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REVIEW
Artigo de Revisão

Manual of good practices for welfare: a proposal for dairy cattle on pasture in Brazil

Manual de boas práticas para o bem-estar: uma proposta para bovinos leiteiros em pastejo no Brasil

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Abstract Debate on ethics in animal production started in 1960s. Since that time, discussion on animal welfare (AW) has taken large proportions, where laws and specific rules were created in some countries. Also, this issue has been considered a major subject, and discussed in different levels such as academic, business and social spheres. Although there is a lot of information and good practice manuals for livestock production, information is still limited so that animal welfare practices can be adopted on farms effectively. Currently, the development of protocols that can assess the level of AW in properties is a reality. For dairy cattle in intensive systems, the Welfare Quality® protocol evaluates and addresses critical points so that improvement might be implemented. However, little information exists for dairy cattle in extensive systems. Thus, based on covering actions directed by the animal welfare management, behavior, nutrition, health, facilities, transportation, and human resource management, a proposal for dairy cattle on pasture in Brazil aims to provide and to disseminate good AW practices for dairy cattle on pasture. Hence, a welfare manual for good practices was created, which describes the actions and strategies to best promote the AW in this livestock production.

Keywords Animal welfare, ethics in animal production, extensive systems.

Resumo Na década de sessenta, o debate sobre a ética na produção animal foi aberto. Desde aquela época, a discussão sobre o bem-estar animal (BEA) tomou grandes proporções, como a criação de leis e normas específicas em alguns países. Além disso, o BEA tem sido discutido em diferentes esferas – acadêmica, empresarial e social. Embora exista grande quantidade de informações e melhores práticas na produção pecuária, ainda há pouca informação para implementar efetivamente as práticas de proteção dos animais de produção. Atualmente, o desenvolvimento de protocolos que possam avaliar o nível de BEA nas propriedades é uma realidade. Para bovinos leiteiros em sistemas intensivos, o protocolo *Welfare Quality*® avalia e aborda os pontos críticos para que as melhorias possam ser implementadas. No entanto, existe pouca informação para bovinos leiteiros em sistemas extensivos. Assim, abordando ações dirigidas ao BEA, comportamento, nutrição, saúde, instalações, transporte e gestão de recursos humanos, o Núcleo de Pesquisa em Ambiência – NUPEA/Escola Superior de Agricultura "Luiz de Queiroz"/Universidade de São Paulo –, com o objetivo de fornecer e difundir as boas práticas de BEA a todos os que trabalham com bovinos de leite em pasto, criou o manual de boas práticas para o bem-estar: bovinocultura de leite em pasto, descrevendo as ações e estratégias para melhor promover o BEA nesta produção pecuária.

Palavras-chave Bem-estar animal, ética na produção animal, sistemas extensivos

Introdution

Until recently, society hardly knew where the products of animal origin came from and how they were produced. Nowadays, the debate on animal welfare (AW) is in focus and many people want to know how it is produced. In adition, concerns about the source as well as the treatment

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that animals receive during their lives have become a priority.

In general, consumers are more aware of the demand of products that take into account of health and welfare of farm animals as well as food quality, and safety. In this scenario, links in the animal production chain begin to be adapted to this new reality, ensuring competitiveness in domestic and international market.

In regard of those involved with animal production, problems of agriculture and AW is often simplistic (Fraser, 2001), showing no attitudes and practices in the implementation of an effective program of AW on farms. To solve the problems of AW in livestock production, not only a diagnosis is needed (Machado Filho and Hotzel, 2004), but also a legislation is required to lead the practical application of AW, giving conditions for it, so that AW can be respected (Webster, 2001).

According to Broom (2004) welfare is a characteristic of the animal and not something that is provided by men. Since then, there has been many outstanding developments in dairy production systems. However, such progress has not been matched on the aspects related to AW. The high yield was achieved at a high cost of quality, where the animals involved, live in unacceptable conditions.

Much of milk production comes from small and medium producers, presenting large stemmed production systems on pasture. In this scenario, welfare involves many challenges, mainly men and dairy cattle. First, there are difficulties for finding an appropriate environment for the well-being of workers, permanent technical training to those who work directly with cattle, good human-animal relationship, and effective improvement of the AW in the properties.

