



AENSI Journals

Australian Journal of Basic and Applied Sciences

ISSN:1991-8178

Journal home page: www.ajbasweb.com



Drivers for environmental sustainability in the Brazilian beef chain

¹Filipe Quevedo-Silva, ²Dario de Oliveira Lima-Filho, ¹Otávio Freire

¹Nove de Julho University. São Paulo, Brazil.

²Federal University of Mato Grosso do Sul (UFMS). Campo Grande, Brazil.

ARTICLE INFO

Article history:

Received 25 June 2014

Received in revised form

8 July 2014

Accepted 25 July 2014

Available online 20 August 2014

Keywords:

Sustainable management; Consumer consciousness; Productive chain

ABSTRACT

Background: A very important question that has emerged in first-world nations is the relationship between the consumer and the natural environment. In fact, the environmental questions have increasingly become an important factor for beef consumer, especially in the developed countries. Furthermore, during recent years the studies on sustainability have been focusing their efforts no longer in individual companies, but in the practices developed throughout the entire chain of production. Some studies suggest that the greatest challenge currently facing Brazil is to satisfy all the demands in the international markets relative to the attributes such as the welfare of the animal and environmental sustainability. **Objective:** The objective of this study is to investigate the practices employed by the agents of the productive chain and the main Drivers responsible for this. For such there was a qualitative study realized and some agents belonging to the links of production (cattle farming), transformations (refrigeration and freezing) and distribution (retail) of the meat/cattle breeding industry in Brazil. **Results:** Studying the Drivers: Legislation, Environment, Financial Performance, Internal Processes, Social Environment and Consumers we verified that these same were shown to be fit for analyzing the chain, some being more relevant than others such as, for example, the financial performance proved to be a good justification for the adoption of certain practices and the Environment which, in function of the characteristics of the producers is capable of exercising their influence over these same. **Conclusion:** It was possible to identify some of the practices being adopted and important movements of important agents signaling the real possibility of a future change. We note that for most of the agents in the productive chain the question of environmental sustainability has not been assimilated due to the non-existence of incentives, mainly financial, or of those that have been seen as small or as the economics theory suggests, makes it difficult or impossible that there is a change in behavior. This causes many of the producers to be unable or unwilling or unprepared to adopt sustainability practices. Nonetheless, there is still much to evolve in terms of sustainable practices, especially in relation to the agents abandoning a reactive posture doing simply what the law establishes and adopting a more proactive one.

© 2014 AENSI Publisher All rights reserved.

To Cite This Article: Filipe Quevedo-Silva, Dario de Oliveira Lima-Filho, Otávio Freire, Drivers for environmental sustainability in the Brazilian beef chain. *Aust. J. Basic & Appl. Sci.*, 8(13): 473-484, 2014

INTRODUCTION

Brazil has passed through a period of elevated economic development being considered one of the principal third-world emerging countries (Oaigen *et al.*, 2011). In 2012 it represented the 7th economy in the world with the capacity to arrive at the 5th in 2015 (Pochmann, 2012). Within this scenario the agribusiness represents 22.74 of the national GDP, displaying the relevance of this sector for the economy of the country (Cepea, 2012). Between the months of April 2010 and March 2011 agro-exports amounted to US\$ 79.8 billion, a 19.7% increase of sales during the same period between 2009 and 2010 (MAPA, 2011).

Of the Brazilian agro-industrial productive chains the sale of beef must be highlighted. Brazil also occupies a privileged space in the international production with an amount of approximately 16% of the total produced internationally (USDA, 2012), and according to the USDA (2012) data, the second largest world exporter of beef.

According to the projections on the United States Department of Agriculture [USDA] (2011), among the selected countries, Brazil has the third largest meat consumption per capita with 37.6 kg only behind Argentina [64 kg] and Uruguay [53.9 kg]. In fact, in a study led by Silva *et al.* (2007), in Campo Grande-MS it was revealed that 76% of those interviewed prefer cow beef.

Corresponding Author: Filipe Quevedo-Silva, Rodovia Raposo Tavares, 3175, Bairro Jardim Olympia, São Paulo, SP. CEP. 05573-900, Brazil.
Tel: 55 11 97066-4591 E-mail: filquevedo@gmail.com

Before the importance of cow beef for the Brazilian economy, this study will have as its objective the production chain of the meat/cattle industry in Brazil. In the productive chain each link exercises a specific function and all producer agents should fix their eye on the main agent – the end consumer. He is the one that paves the path for the actions of the other links.

With the changes that have occurred in the society during the past few decades, the eating habits of consumers have also suffered modifications (Poulain, 2004). In the second half of the XX century there had been considerable improvements in the life-condition and income due to some factors, for example such as the increase in production and the world-scale level of productivity, geopolitical modifications, advance in transport which accelerated the sales of merchandise, especially foods, affecting the alimentary availability, the prices of the food and the forms (Lambert *et al.*, 2005).

Within this context we can note a more informed and demanding consumer regarding their necessities. This fact requires from companies a better knowledge of the current and potential clients so as to keep them satisfied. The concern about nutritional questions has grown due to the accumulation of evidence about the relationship between the aspects of an alimentary diet with health; the consumption of foods in an insufficient manner or excessively, or even an unbalanced diet can result in situations of mal-nutrition or obesity (Oliveira and Lima-Filho, 2011).

The concern about food safety is increasingly present among consumers, even more-so after the sanitation problems that occurred throughout the world during the last few years, for example, such as mad cow disease and the aviary flu. One way of reducing the risk relative to the product is to buy food with seals of quality which gives greater trust relative to the physical, microbiological and organoleptic aspects of the food as there is a Government guarantee. One very important question that has come up in first-world countries is the relation between consumption and the natural environment. In fact, environmental questions have increasingly become an important factor for the beef consumer, especially in the developed world (Gianezini, *et al.*, 2011; Silva *et al.*, 2011). A study done by Gianezini *et al.* (2011) has shown that consumers are especially concerned about consuming products coming from the productive chains that adopt environmentally and socially correct systems using sustainable productive systems and believe that this behavior should even include the retailers.

Environmental management has become an important managerial instrument for the creation of greater competitiveness for the organizations (Matos and Hall, 2007). According to Barbieri (2007), the company that forecast servicing the new demands through legitimate and true actions ends up creating an important strategic differential. Furthermore, during the last years the studies about sustainability have not focused their efforts on companies individually, but rather in practices that have been developed throughout the productive chain (Seuring *et al.*, 2008; Linton *et al.*, 2007). This is what the study realized by Souza Filho *et al.* (2008), which states that to offer a product that has environmental sustainability can be a decisive factor for competitiveness in the beef productive chain.

