, some farmers would go out of business due to the high cost of adapting, while others would remain, with the result of a permanent increase in the cost of animal products for the consumer.

Farmers must be able to compete on a cost basis just like every other business. But more than just the farmer, the rural communities benefit from animal agriculture. If a grain farmer feeds his or her grain to animals, it adds real value to the community economic engine. It gives employment to allied industries and keeps the smaller towns viable — they become sustained by the farms. A community based only on crops can not have as developed an infrastructure as when animals are added. Think of a town with only grain production. Then imagine animal feeding and processing plants. Further processing means more jobs and better infrastructure (schools, health care, entertainment, etc.).

Measuring animal welfare without taking into account farm and community economics is shortsighted.

3.2. International trade and domestic protection

Domestic food production is a national security issue for every country. If domestic food production is possible, most countries want to protect the internal food supply. This protection may come in

conflict with the welfare of the animals. For example, in the UK, when veal calf crates were banned, consumers could still buy veal from continental Europe. When gestation crates were banned in the UK, British consumers could still buy pork from Danish farms that use crates. In these two cases, domestic laws hurt the domestic farmers and on the whole, the same number of animals may be in the less-than-desired production system. The situation is far more complex than this, of course, and the general topic is tangential to the theme of the paper. However, animal welfare assurances can not be made in a vacuum without considering if domestic production is to be protected and if international trade may be affected.

Included among domestic protection is the protection of rural environments and of the family farms. City-dwelling people like to drive in the country and see animals grazing and wide-open farm lands. They also have some desire to protect family-based farm production. How much consumers are willing to pay to protect less-efficient, smaller farms remains to be determined.

3.3. Environmental concerns

Environmental protection can come in conflict with animal welfare. There are several examples to make the point. Feeding high fiber diets to sows was offered as a way of partially satiating limit-fed sows (Robert et al., 1997). Non-ruminants do not utilize fiber very well and adding fiber to the feed will add to the environmental burden of the farm. Many farms are struggling to meet environmental standards and increasing the biomass of the effluent is not desirable.

In the UK and Europe, outdoor sows are commonly given nose rings — a painful experience — to prevent damage to pastures that can lead to run-off of manure nutrients to undesirable places (ground water, rivers, etc.). The nose ring is a classic environment vs. welfare issue. In some environments, especially wet climates, nose rings will reduce environmental pollution at the expense of sow pain and suffering (thwarting of their natural drive to root in the soil). In Denmark, the environment is winning because nose ringing is required, but in the Netherlands, nose ringing will be banned in the name of animal welfare. The real conflict will come if the public want the sows outdoors, with environmental protection, but at the same time they do not want nose rings. It is difficult to see how sows can be kept outdoors in wet climates while protecting the environment and remain economically competitive. One solution is to not produce pigs in the outdoors in wet climates. If the public prefers (or requires) sows outdoors, then they must be produced in relatively dry climates.

3.4. Drug residues and food safety

Consumers demand and deserve safe food. Food safety concerns are both in drug residues, antibiotic-resistant microbes and in microbial contamination. Before a welfare-friendly system is proposed, the effect on food safety must be determined. And because we are still learning about food safety, it is impossible to predict the effect of production systems on food safety unless specific studies are performed.

3.5. Worker health and safety

Worker health and safety is the least discussed society issue at this time, but it is still very important. Consumers in the USA are supportive of paying more for produce if the farm workers have a safe, healthy environment. In California, a decades-long fight helped get migrant grape workers basic toilet facilities and protection from agricultural chemicals. Today, provision of basic health care to workers who produce animal products is not assured in many countries. As less-developed countries begin to export animal products, worker health and safety may become a more important issue.

4. Conclusions

Measurement of animal welfare should be performed using a multidisciplinary approach (Fig. 2). To focus on single disciplines (e.g., behavior only) will cause arguments and the need to conduct further investigations to satisfy different segments of scientists and the public. A multidisciplinary approach may give some indications of how well a system

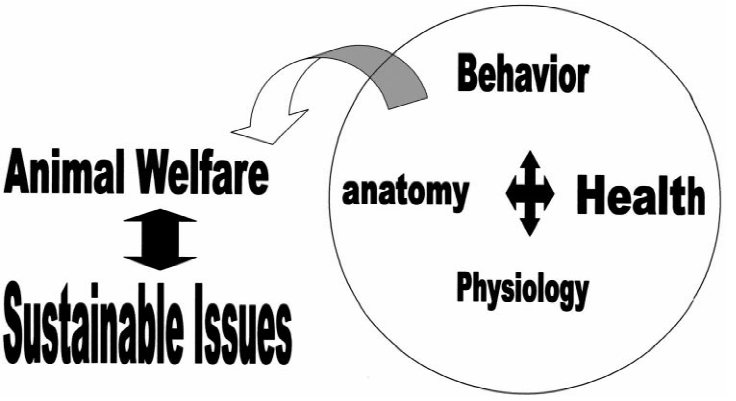

Fig. 2. Model of how animal welfare and its components must fit within the framework of sustainable production systems.

works that otherwise might not have surfaced. Furthermore, the multidisciplinary research approach must be considered within the context of other society issues including protection of the environment, the workers, farm income, community and national health and food safety. To be able to make such complex comparisons will require truly multidisciplinary teams that include scientists, economists and sociologists with a strong dose of reality. Some nations might want to consider their national resources and local environments and determine if each segment of animal agriculture can be sustained while protecting the health of the animals and the people.

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