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Beef Consumption Pattern in Brazil

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Abstract

Brazil is one of the world's leading beef producers. The goal of this chapter is to give an overview of how Brazilian beef production is important to Brazil and worldwide. We also give an overview of some aspects of red meat consumption in this country and the main tendencies regarding sustainability production. The economic importance of beef production in Brazil is based on secondary data and the main content about beef consumption is based on researches conducted by the authors that interviews Brazilian consumers. The chapter focus in some concepts, concerns and factors that affects consumption as symbolic aspects, ethical, health and environmental concerns, brand, herd tracking, guarantees of origin, legal employment, safety and hygiene, animal wellbeing, sustainability and the Carbon Neutral Beef initiative (CNB). Marketing, certification, traceability and brand strategies conducted by some industries, the red meat premium boutiques in the retailing sector, and the role of Brazilian government in meat safety, monitoring and regulation are also covered.

Keywords: Meat, Beef Production, Brazil, Consumer Behavior, Food Consumption

1. Introduction

Brazil is one of the world's leading beef producers not only as a consequence of the favorable environment to production and land available, but also as a result of decades of investment in technology that have increased not only productivity, but also the quality of the Brazilian product, making it competitive and allowing it to reach markets in more than 150 countries. Comparing with other meats, the volume of chicken meat exported in 2019 was 4.12 million tonnes, followed by 1.85 million tonnes of beef and 0.73 million tonnes of pork. However, sales with beef exports reached 7.57 billion dollars, followed by chicken with 6.90 billion and 1.58 billion in pork. The total for Brazilian meat exports accounted for 19.45% of the value of Brazilian agribusiness exports, with beef responsible 8.91% of that volume, which illustrates this sector's relevance to the Brazilian export agenda [1].

Forty years ago, the prevailing scenario of the Brazilian beef market was quite different. The herd was barely half the size of what it is now (213 million head), the focus was much more on supplying the domestic market, severe sanitation conditions blocked exports, degraded pastures predominated on the landscape and productivity was low. Over the last four decades cattle ranching has undergone a

revolutionary modernisation process supported by technological advances in production systems and in organizing the supply chain that today are clearly reflected in the quality of Brazilian beef. The herd has more than doubled, while the pasture area has advanced little or has even diminished in some regions – a clear indication of increases in productivity. There has also been an increase in animal weight and reduction in mortality, increase in birth-rates and reduction of the time until slaughter. These gains have been possible thanks to the growing use of technologies by rural producers, especially along the lines of feeding, genetics and animal management and health.

In 2019 the Brazilian GDP was BRL 7.3 trillion, a nominal growth of 6.8% over the previous year. Part of that growth was due to the Ranching GDP, which registered a slight growth for the same period, illustrating the strength of the ranching sector in the Brazilian economy [1]. With a herd of approximately 215 million head, the Brazilian ranching sector in 2019 recorded 43.3 million head of cattle slaughtered. For that same period Brazil saw a 12.2% increase in beef exports that reached 2.49 million CWE. Of the total volume of meat produced, 76.3% or 8.01 million CWE went to the domestic market, while 23.6% were slated for export, the equivalent of 2.49 million CWE. Of the total exported, there was a 15.9% increase in the volume of fresh beef. That increase was due not only to the number of countries receiving exports, which went from 101 to 154, but also the increase in the volume of meat directed towards already consolidated markets such as China, where the volume of exports rose 54% from 2018 to 2019. During that same period the area of pastures utilized remained practically stable at 162.5 million hectares, with an average productivity that was also stable at 4.3 @/ha/year.