Thus, some researchers have studied objective methods to assess the degree of AW. However, in the case of dairy cattle, these methods are based on intensive production systems, since they have their origin in the United States and Europe. Therefore, protocols for milk production on pasture should be adapted and developed.

Many project management practices and inappropriate facilities could lead AW levels to inadequate standards (Machado Filho and Hotzel, 2004), thus, NUPEA – Animal Environment Research Nucleus/ESALQ/USP, in accordance with the Recommendations for Good Practices on Livestock Welfare and Economic Interests (REBEM), the only Brazilian official document published about AW in the country by the Ministry of Agriculture, Livestock and Supply (MAPA), aims to provide and disseminate welfare manuals of dairy cattle on pasture, poultry and swine, detailing the actions and strategies to assist the implementation of a AW program in farms.

Development of the good practices manual for welfare: dairy cattle on pasture

The good practices manual for welfare: dairy cattle on pasture was developed in accordance with Normative Instruction (IN) number 56 published by MAPA laying down REBEM, including actions directed to AW by handling, behavior, nutrition, facilities, transportation and sanity. According to REBEM, livestock includes all animals which are raised to obtaining meat, milk, eggs, wool, fur, leather, and honey, or another product for commercial purposes. Animals of economic interest or those whose purpose is sporty and generates income and employment are also inserted in this group. Thus, this manual is based on the principles in Article 3 of REBEM (Table 1). Therefore, the chapters of the manual were divided into handling, installation, nutrition, health, behavior, transport. A chapter about management was added, since the human factor is essential for the AW program efficiency.

Table 1 Paragraph of Normative Instruction (IN) number 56 establishing the REBEM used in The Good Practices Manual for Welfare: Dairy Cattle on Pasture

Recommendations for Good Practices on Livestock Welfare and Economic Interests			Manual chapter
Article 3 (IN 56/2008/MAPA)	§ 1	To have careful and responsible handling in the various stages of the animal's life, from birth, creation and transport	Handling
	§ 2	To have basic knowledge of animal behavior in order to appropriate handling	Behavior
	§ 3	To provide satisfactory, appropriate and safe diet, suitable for different animal´s life stages	Nutrition
	§ 4	To ensure that facilities are properly designed to different species in order to ensure protection, possibility of rest and welfare	Facilities
	§ 5	To handle and transport animals appropriately to reduce stress and prevent injuries and unnecessary suffering	Transportation
	§ 6	To keep authoring environment in hygienic conditions	Sanity

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Besides REBEM, international standards and assessment protocols of animal welfare have served as the basis for the development of this manual, such as the Welfare Quality® Project and Humane Farm Animal Care Program.

The team responsible for preparing the material is multidisciplinary, and it is formed by professionals from biology, agricultural engineering, veterinary medicine, and animal science fields, offering broad view in relation to livestock and their needs.

Considerations

The manual of good practices for welfare: dairy cattle on pasture is divided into eleven chapters. The contents of each one is briefly described below. For the time being, this manual is available only in Portuguese, even so its content is applicable for any dairy cattle farm on pasture. Also, this manual will be provided on NUPEA's website: http://www.nupea.esalq.usp.br/.

Chapter 1. Introduction. Brings a brief definition of AW, its importance, its foundations, and practical applications. In adition, the main goals of this manual development and the expectations of its use are also highlighted.

Chapter 2: Handling. Based on article 3, paragraph I of IN 56/2008/MAPA: "Careful and responsible handling in the various stages of the animal's life, from birth, creation and transport". According to the concepts of AW, this chapter refers to daily activities of dairy cattle production system, such as handling animals to milking room. This chapter describes succinctly the colostrum feeding practices, milk feeding, and weaning of calves as well as their healing navel. Also, cattle identification, methods of castration, dehorning, removal of supernumerary teat, preventive trimming, respect to the dry cow period, and proper procedures for euthanasia are discussed in this chapter.