There is international pressure on the part of consumers in search of safe foods and that they are produced in such a ways that is environmentally sustainable and with the well-being of the animal; this fact seems to be confirmed when observing not only the growing demand for food which contain these attributes, but also with reference to the legislation created to regulate these productive processes (Macedo *et al.*, 2011; Silva *et al.*, 2005).

In this study led by Silvia *et al.* (2011) with the objective of analyzing the exportation non-tariff barriers in the Brazilian beef chain, after a bibliographical study and interviews with specialists in the area, the authors concluded that the greatest challenge currently for Brazil is to satisfy the growing demands of the international markets relative to the attributes such as, for example the animal welfare and environmental sustainability. Currently, there is even a research Project funded by the European Commission and coordinated by the *Universidade de Bolonha* entitled “Knowledge-based Sustainable value added food chains: innovative tools for monitoring ethical, environmental and Socio-economical impacts and implementing EU-Latin America shared strategies” or the SALSA project which, through many partners in numerous countries they study, among other things, sustainability in the Brazilian beef chain.

In this manner, we can see the growth of what is called “environmental consciousness” which has been changing the consumption habits of the population making it such that the attributes related to environmental questions become, even in the food sector, increasingly important in detriment to others, such as, for example, the price.

In the face of this new scenario, based on the model by Mann *et al.* (2010) about the factors responsible for the sustainable management of supply chains, the objective of this work is to investigate which practices have been employed by the agents in the beef chain seeking management for environmental sustainability and who are the Drivers responsible for this.

Theoretical reference:**Environmental Sustainability:**

There are diverse concepts for sustainability, although the most-frequently cited concept is the one published in the Brundtland Report in 1987 (Grosskurth and Rotmans, 2005). Based on this report, sustainable development is that which attends the needs of the present without compromising future generations from meeting their own needs (CMMAD, 1991). Furthermore, sustainability requires a systematic vision of the world, being that we can only perceive if the decisions taken today and now will have an impact on today's lifestyle and the future one.

Within the numerous concepts around sustainability, one of the better-known approaches is that which considers that sustainability as composed of three dimensions: a) economic dimension; b) environmental dimension; and c) social dimension; the so-called Triple Bottom Line (Lee and Kim, 2009; Cai and Wheale, 2004). This analysis model involves a holistic concept, integrating the three dimensions in such a way that they attain sustainability (Elkington, 1999). Thus, due to the complexity of the theme, in this study we will focus on the environmental dimension of sustainability. The environmental dimension refers to the impact over the natural systems both living and non-living, such as land, air and water and is related to the management of the natural resources (Lorensetti, *et al.*, 2008).

According to Dyllick and Hockets (2002), the natural resources present in this dimension can be classified in two groups: the resources, renewable or not, that are used in the economic processes and; the more complex resources, such as for example, species in extinction and biodiversity. Further, according to the authors:

Environmentally sustainable companies use only the natural resources that are consumed at a rate of natural reproduction, or at a lesser rate than the development of substitutes. They do not cause emissions that accumulate in the environment at a rate beyond the capacity of the natural system to absorb and assimilate these emissions. Finally, they do not perform activities that degrade the eco-system services (Dyllick and Hockets, 2002, p. 133).

Consumer Environmental Sustainability:

The environmental questions have increasingly become an important factor for the consumer, especially in the developed world or first-world countries (Gianezini, *et al.*, 2011; Silva *et al.*, 2011). A study done by Gianezini *et al.* (2011) showed that consumers are concerned about consumer products coming from productive chains that adopt practices that are environmentally and socially correct, with sustainable productive systems and believe that this behavior should include the retailers as well.

According to a study done by Souza Filho *et al.* (2008), offering a product that has environmental sustainability could be the decisive factor for the competitiveness of the beef productive chain. There is some international pressure on the part of the consumers in search of safe foods and that are produced in an environmentally sustainable way with the welfare of the animal in mind, which makes the growing demand for food with these attributes very clear as well as the legislation which has been created to regulate these productive procedures (Macedo *et al.*, 2011; Silva *et al.*, 2005).

Likewise, sustainable ethical consumption consists in the consumption of goods and services respecting the environmental resources in such a way so as to guarantee the necessities of future generations (Heap and Kent, 2000). In line with this, Cooper (2002) stated that sustainable consumption has the standard of consumption that meets the basic necessities together with minimizing environmental degradation.

In a study led by Memery *et al.* (2005) together with supermarket consumers in the United Kingdom with the objective of identifying three categories of influence: food quality and safety; human rights and commercial ethics; and environmental questions. Nonetheless, factors such as price, variety and convenience were considered more relevant for the decision than location and the products consumed.

This study points to an interesting phenomenon found in other similar studies. In accordance to Devinney *et al.* (2006), even if there is an increase in the number of consumers participating in the study who state their concerns and indicate that they would have more sustainable consumption, in practice they continue ignoring social-environmental questions and maintaining their consumption of traditional products, therefore, showing a gap between what they say and what they do, or between attitude and behavior.

In a study done by Eckhardt *et al.* (2010), using data collected from eight countries there were three possible reasons selected for this observed discrepancy between the declaration of intention and the behavior of the consumer: a) the economic rationalization, where the greater focus of the consumer is the greatest return on the money invested; b) institutional independence, explained by the fact that consumers consider the responsibility lies with the government to regulate these questions and protect the environment and; c) economic reality, where certain anti-ethical behaviors are accepted by the consumers as a justification for macroeconomic development.

Kalb (2012) leading a study to verify how the actions of environmental management of retail foods are perceived by the Brazilian consumer, did an ample review of the studies about the theme. Lima-Filho and Quevedo-Silva (2012) sought to demonstrate Standards that allowed to segment the organic products consumer

market through an analysis of the behaviors of the supermarkets. The authors verified that one of the consequences of this consumption is exactly respect or the environment, considering the absence of chemical inputs. Relative to organic products, according to Lima-Filho and Quevedo-Silva (2012), studies about the consumer profile of organic products indicate a relation between the consumer and schooling, environmental consciousness, family income and availability of the product.

Sediyema and Rezende (2010), identified that the association of the brand or company or cause considered relevant by the public and duly communicated can awaken the interest and the loyalty of consumers. Nonetheless, in order that the association of a company to a cause be efficient, first social-economic actions must be prioritized and implemented to real actions to have the correct effect and in order that it not have a contrary effect and the consumer perceives the attempt of association as an exploitation on the part of the company.