In 2019, Brazil ranks as the second largest beef producer worldwide, 10.49 million CWE, behind only the USA with 12.26, but ahead of Argentina 3.01. India with 2.91, and Australia 2.26. However, Brazil leads global exports with 2.49 million in CWE, followed by Australia with 1.56 and USA with 1.31 [1]. Among the importing countries, China stands out with a volume of 1.28; followed by the USA 1.30 and Hong Kong 0.388. It is worth pointing out that China received 50.4% of the volume of Brazilian exports in 2019. The European Union imported 3.05 million CWE, but only 180 thousand CWE from Brazil (5.9%). In terms of consumption, the USA stands out as the world's largest beef consumer 12.22 ml te c (37.1 kg/inhab. /year), followed by China 10.01 (7.18 kg/in hab./year); Brazil 8.06 (38.4 kg/in hab./year) and Argentina 2.29 (50.91 kg/inhab. year). One should note here the great potential for growth that China has, given that its consumption per inhabitant is only 18% of the Brazilian per capita consumption [1].

The goal of this chapter is to give an overview of how Brazilian beef production is important to Brazil and worldwide. We also give an overview of some aspects of beef consumption, marketing and retailing in this country. We finish presenting the main tendencies, most regarding sustainability production.

2. Consumption of red meat in Brazil

The symbolic aspect of food represents one of the factors that most influences the consumption of individuals. Proof of this symbolic weight can be observed in any empirical research, asking a consumer what food means to them. Da Matta [2] explained that the same food can have numerous meanings and such variation is dependent on the ways in which people think and judge such food. Through social interaction, the rules related to food and eating vary in time and space, being learned from an early age. Therefore, beliefs, values and emotions related to any food can say a lot about individuals' eating patterns and consumption behaviors.

The more a food, through its symbols, represents values considered important to consumers, the greater the chance of being chosen for consumption. Taking red meat as an example, in Western societies, its consumption is valued, for many consumer groups, for being associated with a status symbol, the strength for work and the guarantee of satiety [3–6].

On the other hand, in the context of contemporary food, there are also movements against the excessive intake of red meat consumption and, even, the justified suppression of animal protein, among others, for ethical, health and environmental reasons. Disregarding the proportionality between consumers and non-consumers of red meat but considering that the appreciation of the animal's intake, the reduction of consumption and the practice of abstaining from this act represent strategies of meat consumption. A better understanding of the determinants of such strategies can be clues to explain, for example, the transitions in current food models. For research on consumption behavior, it is important to access the ways in which consumers classify proteins (healthy x harmful, lean x fat, ordinary x festive, heavy x light) and decide to consume them (fresh x processed, chilled x frozen, meat in slab x cut, fresh x canned).

Red meat is a factor that simultaneously provides benefits and detrimental to health. Ranabhat Park and Kim [7] have conducted a study about the influence of alcohol and red meat Consumption on Life Expectancy in 164 Countries from 1992 to 2013 providing evidence on red meat consumption and life expectancy (LE) based on ecological analyses. Results suggest that high consumption of red meat has a negative impact on LE in higher income countries (HIC and UMIC)¹. Consumption of red meat over the acceptable level is positively associated with cancer. On the contrary, red meat consumption appears to have no influence on LE in lower income countries (LIC or LMIC). Animal source foods (ASF) such as red meat is still very important for developing countries from a nutritional point of view. Refraining from red meat consumption in these countries is not warranted. Under IGW categorization, Brazil fits into the UMIC (upper middle). In this case authors suggest that high- and middle- income countries are likely to revisit their policy regarding red meat in terms of production, sales, and consumption.

Other research on consumption intention also recognizes that individuals' ways of acting are determined by their value systems, their beliefs, their social rules and by taboos [8, 9]. Judgments guide the acceptance of a food, and its choice is conditioned by how it best represents a lifestyle, an activist stance, or conduct. In studies conducted in Belgium, Verbeke [8] proved that the greatest motivations for the purchase and consumption of food products were justified by their adaptations to an individuals' morals.