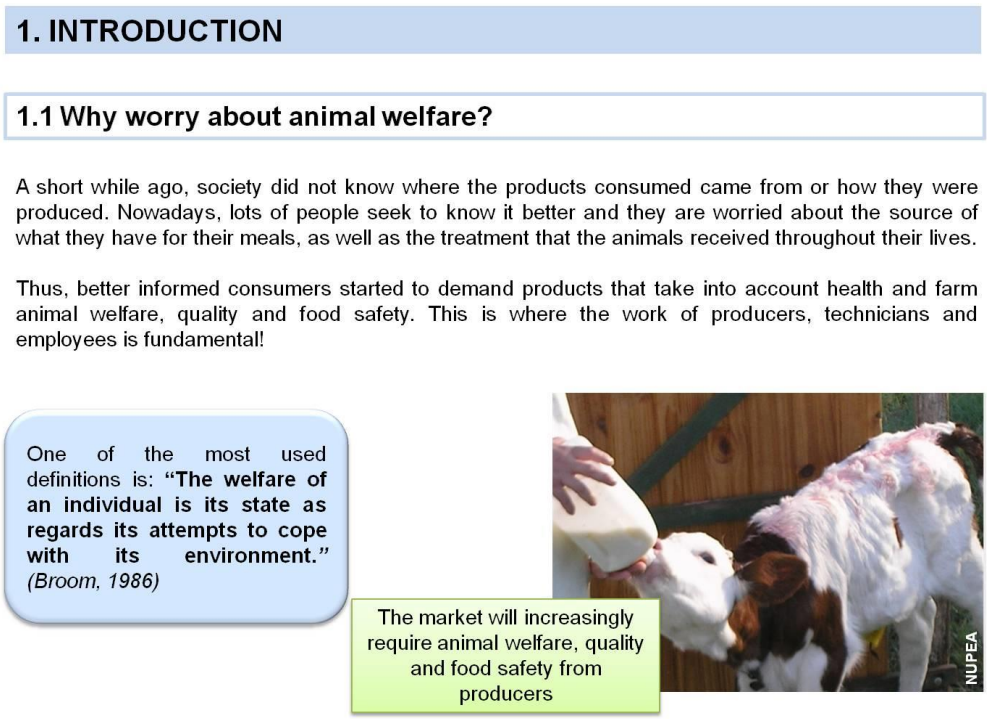

Figure 1 The first page of chapter 1: Introduction

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2. HANDLING

Article 3, § I, IN 56/2008/MAPA: *"To have careful and responsible handling in the various stages of animal's life, from birth, creation and transport."*

2.1 Careful Handling

I. Daily activities within dairy farm must be developed to ensure no fear and no stress;

II. dairy cattle like routine, therefore changes in their routine must be introduced with caution. Knowing their natural behavior allows calm, quiet , and efficient handling;

III. It is forbidden to scream, make sudden movements or use tools in ways that cause injury to animals, such as pieces of wood or iron spikes;

V. Employees must be trained and they must understand bovine natural behavior. Employees dealing directly with dairy cattle, such as milkers, should be calm people.

Figure 2 The first page of chapter 2: Handling

Chapter 3: Facilities. Based under article 3, paragraph IV, IN 56/2008/MAPA states "To ensure that facilities are properly designed to different species in order to ensure protection, possibility of rest and welfare". This concept can be used as basis for chapter three, which emphasizes the main points that can directly affect the cows´ welfare and comfort.

It is suggested that the establishing of a relation between the occurrence of recurring injuries (chronic calluses and scars) and the presence of piercing, sharp or uncomfortable structures (i.e. protruding nails or improper bed). In this sense, it is recommended the most appropriate flooring type.

Adjustments in individual facilities for calves are recommended to be according to AW concepts, such as access to resting area, easy cleaning and decontamination, comfortable bed, protected from the weather and sufficiently ventilated to maintain constant air circulation. The two-month-old calves should be housed in groups. Also in this chapter, it is highlighted the importance of natural or artificial shade for this type of production system as a tool for improving the thermal comfort of the cattle on the pasture, in which in some cases, the use of air conditioning is necessary. Basic standards of size, location and materials feeder, drinker, paddocks and milking pens are described.

Chapter 4: Nutrition. Based under article 3, paragraph III, IN 56/2008/MAPA, which states "To provide satisfactory, appropriate and safe diet, suitable for different animal´s life stages".This chapter emphasizes the importance of providing good and abundant water, and adequate and balanced diet of each individual life stage. Necessary information is providedy to monitoring body condition scores of the cows, which minimizes fluctuations of body condition and productive and health problems.