Therefore, even if there are some cases of discrepancy between declared intent by the consumers and the purchase behavior, these studies demonstrate a tendency towards behavior that is increasingly more sustainable on the part of the consumers, also indicating that the companies who wish to obtain competitive advantage and gain the loyalty of clients have to reverse their practices and adopt environmentally responsible processes and take into consideration the environmentally sustainable attribute by placing himself alongside their consumer.

Company Environmental Sustainability:

According to a study by Barbieri (2007) there is an increase of the concern for environmental questions on the part of the Brazilian companies in function of three sets of forces: the government, the market and the society. You can add to this list ecological ethics and the concern with the well-being of future generations on the part of the managers themselves, which in order to become a reality for the companies as a whole a change of values in the entrepreneur culture is necessary (Tachizaw and Andrade, 2008).

For D'Avignon (1996) there are numerous benefits resulting from the implementation of an environmental management system in the companies, such as for example, greater ease in the Sales relationships and access to new markets; building a "green image" for the organization before its stakeholders; cutting waste and greater control and logic of the processes and; improvement of the work conditions.

Along these same lines, Andrade *et al.* (2001) stated that within one process there can be space for minimizing residuals through the optimization of operational procedures improving the process and being more environmentally responsible or which can also be called greater environmentally-economical efficiency.

Thus, environmental management has become an important management instrument for the creation of conditions of greater competitiveness for the organizations. Dessa forma, a gestão ambiental tem se tornado um importante instrumento gerencial para a criação de condições de maior competitividade para as organizações. According to Barbieri (2007), the company that foresees servicing new demands through legitimate and true actions ends up creating an important strategic differential. A survey of the studies done by Souza (2002), regarding environmental entrepreneurs all the studies had demonstrated an evolution in the nature of the actions of the environmental entrepreneurs beginning with a more passive, reactive and conformist characteristic to later becoming more pro-active.

Therefore, sustainability has increasingly become a key factor for the strategies of a growing number of companies (Matos and Hall, 2007) and, in the most recent years that studies about sustainability have not focused their efforts on individual companies, but in the practices developed throughout the production chain (Seuring *et al.*, 2008; Linton *et al.*, 2007).

Productive chain Drivers for sustainability:

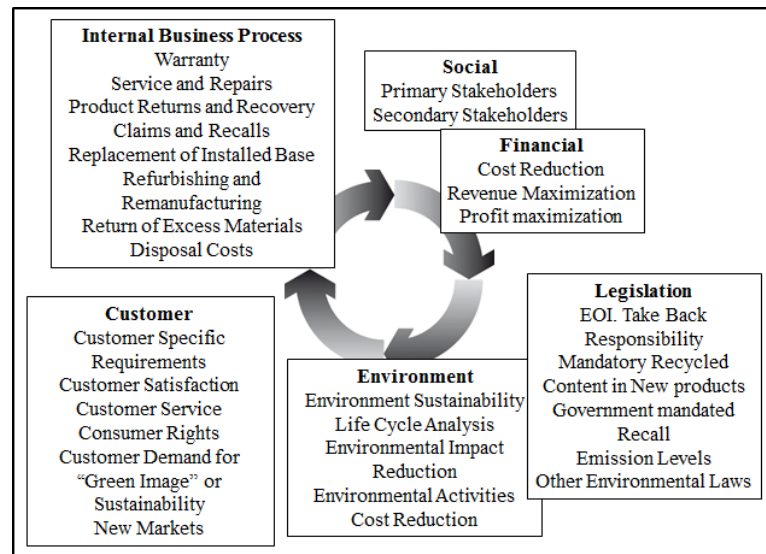
In review of the studies done by Mann *et al.* (2010), the authors proposed a model with the principal factors responsible for the companies to seriously consider adopting sustainable management in the supply chain, and these are: Legislation, Environment, Financial Performance, Internal Processes, Social and Consumer Environment, as can be seen in Figure 1.

According to the authors, the Legislation does not leave options for the companies to fulfill any determination in the laws. The Environment can be a relevant factor being that not always are the companies obliged by Law to take attitudes that involve sustainability. Sometimes ecological and environmental concerns of management make the company adopt sustainable practices.

Financial performance has also proved to be important because despite the traditional vision of seeing sustainable practices as a cost, many times these actions that avoid loss and promote greater efficiency can bring greater price reductions in the middle and long-term. Furthermore, the consumer can pay a Premium price to these companies also resulting in greater profits. Internal processes relates to the fact of the practices that see that sustainability can generate more efficient operations and greater quality.

Social environment refers to the stakeholders that directly or indirectly influence the companies' performances. And finally, relative to the Consumer factor we note a more informed and more demanding consumer referring to their desires and necessities. The concern with environmental questions has become

increasingly important and this is why the demand for products of companies that transmit an image of environmental responsibility has grown as well.



Source: Mann *et al.* (2010).

Fig. 1: Factors responsible for sustainable chain management.

Methodology:

This study is a qualitative study using the case study method. A qualitative study is characterized as being subjective and having to examine and reflect on the perceptions to generate an understanding of the social and human activities (Collis and Hussey, 2005). The case study is an interesting approach to facilitate the understanding of the context where the phenomenon has occurred, making it possible for a profound analysis of this same.

This study was divided into two steps. In the first step we did a systematic search in the literature available in books, national and international periodicals, Congress annals, dissertations and academic theses. The second step (empirical) consists of realizing the interviews together with the representative agents of the rural production chains, the transformation and distribution cow beef chains, having the objective to identify practices that have been used by the agents in these (cow beef chains) and searching for environmentally sustainable management and who the principal Drivers responsible for this are.

The target population of this study is comprised by the agents pertaining to the production chains [cattle farmers], transformations [refrigerators and freezers] and the distribution [retail] of the beef/meat industry in Mato Grosso do Sul. The sample method was by convenience and in order to obtain the most significant sample possible, the interviews were done with groups of agents that have distinct characteristics, for example, large capitalized cattle farmers, the cattle farmers representing the State median and small cattle farmers such that, even not having a statistical significance they could have a good vision of the sector.

The studied variables sought to cover the practices that are environmentally sustainable and practiced by the agents but especially the Drivers responsible for the chain production sustainability, as proposed by Mann *et al.* (2010).

The technique used was analyzing the content. According to Bardin (2009, p. 33 e 40), "the analysis of the content is a set of communication analysis techniques [...] that use systematic proceduresdescription objectives of the message content". This technique enriches the study as it deeply explores the messages relating the criteria of the oral interviews in accordance with what the interviewer wanted to say. One must take assiduous methodological care in applying the analysis to the study in order to not develop the technique as an intuitive practice, but rather as a systematized practice.