According to Vialles [10], the way individuals choose and prepare animals to be consumed is related to symbols, which determine a double strategy of meat preparation and consumption, zoophagy and sarcophagy. The first, without any change in shape, values the animal's presentation as it is, and can even be presented whole (for example, a fish or a piglet). The second proposes to mischaracterize the animal, valuing the consumption of its parts without being recognized (steaks, cuts of meat with culinary dishes such as stroganoff and sausages). Denying the death of the animal intended for human consumption and the difficulty in recognizing parts of an animal or the animal itself in one's food are sarcophagic characteristics.

With the purpose of measuring the sensitivity of consumers from different countries in Europe in relation to the consumption of red meat, Gautier [11] validated a scale of zoophagy (acceptance of the individual to recognize an animal as

¹ Using definitions from the World Bank International Gateway (IGW) as of January 2016, countries were categorized into the following 4 groups: Low-income countries (LIC), lower-middle-income countries (LMIC), upper-middle-income countries (UMIC), and high-income countries (HIC). Available online: <http://data.worldbank.org/country>

food) and sarcophagy (difficulty and malaise) the individual's ability to recognize an animal as food) by means of attitudinal and ideological determinants. On this scale, the individual expressed his value system, which was measured by personality indicators and other affective, symbolic and imaginary indicators of the attitude towards meat. Gautier's [11] zoophagy and sarcophagy scale was also tested by Cazes-Valette [3] in France. The results were interesting because consumption was not explained only by socioeconomic and demographic variables. The attitude and behavior towards meat explained, for example, the different points of view about the relationship between man and nature, about the ways of thinking and accepting the slaughter of animals for consumption, about the frequency of consumption, the ingested volume, and cutting and cooking preferences.

A study that examined animal wellbeing (AWB) was performed by Souza, Casotti and Lemme [12] seeking to understand reactions of consumers related to ill-treatment practiced against animals in industrial meat-producing processes which cause pain, suffering and stress. Their research shows that consumers generally are not aware of management standards in meat production and that 87% of respondents have difficulties connecting the food they consume with living animals. Even though meat is considered a commodity, some countries employ labelling schemes. The main criteria certified by those labels include herd tracking, guarantees of origin, management employed, safety and hygiene, animal wellbeing and so on.

The proposition of the beef acceptance index was useful to think about the attitudes of individuals classified in household surveys as strong consumers of animal protein in Brazil as it was shown on study carried by Lucchese-Cheung, T., Spers, E. E., Pereira, M. W. G. & Dias, P. C. S. P. [13]. An incredibly detailed analytical model was proposed, not only so that it could be replicated in other Brazilian states, but for determining other indexes that answer questions from applied research in other productive sectors. It was verified how the variables relate within the factors and among them, as well as to understand what they represent and, later, the determination of the independent variables on the attitudes of zoophagy and sarcophagy was measured.

The results are interesting when they point out statements of strong beef consumers that indicate a desire to reduce their consumption or replace it with white meat, or leaner cuts, for health reasons. In addition, food safety and certifications appear as signs of quality, which can be a tip for sector's agents to seek innovation in proposing quality seals and brands for the sector. On the other hand, more sarcophagic attitudes are described by feelings of pity, concern about the environmental problems that arise in the meat chain, as well as distrust in relation to the quality of the protein sold in retail.

Such attitudes were determined by feelings of emotion and the belief that man should protect nature. In general, ordinary beef consumers have many doubts about the production system of animals intended for human consumption, and it may be an opportunity for agents in the sector to invest in communication campaigns. The way food is perceived depends on the food culture of individuals that, in turn, guides their attitudes and behaviors. An index of zoophagy and sarcophagy was proposed in in this work, intending to measure the intensity of these attitudes among a group of consumers in the Brazilian region that declare itself as the largest consumer of fat meat in the country.

In light of theories that indicate that beliefs, social rules, emotions and personalities are as determinant of consumption as economic variables, this work found that the most zoophagic attitudes were determined by personality traits that reveal patterns of behavior that, in turn, indicate dissatisfaction and a need for always wanting more, in addition to extroversion and the desire to always be in a group and party.