Chapter 5: Sanity. The theme of this chapter is related to the terms of article 3, paragraph VI, IN 56/2008/MAPA: "To keep authoring environment in hygienic conditions". It is recommended that the entire production unit develops its own planning and sanitary control in order to prevent and control disease in the herd. One should have an accurate registration system of all occurrences, so that consistent attitudes are taken as early symptoms of diseases are identified. Relying on Welfare Quality® (2009), it is indicated to monitor body cleanliness and locomotion scores of cows to prevent and detect previously hooves disorders. Aspects related to the handling of vaccination are also described in this chapter.

Chapter 6: Behavior. According to the terms of article 3, paragraph II, IN 56/2008/MAPA: "To have basic knowledge of animal behavior in order to appropriate handling". This chapter presents aspects of cattle behavior that facilitate its handling and avoid stress, such as social organization, individual space, flight zone and vision characteristics that influence behavior. Moreover, it presents some major stereotypies and abnormal behaviors in order to alert the producer about the importance of seeking the cause of this anomaly and treat it with professional guidance.

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3. FACILITIES

Article 3, § IV, IN 56/2008/MAPA: *"To ensure that facilities are properly designed to different species in order to guarantee protection, possibility of rest and welfare".*

3.1 Facilities Free of Obstacles

I. It must be considered the free flow of dairy cattle in project development of facilities;
II. Uneven and slippery surfaces are not allowed;
III. To ensure the absence of any point in the facilities that cause recurring injuries in dairy cattle.

The occurrence of recurring injuries may be indicator of problems in the facilities

Chronic scar tissue	**Neck calluses**
Soft feet and bruised soles	**Knee and hock swellings/callus**
Interdigital infections	**Teat/Udder injuries**
Laminitis	**Broken tails**
Abscesses	**Hematomas**

Humane Farm Animal Care (2012)

Figure 3 The first page of chapter 3: Facilities

4. NUTRITION

Article 3, § III, IN 56/2008/MAPA: *"To provide satisfactory, appropriate, and safe diet, suitable for different animal life stages."*

4.1. Water Quality

I. To ensure that all animals have access to fresh and clean water throughout the day. A lactating cow can drink over 60 liters of water per day;
II. To inspect the troughs to ensure perfect operation periodically,
III. To clean the troughs periodically;
IV. If dairy cattle have access to natural sources (ponds, streams), it must be determined whether the water is suitable for consumption;
V. It is recommended chemical and microbiological analysis of drinking water at least once a year.

Troughs are considered clean when there is no evidence of dirt crusts and food waste decomposition, i.e., both trough and water are clean.

Clean and fresh water

Trough with insect larvae

Figure 4 The first page of chapter 4: Nutrition

Chapter 7: Transportation. In order to characterize handling and facilities related to the transport of cows, this chapter is based on article 3, paragraph V, IN 56/2008/MAPA: "To handle and transport animals appropriately to reduce stress, preventing injuries and unnecessary suffering", suggesting a loading and unloading facilities suitable to AW concepts. Besides some recommendations on cattle handling and fasting, staff training and some casualties that may occur during the transport must be solved according to AW.

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5. SANITY

***Article 3, § VI, IN 56/2008/MAPA**: "To keep environment in hygienic conditions."*

5.1 Health Care Practices

I. Planning and sanitary control in order to prevent and control diseases;

II. All incidents must be systematically registered;

RECOMMENDATIONS OF WARNING AND ALARM THRESHOLDS FOR SOME OF THE SYMPTOMS PRESENTED AT THE HERD

Symptom	Warning threshold	Alarm threshold*
% cows with nasal discharge	5.00	10.00
% cows with ocular discharge	3.00	6.00
% cows with hampered respiration	3.25	6.50
% cows with diarrhoea	3.25	6.50
% cows with vulvar discharge	2.25	4.50
% dystocia (in the last 12 months)	2.75	5.50
% downer cows (in the last 12 months)	2.75	5.50
% mortality (in the last 12 months)	2.25	4.50
% mastitis (milk somatic cell count > 400,000)	4.37	8.75

* the person responsible to take action according to the health protocol property **(Welfare Quality, 2009)**