RESULTS AND DISCUSSION

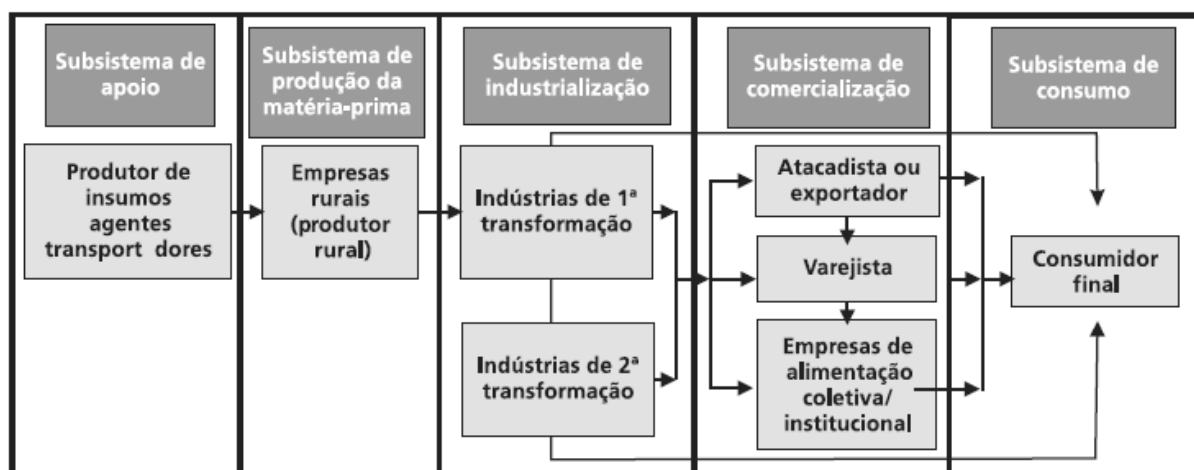
Cow/Beef Chain Description:

The Brazilian beef/meat chain has obtained expressive results for the economy of the country. Brazil is according to the USDA (2012) the second largest producer and world exporter of beef meat. The Central-West Region represented in the fourth trimester 36% of the national slaughters. The State of Mato Grosso takes the

lead, having had slaughtered 15.6% of the national production by the supervised/inspected establishments, followed by the State of Mato Grosso do Sul [11.6%] and São Paulo [11%] (IBGE 2012).

According to the projections of the Ministry of Agriculture, Cattle Farming and Supply [MAPA] (Brasil, 2010), for the period of 2009/2010 to 2019/2020, the production of beef will present one of the largest rates of growth with annual values at 2.15%. For this same period the annual growth rate expected will be 1.94% indicating the importance of this type of meat in the food list of Brazilians; according to Souza *et al.* (2011), the national production of beef meat will pass 9.2 billion tons [t], in 2010, to 11 million t in 2020, presenting an annual growth rate of 1.9% between 2010 and 2020.

Thus, it is possible to perceive the relevance of this chain not only for Brazilian agro-business, but for the entire Brazilian economy as well. Nonetheless, we can also see the complexity of this system, making it necessary to firstly, characterize it. Therefore, this topic follows with a description of the agents in the chain. As you can see in Figure 2, the chain of beef/meat involves from the production of the input [defensive, animal feed, genetics, animal] to the final consumption.



Source: Buainain e Batalha (2007).

Fig. 2: Structure of beef/meat chain.

Producer:

This chain is formed by companies or cattle farmers responsible for breeding, rebreeding and fattening the animals to supply the needs of the industry of transformation. They can be classified, in at least three sub-systems: the breeding, related to the reproduction, or production of calves; rebreeding relative to the development of the animal for slaughtering or coupling; and the fattening/termination refers to the weight gain for the slaughter; making it possible to find producers that only practice one of these, more than one or even the three, called the complete cycle (Oiagen, 2010).

In Brazil, diverse studies (Malafaia *et al.*, 2014; Caleman, 2005) showed that most of the producers are little technical skill, making the end product different than expected. Furthermore, another great problem is related to the management of the properties, being that many of them do not have a clear notion of their production costs, or long-term planning. However, according to Oiagen (2010), during the most recent years in function of the greater complexity of the system, there has been a change in the profile of the rural producers, with greater use of technology.

Another important point to be commented on is that, because this link presents a large number of producers that offer a homogenous product and they are the price-makers relative to their suppliers and consumers. This being the case, one can say that these agents find themselves in a market of perfect competition (Caleman, 2005), a factor that ends up influencing the adopted market practices.

The slaughtering and processing industries:

Generally speaking, the processing industry can be divided into three categories; slaughterers, that are apt to do the slaughter and sell the meat in natura as they do not have the structure that allows for freezing; slaughterers/freezers, who besides slaughtering have the structure to freeze the carcasses and; refrigerator/freezer processes, a company that has more technology to process the meat and take advantage of the sub-products (Silva and Batalha, 2001).

According to Buainain and Batalha (2007), the capacity of processing beef meat from these agents is quite significant, in 2011 there were 28.8 million heads of cattle slaughtered, with the Center-West corresponding to 36% of the total (IBGE, 2012). Furthermore, the agents would have sufficient technology to supply all the needs

of the demanding international market in terms of types of cuts of the meat, productivity and quality of the product (Buainain and Batalha, 2007).

Another important fact and also influences in the market practices adopted is that the greatest concentration occurs in this sector, resulting in greater market force (Caleman, 2005). This behavior becomes evident when one analyzes the survey realized by the refrigerator/freezer industries in Mato Grosso do Sul, in 2012, where the principal industrial group alone corresponds for 37% of the operations in the State and 47% of the installed capacity (Mascarenhas *et al.*, 2012).

Retail and distribution:

The distributions channels can be defined as a “network of organized agencies and institutions combined, that perform the necessary market activities to link the producer to the users” (Berman, 1996, p. 5). Thus being the case, these agents are responsible for distributing the beef/meat making the link between the chain and the final consumer. They are comprised by wholesalers, large supermarkets, supermarkets and even more specialized stores such as butchers and meat boutiques (Caleman, 2005; Zylbersztajn, 2000).

In Brazil, the purchasing of food, in its majority, is done in the supermarkets, in the case of semi-ready and not ready (Sproesser and Lima-Filho, 2007). It is estimated that the supermarkets are responsible for more than 85% of the retail food revenue in the country.