The taste, the fat of the meat, the high frequency of consumption, the preference to see the meat hanging, and the fact that they think of animals as a food

source for humans characterize zoophagic attitudes. The most emotional individuals, the smallest part of the interviewed group, sarcophagics, revealed negative emotions when talking about beef. They are consumers concerned with their choices because it has an impact for themselves and for others.

These reflections are original for marketing and consumer behavior studies, proving that the culture and symbolism of food play an important role in the way of acting and thinking of individuals. Thus, the agents of public and private power are interested in knowing that the taste for beef represents a strong cultural significance and that changes in consumption patterns represent fighting against feelings, emotions and their personal history.

Purchasing intentions motivated by ethical, health and environmental concerns have been identified as new drivers of consumption by a specific group of the population [14]. But, in general, what do Brazilian consumers think about the consumption of beef and the safety of the food they consume? What is the perception of these consumers in relation to the commercialized meat and the Brazilian production models? To what extent are your choices determined by human, animal and environmental health concerns?

The greater the perceived risk, the more consumers will seek alternatives to minimize it [15]. When it comes to the consumption of beef, the perception of risk can have an even greater impact on consumption decisions, since there is not always information that guarantees safety at the time of purchase and quality assessment is done during consumption [16, 17].

Investment in brand and certification attributes are examples of ways to guarantee access to relevant information in the attempt to provide greater security and generate trust with consumers [18]; Verbeke and Ward [19]. Thus, the certification of protein can be an attribute of choice of beef and a generating factor of greater confidence and perception of quality [20, 21]. Furthermore, on these attributes, Henchioni, McCarthy and Resconi [22] mention investments in guarantees of origin, in animal welfare, in pasture production systems with certificates of care with animal nutrition, guarantees of concerns with environmental issues, of traceability, genetic improvement and technologies that involve its processing.

Some research has been conducted on the consumption behavior and preferences of the beef consumer and the willingness to pay more for products with labels that attribute information on traceability and different types of meat quality guarantees [23–29]. In general, traceability can contribute to increasing consumer confidence in the entire food system as a means of attesting quality assurance [30]. Knowing about the animal's origin has been proven by studies as important information for European consumers [31, 32]. Certain countries are better regarded than others for their seriousness/credibility in food production. Origin is an important quality attribute that generates greater confidence. Consumer belief, on the other hand, is that quality/safety comes at a high price.

In a qualitative phase of the study conducted by Burnier [33] a clear distinction was identified in the involvement in a purchase depending on the type of event. According to one of the interviewed experts, there is a functional choice (day to day) and 'recreational' shopping for specific events (barbecue, dinner with friends). In the recreational choice there is a greater involvement with the product, a greater concern with the productive characteristics as well as quality of the meat. On the other hand, functional purchases are generally made by women and do not require specific information on the quality of the meat being purchased.

The study also indicates that involvement with the product appears as an important element in the discussion of sustainability in the meat sector. Another interviewed expert stated that the creation of the "meat academy" website exemplifies attention to meeting a real demand. Consumers have shown a greater interest in

obtaining information on various attributes (besides softness) before or even after purchasing the product. The recent movement of 'gourmetization' in this market, evidenced in TV shows and movements by innovative chefs, increase consumer interest and consequently their greater involvement with the product.

The purchase occasion also influences the consumer in the definition of attributes that a product must have at the time of purchase and in the WTP for a higher quality and safer product. The day-to-day shopper has less concerns when compared to looking for a product for a special occasion (eg dinner with friends or a barbecue).

As a result of the focus groups, it was found that the group with a high level of involvement with the product showed concern with the meat production process, especially the AWE (animal welfare). This interest was manifested lately in the participants since, at first, they did not consider aspects related to the animal, nor were they sensitive to socio-environmental attributes at the time of purchase. However, when presenting the different product choice options, AWE was a decisive factor for most of the group. This behavior was observed in both groups, being more evident in Group 1 (meat boutique), since they are more involved with the product.

