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ECONOMIC BENEFIT OF ANIMAL WELFARE: A REVIEW

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INTRODUCTION

Animal welfare is defined by Donald Broom (2011) as “the state in which the animal is able to face and adapt to the environment and the changes that occur in it”. The absence of welfare translates into the presence of stress; a more precise approach should allow us to understand stress as “the adaptive response of the organism to the presence of a hostile or threatening environment” (Alende, 2011). Stress is a response whose purpose is to achieve adaptation and, ultimately, the survival of the animal in the face of a challenge. However, when stress is very intense or prolonged, this response ends up being negative and detrimental to the animal (Pordomingo, 2005).

Nowadays, economics has acquired great importance in different areas of society, so knowledge is needed to understand its problems and possibilities (Francés, 2010). Animal welfare is no stranger to economic aspects, since the economic role of farm animals is essentially to provide benefits, in terms of consumable livestock products (Bennet, 1998). Because signals come from food markets, all economic incentives for livestock producers are to maximize the net economic gain that their animals can provide: their market value. To achieve this market value (productivity), it pays to provide animals with a certain amount of explicit care and, therefore, apparent attention to their “welfare”. Thus, farm animals are fed, housed, protected from predators, their diseases prevented or treated and, in general, receive beneficial treatment compared to what they would experience in the wild (McInerney, 2004).

Therefore, the objective of this review is to address the issue of animal welfare from an economic point of view.

THE ANIMAL WELFARE MARKET

Animal welfare is important in many ways, it becomes valuable when it is understood that living beings have minimum welfare needs, which must be met without exception. This section describes some characteristics that represent a potential market. We understand as market, the process of buying and selling given by different entities. In a market research, the objective is the acquisition of information for decision making, seeking to be the most accurate, anticipating changes over time (Herrera, 2013). In this section, we focus on the opportunities that animal welfare has to cover the different needs of each case, which represent an economic effect.

LEGISLATION

The way in which the government legislates animal welfare, in most countries, tries to adhere to the standards of the World Organization for Animal Health (OIE), but it is also influenced by some previous legislation (setting some guidelines), codes of good practices, the development of new technologies and advances in research (Huertas *et. al.*, 2014). In legal matters, Morales and Morales (2017^b), defined legislations that still classify animals as “things” as “archaic and retrograde”. However, fortunately, in recent years there has been an increase in concern for the welfare and protection of animals (Brels, 2012), these trends begin to destroy the legal concept that “reifies” animals, however, animals for productive purposes, are far from ceasing to be “goods at the service of humanity” which hinders their protection (Morales and Morales, 2017^b). Mexican animal welfare regulations, although established since 1940, Morales and Morales (2017^b) state that the regulatory system and public policies have been insufficient to provide protection to domestic species.

The Federal Animal Health Law of 2007, is the regulation that established the criteria,

specifications, conditions and procedures for the welfare of animals destined for livestock production, however, this law lacked the elements to ensure these are carried out, because the necessary public policies to ensure its implementation did not exist (Morales and Morales, 2017).^b

Based on the above, the application of animal welfare is important in its execution, since the normative and legislative predispositions are already in place and at the time progressed towards severe sanctions, which if applied in accordance with the law, could represent economic losses or even jeopardize the permanence of a company or the freedom of a responsible party.

CONSUMER INTEREST

Another area of opportunity for the adoption or continuation of animal welfare is consumer information on the different animal welfare practices (Matas, 2013), several authors agree that there is a willingness on the part of consumers to pay more for products that are free of animal cruelty (Matas, 2013; Huertas *et al.*, 2014; Moyano *et al.*, 2015), 2014; Moyano *et al.*, 2015), this is due to the fact that human empathy is a natural and ancestral ability, in addition to the perception by the consumer, who associates a higher quality of animal-derived products with welfare (Moyano *et al.*, 2015).

In addition to the nature, proper to humans, all markets agree on the need to obtain products free of animal cruelty, international markets, non-governmental organizations, regulations for exporting and importing their products (Huertas *et al.*, 2014).

Therefore, it is clear the need to apply animal welfare standards, due to the potential market that they represent or the market that is becoming increasingly strong. Failure to adapt to these standards may result in loss of customers and, therefore, economic losses.

ANIMAL WELFARE COSTS

FACILITIES

In general, the design of optimal facilities should include consideration of factors such as safe, functional and environmentally protective (Grandin, 2008). In addition, facility design should seek to minimize social tension and stress (Lindberg, 2001). Several studies have determined that behavior and social organization can be extremely affected by housing conditions and space availability (Kondo & Hurnik, 1990). Living space is referred to as the space required by the individual to feel comfortable and free from social tension. Space availability can strongly influence behavior and social organization, which in turn affect a wide number of aspects of production, and therefore, animal welfare (DeVries *et al.*, 2004; Landaeta-Hernandez *et al.*, 2004). Landaeta-Hernandez and Drescher, 2011, mention that when designing facilities, the economic aspect should be set aside in search of the best in terms of animal welfare, by means of a quick quotation, in pigs, it was found that adapting facilities is 25% to 45% more expensive than carrying them out from the beginning with an adequate design and infrastructure to maintain welfare.