Consumer:

In the last link we find the end consumer. According to Zylbersztajn (2000), it is to them that the flow of products of the chain converge and, in counterpart, from them that the information comes [preferences of consumption] that will orient the actions of the entire system. Thus, the importance of knowing the end consumer becomes clearly evident as well as the habits and preferences of these consumers.

Many studies that have been done in various countries have studied the profile of the beef consumer, and having found some of the principal attributes that are taken into consideration during the choice/consumption of these products. Becker *et al.* (2000), when they studied the consumption of beef in Germany, they found that, when discussing beef, the consumers at the moment of purchase considered questions such as the origin of the meat, color, appearance, odor, taste, if it was soft, if the meat was lean or not, succulent, texture, brand and packaging.

Another study, conducted by Souki *et al.* (2003), together with 400 consumers in the city of Belo Horizonte has identified that the attributes that were considered most important at the time of purchase were the hygiene, color, pleasant odor, non-presentation of residuals and healthy-looking, fresh tasty, soft and nutritious. In addition to these main factors, the review of the studies done by the authors also had found succulence, low fat content, good yield in the preparation, vacuum-packed, easy to store and quick to prepare.

Therefore, it can be seen that during the past few years, the beef market has become more demanding and segmented signaling for the retailers and other agents of the chain that in order to be more successful today and in the future it is necessary to increasingly pay more attention to the market strategies adopted.

Environmental Sustainable Practices in the Beef chain:

The number of producers looking for a certificate referring to the good practices in the field has grown such as, for example the Rainforest Alliance Certified (RAS) or the Institute Manejo and Forest and Agriculture Certification (Imaflora). In order to receive the certification the farm goes through an audit that verifies certain labor, social and environmental aspects based on the fulfillment of agreed to requirements in the sphere of the RAS and that presuppose the adhesion of the producer to some articles of the Convention of the International Labor Organization, besides respecting Brazilian labor legislation. Below are some of these requirements:

- Proving that there is no deforestation on the farm, and no destruction of the high-value conservation ecosystem since 2005;
- The individual identification of animals through a chip or even a ring, making it possible to track it from birth to slaughter;
- Permanence of the animal on the property certified for, at least, six months. The establishment should be able to prove vaccines and the good health of the animal;
- The adoption of measures to reduce the gas emissions of methanol (such as the presence of trees in the pastures to capture CO₂ and measures that facilitate the digestibility of food to reduce emissions);
- Proof that there is no infantile labor;
- Proof that there is no forced labor;
- Proof that there is no discrimination of any type;
- The industry (refrigerator/freezer, tanning and other phases of the productive chain) are also submitted to auditing and should prove that the packaged product that will be delivered to the suppliers is that which had been evaluated at its place of origin.

Another example of a practice that could be adopted by the producers is the nutritional care and feeding of the animals. It just happens that during the rumen fermentation process there is the production of methane gas (CH₄), among other gases which besides the environmental factor it is a waste of energy for the animal (Berndt and Tomkins, 2013). According to the author, some factors that affect the production of methane gas are: a) nutritional, such as for example the amount of carbohydrates, lipids, etc.; b) metabolic, including the digestion passing rate; c) environmental, covering the temperature and the management and; d) physiological, such as for example the size of the animal.

From the increase in quality of the food a smaller production of methane can be generated and an improved animal. In the case of beef/meat with the improved performance it would be possible to slaughter animals earlier diminishing the productive cycle, and consequently, the total emission of methane. In accordance with Chizzotti *et al.* (2012), by diminishing the time of the slaughter there can be a reduction of 53% in the emission of CH₄, which would bring gains not only in terms of environmental sustainability, but also in terms of the quality of the meat.

In the conversations with producers Mato Grosso do Sul, we could see that these same had fulfilled the legislation and in function of their bond with the land, these same showed that they had some concern with environmental preservation, even at times because of the lack of information or for any other reason, they didn't take care of the land adequately.

Most of them said that the refrigerator/freezer companies are not concerned if the producers have adopted sustainable practices and do not make any demands in relation to this. One producer stated that one of the refrigerator/freezer companies with whom he works demands a sustainable behavior of his suppliers, but He does not pay a Premium price for this. Furthermore, it is important to emphasize that some producers state that they have little incentive on the part of the government for the preservation.

Relative to the transforming industry, the results of this study are in line with those found by Santos and Barczsz (2010) when they analyzed the environmentally sustainable practices adopted by some exporter refrigerator/freezer companies from Mato Grosso do Sul. The occurrence of seven indicators was studied, they are: Effluent treatment, Recycling of Effluent liquid, Recycle the solid residues, Reforesting projects, Alternative sources of energy, Fulfilling environmental legislation and ISSO Certification 14000.

Relative to the first three, they stated that they possess a system of control and treatment of the emissions, effluents and residual, having attested to the existence of lakes of treatment and the use of clean technology in all of them, a similar result was found by Rodrigues and Aguiar Junior (2004) in Goiás. One of the refrigerator/freezer companies have an effluent project of zero, which through a partnership with farmers close to the company, have the objective of using the treated effluents in the industrial unit for the activity of fertilizer-irrigation, thereby using the remaining nutrients for the fertilization of the soil. As to the solid residuals, some companies have systems that transform them into fertilizer, while others sell their residuals to specific recycling companies

Relative to the fourth indicator, two of the refrigerator/freezer companies have reforestation with their own production of the wood necessary and another of them implanted a wood substitution project by the bagasse of the sugar-cane presenting positive results as much in environmental preservation as well as diminishing the production costs. The rest of the companies by the wood by credentialed suppliers and authorized by IBAMA.

Dealing with rationalization of resources the authors have identified the existence of a system to control the use of water and the establishment of goals. A similar situation occurred with the electric energy only one company stated that they are developing a project seeking to reduce the consumption of natural resources. Another interesting result of the study is that all of the companies studied stated that they have fulfilled 100% of the legislation in vigor, according to the parameters of the National Environment Counsel (CONAMA), and the Environmental Institute of Mato Grosso do Sul (IMASUL). Nonetheless, none of the refrigerator/freezer companies seek to GO beyond the legislation and none of them possess the ISO14000, certification that refers to the formalization of a management system within the company.

Another study demonstrated that environmental investments correspond to less than 5% of the costs of a refrigeration/freezer company for more than 80% of the cases, this probably occurs in function of the image the consumer has, and being a little effective marketing instrument (Rodrigues and Aguiar Junior, 2004). Furthermore, questioning the motives that brought them to make such investment, most of the refrigerator/freezer companies stated that it was in function of the legislation.