3. Food safety and the red meat in Brazil

The guarantee of food quality is a growing focus of governments, companies and standardization agents. Efforts are addressed to control the attributes of a food product, with a peculiar care with the nutrition and safety characteristics. Guaranteeing quality is gaining notoriety as food consumption is being better appraised for the rulers, consumers and companies. This better evaluation suggests more voluntary quality assurances for companies and more regulation for government ([34], p. 409).

Food safety is consumer's warranty to acquire a food with quality and health attributes [35]. Institutions changes like new industrialization processes, new consumer demands, industrialization and urbanization, increase of competitiveness, development of scientific research, decrease of income expenses on food and globalization demands increasing the consumer, government and private organizations interest for safety and quality.

Meat is a source of protein and important vitamins and minerals. However, if produced and marketed in an incorrect way by private companies, can cause alimentary intoxication and, consequently, loss of value and reputation to final consumer. In the case of Brazilian beef the healthy profile are emphasized as a "green" cattle (that grows in the fields), different to those intensive processes that led to the mad cow disease that opens discussions about the State effectiveness in guaranteeing consumer's safety [36].

Understanding how consumer perception behaves over government enforcement policies and private branding strategies could help in an appropriate introduction of effectiveness communication over food safety aspects. Analyzing the process of meat purchase, Barcellos and Callegaro [37], interviewed 400 consumers in a Brazilian city and, through factor analysis, they reduced the variables on information quality indicators. Keeping constant the information about the animal, the product and choosing a specific type of meat, the consumer preference structure could be defined by the monitoring attributes (or public mechanism) and brand (private mechanism). We use these results as an assumption to the proposed model.

Scholars have discussed the level of knowledge that consumers have of the food production process within the boundaries of different constructs. Hanf and Kuhl [38] argued that quality, in consumer understanding, is a construct with multiple attributes, and they considered orientation throughout the process as one of the main dimensions of the quality control system. That is, the production system must

be explicit: “from farm to fork”. The authors noted that “providing traceability information and having a transparent production chain becomes a competitive necessity” ([38], p. 179).

The results found in a study conducted by Burnier et al. [39], involving 725 Brazilian consumers, suggest that concern with the production process is related to attitude and the intention to buy sustainable meat. The findings of this article confirm the importance of the “animal wellbeing” (AWB) and “traceability” attributes in the process of choosing meat. The results suggest that the meat industry and retail sector need to better explore the opportunity for differentiation at the moment of purchase. They can do this by increasing knowledge about carbon emissions and by disseminating the concept of animal wellbeing in formulating their communications strategies and in positioning products/brands that have socioenvironmental attributes offered to the final consumer. Traceability is another relevant attribute. The willingness to pay (WTP) for traceable meat is greater than that for paying for meat lacking traceability. The results of that study confirm the need for traceability in order to verify belief attributes. And food safety is an attribute very much in demand among consumers. The results make it clear that both types of traceability (back to the packing plant and back to the farm) are valued when compared to a non-traceable product. Participants in the study mentioned the presence of the Federal Inspection Service (SIF) seal as one of the items they observed at the moment of purchase. This confirms the importance of that seal because of its association with assurances of the meat’s origin. In interviews with specialists, industry representatives indicated “farm to table” traceability as relevant to company operations as a means for validating food safety and fulfilling agreements reached with NGOs and the MPF.

4. The red meat industry in Brazil

The subject of branding has gained relevance in recent years in the field of agricultural commodities, particularly when the consumer is faced with making choices between similar products. By identifying reliable products, through known brands, with which they themselves identify, the consumer is able to make what they see as an advantageous purchase [38].