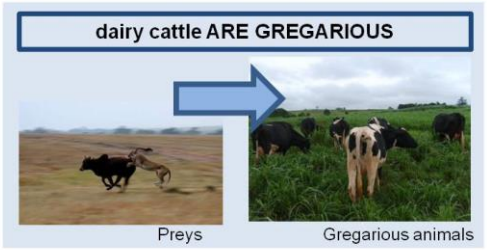
Figure 5 The first page of chapter 5: Sanity

6. BEHAVIOR

Article 3, § II, IN 56/2008/MAPA: "*To have basic knowledge of animal behavior in order to proceed to appropriate handling."*

6.1 Social Organization

I. Originally, dairy cattle are preys and because of their survival instincts they live in groups to protect themselves from predators. When isolated from the herd they become distressed.



Except pregnant cows close to calving and sick cows tend to isolate naturally

When isolating sick cows, keep them in paddocks that allow visual contact with the herd

II. Group life also entails negative interactions such as competition for resources (food, water, space) particularly when scarce. Thus, care should be taken so that resources are available to all individuals.

Figure 6 The first page of chapter 6: Behavior

Chapter 8: Management. This chapter is based on the principle that it is extremely important to have a careful and responsible management program to ensure good levels of AW (Humane Farm Animal Care, 2012). There are some tips to improve worker welfare, human-animal relationship, motivation, training and empowerment, since the success of breeding is directly related to human welfare. The farm management is a process of decision making, in which the manager must know the goals and the steps to be taken to achieve them. It is necessary to understand the difficulties, dissatisfactions and needs of each person and animal involved.

This manual recommends the application of a checklist, from which it is possible for producers and others involved in the process to be aware of the property condition. Thus, it can implement or improve a program of AW in its productive system.

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7. TRANSPORTATION

Article 3, § V, IN 56/2008/MAPA: *"To handle and transport animals appropriately in order to reduce distress, prevent injuries, and unnecessary suffering."*

7.1 Transport conditions

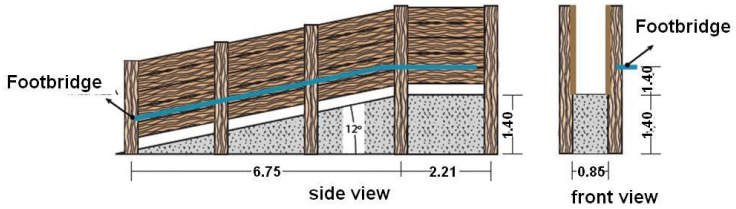
I. Loading Facilities (ETCO, 2010)

a) To use circular syringe and ramp with closed sidewalls of at least 1.8 meters high;

b) The ramp should have sufficient width for the passage of only one animal at a time. There should be no possibility of it turning up or trapping during its passage;

c) The ramp should always be clean and well lit, of no more than 20% incline;

d) The floor must not cause excessive abrasion on dairy cattle hooves and must not be slippery.



ETCO Team (2010)

Figure 7 The first page of chapter 7: Transportation

8. MANAGEMENT

"A highly careful and responsible management is vital to ensure the excellent animal welfare. Managers must be highly trained, skilled, competent on the farmed and animal welfare and should have an adequate working knowledge of the system and of the animals under their care. There should be a predictable daily routine management for dairy cattle." (HFAC, 2012)

The manager must know the farm objectives and what steps should be taken to achieve those goals. It is necessary to understand the difficulties, dissatisfactions, and needs of employees and animals.

It is recommended:

I. To develop and implement improvement programs and training for all employees, with regular updates and opportunities for professional development;

II. To establish the team concept. Work efficiency depends on a group of people who are in favor of a common goal;

III. The team members need appropriate division of responsibilities. Everyone involved must have defining characteristics, such as:

Figure 8 The first page of chapter 8: Management

Conclusions

The development and implementation of specific material for AW program for dairy cattle farms on pasture is essential for producers and industries to work/produce ethically. It is also suitable to the consumer, who is increasingly more aware about the production requirements for food quality and safety. It is expected that with free distribution of printed and digital manuals, a considerable number of farmers, who are seeking to adapt or to start the AW process on their properties, will be reached.

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