An example of a big agent is the case of JBS which only buy cattle from producers that are not part of the list of those that practice deforestation, realize slave labor, are in Indian units or in units of conservation. The consultation to these lists is done twice: the first time is at the moment of purchase and the second is when the animals are going to slaughter. These measures were taken with the objective of guaranteeing the origin of the raw material and, in this manner, adds strength to the search for sustainable growth of cattle farmers.

Another interesting aspect was the creation of a system that allows the very consumer to consult the tracking of the animal. This system gives access to a list of the original and all the owners of the animals aiming to guarantee to the consumer that the meat that is being consumed does not come from embargoed areas or from

practices with slave labor. To have access to the system, the consumer should insert his Federal Inspection Service number (FIS) (in Brazil: SIF) and the date of the production in the form presented on the site of the company.

Furthermore, the company has also for the very first time launched a sustainability report and elaborated according to the guidelines of Global Reporting Initiative (GRI), making it very clear that it is the first sector to do this. This action clearly demonstrates the growing importance of the theme of sustainability in the beef/meat sector and just how sustainable practices can be used as a source of competitive advantage.

Among the agents of the beef/meat retail sector it is also possible to identify some of the actions being adopted. Within the pact of sustainability signed by Walmart Brasiler there is the pact for cattle, whereby Walmart is committed to not participating in the financing, use, distribution, sale and consumption of the cattle products that have any illegality in its chain, especially deforesting and something similar to slave labor. Some requirements of this pact are: suppliers are required to submit forms of animal transit and annex this to the receipts and identification of origin, to guarantee the origin of the product; b) there are independent audits done to guarantee that the products sold by Walmart do not come from the devastation areas of the Amazon.

According to the study by Morilhas *et al.* (2009), the Pão de Açúcar Group is a part of the Tear program, together with organizations such as, the Ethos Institute and Inter-American Development Bank, developing a Program for Quality Meat Production. Through this Program Tear, the company assumes the role of implementing measures of social-environmental responsibility together with their suppliers of beef, small and medium producers. The company pays a premium price 15% above market for the producers participating in the program and these should use, among other things, only input from suppliers registered with the company, implementing an environmental plan and have a computer system for management and tracking.

And lastly, Carrefour through their partnership with the Marfrig Group, one of the largest international food companies, beginning the second semester of 2012 has been selling the first line of meat in the world with the social-environmental RAS Seal. This has become possible in function of the certification obtained by the Marfrig Group, the first industry of the animal protein food sector to track the complete cycle of meat production with the support of Rainforest Alliance and Imaflora. Carrefour's expectation is to sell approximately 10 tons of this meat per month offering ten types of cuts of meat vacuum-packed among which are sirloin, rib-eye, top-round, knuckle, brisket, middle-ribs and shoulder cuts.

Thus, it is possible to identify in the Field research as well as in the survey of the secondary data, the existence of some environmentally sustainable practices being employed by the agents of the beef/meat chain. Beginning at this point in time, and based principally on the interviews done with the agents, we will discuss the main Drivers for sustainability identified in the chain based on the model proposed by Mann *et al.* (2010) and shown in Figure 1.

Principal Sustainability Drivers:

Relative to the environment we could perceive that this is an important motivating factor of good practices for the rural producers. These agents, in function of their productive activity feel somewhat linked to the earth and have an interest in cultivating it and seek to preserve it as well.

This inclination on the part of the producers should be worked out better by the associations and by public policy in such a way as to instruct them of the better practices to be adopted. Many times, some producers have done prejudicial things to the environment purely because of a lack of information. There could have been great gains had there been more investment in training in capabilities for these producers.

Relative to the Driver the environment for the refrigeration/freezer and retail we have noted with numerous studies that it is a personal question of the leader of the organization rather than a characteristic of the sector itself. An example of this is the owner of the supermarket interviewed who thought it was important to be concerned with environmental sustainability and has implanted numerous small projects in his stores from offering returnable bags for free to programs of economic incentives such as electric energy for his workers at home, rewarding those who can manage to diminish their consumption of energy.

In relation to the internal Driver Processes we note that for all of the agents interviewed greater sustainability ended up being the indirect result of the improvement of the productive processes.

This became very clear with the rural producers when they demonstrated in the talks great concern with productivity and principally with the increase of productivity as being largely linked to the earth and natural resources, also gaining in terms of environmental sustainability.

Dealing with the Driver Social Environment, relative to the many stakeholders that directly or indirectly influence the performance of the agents we noticed that there was a variation in the weight given to this factor with it being more evident for some than for others. Generally, it was possible to verify that the vision of those interviewed about this theme is closer to the vision of the society *en masse*, in other words, environmental sustainability is important, it has been in the media, but there isn't any profound knowledge or criticism about the subject.

Therefore, the interviewed even feel somewhat pressured by society as a whole but not greatly impacted by this same. A very important information and when this was asked among the agents of different links in the chain, if during the transactions any kind of environmentally sustainable behavior was asked of the client all responded that this had not occurred, in other words, within the productive chain there was no pressure from the suppliers/consumers in terms of environmentally sustainable attributes in their inputs.

Relative to the consumer factor, the results were very interesting being that despite that recent studies demonstrated an increase in the concern with questions of sustainability on the part of the consumers, this was one of the drivers of least relevance for the agents.

When questioning the producers some stated that they believed that the consumers were concerned with this theme and that this influenced in the consumption, however, most believe that the greatest concern of the consumer is related to the quality or the price of the meat to be consumed. Furthermore, it was quite clear that the producers see as their main consumer the refrigerator/freezer company and, as was previously stated, most of them demand sustainable practices of their suppliers.

While talking with some of the retailers their opinions were similar: as much as the better-to-do are concerned about and transmit this to their consumption the principal attributes at the moment of purchasing the meat is the quality (taste, softness, etc.) and among the least-well-to-do, the price. Even the owner of the retail shop with a clientele with greater consumer power, and who declared he used sustainable practices guaranteed the a certification of origin of the meat, demonstrated that in reality these practices are the result of the search for a product of superior quality and it is exactly this that his consumers want.

Financial performance has also shown to be an important driver mainly because it has been demonstrated that sustainable practices can also bring financial returns. Therefore, this factor functions as a certification of the responsible practices more than a motivator for its adoption. An example of this was the refrigerator/freezer company interviewed who sold a residual from his production with good financial gain and which prior to this he had simply discarded thus giving him gains environmentally and financially at the same time.