The joint actions of strong brands, at different levels of the production chain, can add value to the final product in terms of the consumer’s perception of intangible attributes (such as food safety, traceability, and other attributes of trust) linked to the brand.

The production and industrialization sector of the food industry has gone through successive credibility crises due to product contamination, and so the notion of Food Safety has gained strength. Food safety has been the object of interest of several economic agents and some NGOs, who emerge as agents of pressure on the institutional environment, with the fear of a risk to their health down to the consumption of adulterated or contaminated foods.

Some surveys indicate that the food choices of consumers have been more influenced by concerns about the impact of food systems on human health - Food Safety. The perception of a food as safe appears to be a strong requirement in the choice of a product. Traceability during the different stages of the meat production chain is seen as a way of making the “quality” of the product more tangible [40].

As an example of response to this sort of pressure, in early 2013 a strong advertising campaign by the JBS company for its Friboi brand was launched as a means of making consumers aware of the importance of knowing the origin of the beef consumed in Brazil. This campaign was aired shortly after reports that highlighted the

lack of controls at countless meatpacking plants in Brazil, casting doubt on guarantees of “quality”/soundness of the meat sold at retail points and butcher shops. *Veja* magazine published forceful articles on the issue, showing threats and diseases that Brazilians are subject to by consuming that type of meat coming from “clandestine” suppliers. These issues brought up an opportunity, not only for sales, but of gaining a market share. “But for that to happen we had to deal with something very interesting and curious, which is people changing their habits. What we wanted, therefore, was for people to start asking by brand name for the meat they buy every day [...]”, commented Marcio Oliveira, president of Lew’ Lara\TBWA, the agency that came up with the Friboi campaign.

Grunert et al. [18] also emphasizes the importance of the brand as a way of minimizing consumer uncertainty at the time of purchase. The company can signal a product of superior quality, reduce the uncertainty of the consumer and encourage them to pay a premium price for superior quality [18].

The presence of the Federal Inspection Service (FIS) meat stamp was associated with the safety of the product by those interviewed in the Barcellos study (2007), while the certification stamps are associated with higher meat quality. The FIS stamp is usually present on the packaging and on the meat itself, meaning that it comes from animals that have been slaughtered in FIS-enabled slaughterhouses.

The brand appears as a relevant variable at the moment of buying meat. Respondents in the study by Burnier et al. [41] indicated a greater WTP for meat from a well-known and sustainable brand, which is in line with the findings of Tonsor and Shupp [42] and Grunert et al. [18]. However, unlike what was expected, the sustainable brand presented lower values than those of a well-known one. That indicates that consumers must have confidence in the brand they know because of intrinsic safety attributes instead of sustainability attributes. When it comes to extrinsic attributes, especially socioenvironmental characteristics, the brand will serve to identify the particularities of the productive process (breed, traceability, animal wellbeing, origin, etc.) that must be considered by more frequent consumers, especially those who make purchases day to day. In the qualitative study, interviewees indicated that, besides the tenderness attribute, they are concerned with knowing the animal’s origin (traceability) and with the food’s safety. The beef brand helps the consumer to have greater security in purchasing a product with the desired quality including a safer product obtained from controlled ranches.

The “safety” variable was included in the brand value construct and validated in this work that endorses that relation. The relevance of food security to the meat consumer appears in the work of Oliveira and Spers [40] and Hanf and Kuhl [38], where these researchers confirm the importance of production methods that have a format oriented towards guaranteeing traceability, so that they are capable of transmitting to consumers attributes of trust related to food security.