TRANSPORTATION

The current trend with respect to transport is that it is increasing, longer distances are required to meet market demands, and there are now logistic scales and mixed transports. Losses due to poor transport vary according to the species, from 26% to 76% due to poor ventilation, adding the losses caused by road accidents, which respond to multiple factors such as intense working days, poorly designed routes, long trips and the high levels of demand of the companies (Miranda-de la Lama, 2013). It is necessary to develop tools and protocols that minimize the biological cost of animal adaptation to pre-slaughter logistics and transport.

It is possible that the impact of pre-slaughter stress has been underestimated in the past. It is difficult to quantify the economic value of transport, but through price quotations, it is estimated that the increase in transport is 25% higher, considering good handling at origin, travel times, adequate vehicles, trained personnel, correct stocking densities and optimized routes (Miranda-de la Lama, 2013). It is essential to invest in improvements to ensure animal welfare and improve the industry's profits.

PRODUCT QUALITY

Meat color and appearance are quality indicators, which consumers take into account at the time of purchase (Villaruel *et. al.*, 2003). There are two phenomena that affect meat quality: dark, firm and dry meats and pale, soft and exudative meats (DFD and PSE, respectively). DFD meats can be commonly observed in cattle, sheep, and less frequently in swine, turkeys and rarely in rabbits (Rodríguez-Calleja *et. al.*, 2005). PSE meats occur in pigs, chickens and turkeys (Barbut *et. al.*, 2008), although both phenomena can occur in all species (Adzitey and Nurul, 2011). In general, PSE and DFD meats have poorer shelf life and are more susceptible to bacterial contamination (Eikelenboom *et. al.*, 1990). The problem with the presence of DFD meat lies in its difficulty in marketing, since the consumer associates its dark color with meat stored in poor conditions or from old animals (Rodríguez-Calleja *et. al.*, 2005), in addition to suffering a depreciation of around 10% (Pérez-Linares, 2011). While the PSE phenomenon is susceptible to unpleasant odors, greater water losses due to dripping and cooking, in addition to causing economic losses of 50% compared to hams made with normal meat (O'Neill *et. al.*, 2003).

Hematomas are caused by an accumulation of blood after the rupture of capillary vessels. Meat with hematomas represents an economic loss, since it is not suitable as food and must be confiscated (Paramio, 2000). This

is due to the fact that it cannot be used in the preparation of processed meats, and it also decomposes rapidly, since it is an ideal medium for bacterial growth (Arrebola *et. al.*, 2014).

Other injuries, such as broken bones and torn muscles, caused during handling or transport of the animals, considerably reduce the value of the carcass, and carcasses with hematomas cannot be used as feed and should be seized (Paramio, 2000). In addition, secondary bacterial infections can occur in wounds, leading to abscess formation and septicemia, thus affecting the entire carcass (Arrebola *et. al.*, 2014).

Animal hides and skins are by-products with an economic value and can be damaged by poor handling throughout the process, before or after slaughter (Acero, 2009). Greater attention to animal welfare during transport and proper handling will improve the value of these by-products (Acero, 2009; Arrebola *et. al.*, 2014).

REVENUES

As already described throughout the review, the absence of animal welfare generates productive losses, such as: decrease in productive indicators, quality of by-products, animal damage, poor utilization of different resources, besides being a crime. Therefore, animal welfare generates income in several ways:

- Losses are reduced. In the system, the already consolidated production is affected by the stress of the animals, which lowers the quality of the by-products and the system becomes deficient, decreasing income. In the absence of this problem, income rises.
- Production is assured. By ensuring the quality of production, there is no risk of seizures or any other factor that could lead to direct economic losses on income.
- Access of production to new markets, with greater economic value.

ANIMAL WELFARE BENEFITS

One of the inherent benefits of animal welfare is compliance with current regulations and legislation, even though, for the time being, they do not represent severe sanctions, but ensure the permanence of the production unit in the future.

Access to new markets, in national and international sectors, by complying with standards and obtaining a different vision of the production unit by the final consumer.

Obtaining the highest efficiency, under any production system, given by its system potential.

BALANCE

Based on the information gathered, animal welfare does not generate new economic benefits; its importance lies in increasing the efficiency

of the system and opening up markets, thus stopping losses, basically, stopping losing money by exploiting the potential of the system.

Conclusion

Animal welfare is of economic importance, as it allows production units to obtain a higher economic value for their product.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest related to this manuscript.

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