And lastly, the Legislation Driver was left for last exactly because it is the main motivator of sustainable practices along the entire chain. Most have stated that they do nothing beyond that which is stipulated by the law and numerous practices were cited as bring financial returns or productive ones when they implanted the things that were demanded by the legislation.

Final considerations:

The objective of this study was to investigate which practices are employed by the agents in the beef/meat productive chain in search of environmentally sustainable management and which are the principal Drivers responsible for this. For such, interviews were realized with different agents in the links of the chain as well as surveys for secondary data.

Based on the studies presented and in the interviews with some agents in the chain it was possible to identify some practices that seek greater sustainability being adopted and movements of important agents, signaling the possibility of a change in the future. We noted that for the large majority of the productive agents in the chain, the question of environmental sustainability has not been assimilated in function of the non-existence of incentives, especially financial or that these financial incentives are seen as being too small. As economic theory suggests, it becomes difficult or impossible that there be a behavioral change if there is no incentive. This makes it such that many are not prepared to adopt sustainability norms.

When studying the Drivers proposed by Mann *et al.* (2010) we verified that these same were thought to be fit to analyze the chain, with some more relevant than others, such as for example financial performance which was show to be a good justification for the adoption of certain practices and the Environment which, in function of the characteristics of the producers, is capable of exercising influence over the same. However, there is still much to evolve in terms of sustainable practices especially relative to the agents abandoning the reactive posture simply doing what the law establishes and rather adopting a pro-active stance.

REFERENCES

- Andrade, J.C.S., E. Gonçalves and J.V.G. Fernandes, 2001. Introduzindo práticas de produção mais limpa em sistemas de gestão ambiental certificáveis: uma proposta crítica. *Engenharia Sanitária e Ambiental*, 6(3): 154-157.
- Barbieri, J.C., 2007. *Gestão ambiental: conceitos, modelos e instrumentos*. 2. ed. São Paulo: Saraiva.
- Bardin, L., 2009. *Análise de conteúdo: Edição revisada e atualizada*. Lisboa/ Portugal.
- Becker, T., E. Benner and K. Glitsch, 2000. Consumer perception of fresh meat quality in Germany. *British Food Journal*, 102(3): 246-266.
- Berman, B., 1996. *Marketing channels*. Chichester: John Wiley & Sons.
- Berndt, A. and N.W. Tomkins, 2013. Measurement and mitigation of methane emissions from beef cattle in tropical grazing systems: a perspective from Australia and Brazil. *Animal*, 7: 363-372.

Brasil, 2010. Projeções do Agronegócio: Brasil 2009/2010 a 2019/2020. Brasília: Ministério da Agricultura, Pecuária e Abastecimento, MAPA/ACS.

Buainain, A.M. and M.O. Batalha, 2007. Série agronegócios: cadeia produtiva da carne bovina. Brasília: Ministério da Agricultura, Pecuária e Abastecimento, MAPA/SPA.

Cai, Z. and P. Wheale, 2004. Creating Sustainable Corporate Value: A case study of stakeholder relationship management in China. *Business and Society Review*, 109(4): 507-547.

Caleman, S.M.Q., 2005. Coordenação do sistema agroindustrial da carne bovina – uma abordagem focada na teoria dos custos de mensuração. UFMS thesis, Universidade Federal de Mato Grosso do Sul, Campo Grande.

CEPEA – Centro De Estudos Avançados Em Economia Aplicada, 2012. PIB Agro CEPEA-USP/CNA.

Chizzotti, M.L., M.M. Ladeira, O.R. Machado Neto and L.S. Lopes, 2012. Estratégias para redução do impacto ambiental da atividade pecuária. In the Proceedings of the 2012 Congresso Brasileiro De Produção Animal Sustentável.

CMMAD - Comissão Mundial sobre Meio Ambiente e Desenvolvimento, 1991. Nosso Futuro Comum. 2. ed. Rio de Janeiro: Fundação Getúlio Vargas.

Collis, J. and R. Hussey, 2005. Pesquisa em administração: Um guia prático para alunos de graduação e pós-graduação. 2.ed. Porto Alegre: Bookman.

Cooper, R., 2002. The design experience: The role of design and designers in the 21 century. Cornwall: Ashgate Publishing.

D'Avignon, A., 1996. Normas ambientais ISO 14000: como podem influenciar sua empresa. Rio de Janeiro: CNI.

Devinney, T.M., P. Auger, G. Eckhardt and T. Birtchnell, 2006. The other CSR: making consumers socially responsible. *Stanford Social Innovation Review*. May, 1: 30-37.

Dyllick, T. and K. Hockets, 2002. Beyond the business case for corporate sustainability. *Business Strategy and the Environment*, 11(2): 130-141.

Eckhardt, G.M., R. Belk and T.M. Devinney, 2010. Why don't consumers consume ethically? *Journal of Consumer Behavior*, 9(6): 426-436.

Elkington, J., 1999. Triple bottom-line reporting: looking for balance. *Australian CPA*, 69(2): 18-21.

Gianezini, M., J.O.J. Barcellos, A. Leonardi, C.F. Ruviaro, M. Dewes, and H. Dewes, 2011. Sustainability in Market orientation of Brazilian beef industry. In the Proceedings of the 2011 Annual Ifama World Forum And Symposium.

Grosskurth, J. and J. Rotmans, 2005. The Scene Model: Getting a grip on sustainable development in policy making. *Environment, Development and Sustainability*, 7: 135-151.

Heap, B. and J. Kent, 2000. Towards sustainable consumption: An European perspective. London, The Royal Society.

IBGE - Instituto Brasileiro De Geografia E Estatística, 2012. Estatísticas da produção pecuária: março de 2012.

Kalb, N.D., 2012. Gestão ambiental empresarial e a percepção do consumidor: o caso Walmart. UFMS thesis, Universidade Federal de Mato Grosso do Sul, Campo Grande.

Lambert, J.L., M.O. Batalha, R.L. Sproesser, A.L. Silva and T. Lucchese, 2005. As principais evoluções dos comportamentos alimentares. *Revista de Nutrição*, 18(5): 577-591.

Lee, K. and J. Kim, 2009. Current status of CSR in the realm of supply management: the case of the Korean electronics industry. *Supply Chain Management: An International Journal*, 14(2): 138-148.

Lima-Filho, D.O. and F. Quevedo-Silva. 2012. Percepção do consumidor sobre produtos orgânicos. *Revista Brasileira de Marketing*, 11(1): 29-46.

Linton, J.D., R. Klassen and V. Jayaraman, 2007. Sustainable supply chains: an introduction. *Journal of Operations Management*, 25(6): 1075-1082.

Macedo, L.O.B., F.N. Nishimura and C.G.A. Costa, 2011. Comercialização de bovinos para abate no sudeste de mato grosso: análise do perfil do produtor e os mecanismos de coordenação das transações. *Informações Econômicas*, 41(5): 5-18.

Malafaia, G.C., D.B. Azevedo, J.T.M. Silva, H.F.B. Tadeu and M.E. Camargo, 2014. Towards a social construction of competitive advantages in the Brazilian beef cattle: an approach of local agro-alimentary systems. *Australian Journal of Basic and Applied Sciences*, 8(7): 423-433.

Mann, H., U. Kumar, V. Kumar and I.J.S. Mann, 2010. Drivers of sustainable supply chain management. *The IUP. Journal of Operations Management*, 9(4): 52-63.

Mapa- Ministério da Agricultura, Pecuária e Abastecimento, 2011. Estatísticas e dados básicos de economia. MAPA, Brasília.

Mascarenhas A., A. Rui and L. Carlotto, 2012. Participação de mercado das indústrias frigoríficas em Mato Grosso do Sul, FAMASUL.

- Matos, S. and J. Hall, 2007. Integrating sustainable development in the supply chain: the case of life cycle assessment in oil and gas and agricultural biotechnology. *Journal of Operations Management*, 25(6): 1083-1102.
- Memery, J., P. Megicks, and J. Williams, 2005. Ethical and social responsibility issues in grocery shopping: a preliminary typology. *Qualitative Market Research: An International Journal*, 8(4): 399-412.
- Morilhas, L.J., L.S. Scatena and L.O.B. Macedo, 2009. A cadeia da carne bovina no Brasil e as mudanças climáticas: impactos, ações e recomendações. In: *Mitigação de gases de efeito estufa: a experiência setorial e regional no Brasil*, Eds., J. Marcovitch, São Paulo.
- Oaigen, R.P., J.O.J. Barcellos, M.E.A. Carozzi, L.F. Christofari, J.C.R. Soares and C.O. Alves, 2001. Competitividade interna na bovinocultura de corte no Estado do Rio Grande do Sul. *Ciência Rural*, 41(6): 1102-1107.
- Oiaigen, R.P., 2010. Avaliação da competitividade em sistemas de produção de bovinocultura de corte nas regiões sul e norte do Brasil. UFRGS dissertation, Universidade Federal do Rio Grande do Sul, Porto Alegre.
- Oliveira, L.D.S., and D.O. Lima-Filho, 2011. Modelo de Segurança Alimentar e Nutricional e Seus Determinantes Socioeconômicos e Comportamentais. *Cadernos Gestão Pública e Cidadania*, 16: 1-20.
- Pochmann, M., 2012. O Brasil diante do desafio de se reposicionar no mundo. *Revista faac*, 1(1): 141-154.
- Poulain, J.P., 2004. Sociologia da alimentação: os comedores e o espaço social alimentar. Florianópolis: Editora da UFSC.
- Rodrigues, W. and V.S. Aguiar Junior, 2004. Comportamento ambiental na indústria Goiânia de carne bovina. In the Proceedings of the 2004 Congresso da SOBER.
- Santos, M.G. and S.S. Barczysz, 2010. Sustentabilidade ambiental: o caso dos frigoríficos exportadores de carne bovina de Mato Grosso do Sul. In the Proceedings of the 2010 Congresso da Sociedade Brasileira de Economia, Administração e Sociologia Rural.
- Seuring, S., J. Sarkis, M. Müller, and P. Rao, 2008. Sustainability and supply chain management: an introduction to the special issue. *Journal of Cleaner Production*, 16(15): 1545-1551.
- Silva, A.L. and M.O., Batalha, 2001. Marketing estratégico aplicado ao agronegócio. In *Gestão agroindustrial*, Eds: M.O. Batalha. São Paulo: Atlas.
- Silva, C.C., A.M. Zanine and V.S. Lírio, 2005. Análise do desempenho brasileiro no mercado internacional de carne bovina. *Revista Electrónica de Veterinária REDVET*, 6(11): 1-24.
- Silva, L.M., D.O. Lima-Filho and R.L. Sproesser, 2007. Perfil dos consumidores de carne de frango: um estudo de caso na cidade de Campo Grande, Estado de Mato Grosso do Sul. *Informações Econômicas*, 37(1): 18-27.
- Silva, S.Z., D. Triches and G. Malafaia, 2011. Análise das barreiras não tarifárias à exportação na cadeia da carne bovina brasileira. *Revista de Política Agrícola*, XX(2): 23-39.
- Souki, G.Q., G.T. Salazar, L.M. Antonialli, and C.A. Pereira, 2003. Atributos que afetam a decisão dos consumidores de carne bovina. *Organizações Rurais e Agroindustriais: Revista de Administração da UFLA*, 5(2): 36-51.
- Souza Filho, H.M., F.T. Rosa and M.M.B. Vinholis, 2008. Diagnóstico e recomendações para aumento da competitividade da cadeia produtiva da carne bovina do estado de São Paulo. In the Proceedings of the 2008 Congresso da Sociedade Brasileira de Economia, Administração e Sociologia Rural.
- Souza, G.S., M.O. Souza, D.V. Marques, R. Gazzola and R. Marra, 2011. Previsões para o mercado de carnes. *Revista de Economia e Sociologia Rural*, 49(2): 473-492.
- Souza, R.S., 2002. Evolução e condicionantes da evolução da gestão ambiental nas empresas. *REAd*, 8(6): 1-22.
- Sproesser, R.L. and D.O. Lima-Filho, 2007. Varejo de alimentos: estratégia e marketing. In *Gestão agroindustrial*, Eds: M.O. Batalha. São Paulo: Atlas.
- Tachizawa, T. and R.O.B. Andrade, 2008. Gestão socioambiental: estratégias na nova era de sustentabilidade. Rio de Janeiro: Elsevier.
- USDA - United States Department of Agriculture, 2012. Foreign Agricultural Service. World supply and distribution online.
- USDA-United States Department of Agriculture, 2011 Trade forecast update: pork higher, beef and broiler meat stable.
- Zylbersztajn, D., 2000. Conceitos gerais, evolução e apresentação do sistema agroindustrial. In *Economia e gestão dos negócios agroalimentares*, Eds., D. Zylbersztajn and M. F. Neves. São Paulo: Pioneira.