5. The red meat retailing sector in Brazil

The high-quality beef market in Brazil has changed greatly over the last 5 years and is becoming increasingly sophisticated. We can no longer call it a niche, since a short time ago meat packers were selling boxes to the major retail chains and now, they are selling truckloads. Premium and Gourmet beef have rigid production rules, including demands for animals with at least 50% European genetics. Meatpacking plants also prefer British breeds such as Aberdeen Angus and Hereford. Males must be young, less than 24 months old, castrated and with at most two permanent teeth, which characterizes a young animal. Females can have up to 4 teeth. The carcass must have a fat finish according to specifications from the

meatpacking plants. The now, breeding cow will always be a Zebu, basically from the Nelore breed. The more it has been genetically improved, the better the cross will be, since the cow contributes 50% of the calf's quality. There are dozens of high-quality beef brands in Brazil. All are top of the line products from the major meatpackers and distributors. A large share is sold to steakhouses, restaurants and churrascarias, which look for grill cuts that meet high standards. Retail sales through supermarkets and butcher shops have been increasing constantly.

The Premium beef segment, unlike the one for wines and coffees, is not yet totally consolidated. Consumers do not yet have a clear perception of levels of quality such as differences in flavor, tenderness, texture and presentation of different and new cuts. A sizable number of consumers have reached a level where when they schedule a barbecue for friends, they no longer want to take risks in buying the meat. They prefer to pay a little more in order to be certain they are offering a quality barbecue [43].

Another tendency is the gourmet butcher shop. These establishments invest in different cuts for day-to-day recipes. The old-style butcher shops with tile flooring and hooks hanging from the ceilings have been a rarity in large urban centres for some time. A few survive, mainly in lower-income neighborhoods, but the place to buy beef now is officially at the supermarket. But supermarkets do not offer more sophisticated or newer cuts, or move away from the commonplace. And the growth in gastronomy means that consumer demands and the search for specialty meats have also increased. This is where the gourmet butcher shops come in, seeking to change the relationship between the client and the ingredient.

One of the pioneers in the business was Marcos Bassi; this chef was a butcher back in the 1960s. In his business he has always offered special cuts. His boutique store appeared in 1985 as an extension of a barbecue restaurant. It offers almost all of the cuts for a barbecue, as well as Argentine meats, game, craft beers and wines. This type of establishment is now in fashion, and the clientele continues to be faithful to the products, since it is possible to exchange a piece of meat that has not pleased them.

Another trend is for using the Angus line (a breed with superior quality meat) sold in packaged half-kilogram portions (always vacuum packed). That makes life easier for couples without children or even singles. For the visit to be complete, the store must also provide different types of salt, sauces and everything needed to complement the barbecue, in other words, an emporium completely focused on meat.

A common practice in this type of butcher's is for the owner to help the client to choose the cuts, provide feedback about appropriate quality and encourage the consumption of different products. Instead of the familiar picanha (rump steak) a cut traditionally favored by Brazilian barbecuers, some owners advise that it may be much more interesting to use other pieces such as shoulder (more marbled), bananinha (strips of meat from between the ribs, with a buttery taste) or, for those who prefer fillet mignon, the round cut (as tender as the fillet, but tastier). Besides these cuts being flavourful and appropriate for barbecue, they are also cheaper.

Additionally, it is important to discover the world that is behind the counter with its vacuum-packed red packages. The "world of beef" involves other factors, such as breeding the animals, the diet fed to the cattle, the time for slaughter... Each of these items will determine the type of product. Some of these entrepreneurs believe that the meat found in supermarkets is of doubtful quality. Consumers have less information about the precedence of what they are buying, when compared with the precedence good meat boutiques.

Another tendency is to promote an environment that people will enjoy visiting. Some entrepreneurs seek to closely control all stages of beef production and relate directly to the final consumer. Having classes and providing recipes at the sales

point leads the customer to understand that “there is no second-rate meat, but instead poor preparation.” It is thus possible to suggest less “noble” cuts (ground beef made from chuck, ragu made from knuckle or tender chuck) and stop the obsession Brazilians have of thinking that good meat is fillet mignon meat [44].

The butcher shop is being transformed in order to provide a more pleasant environment for the client, who is increasingly demanding, with a diversity of products and personalized service. That strategy seeks to strengthen smaller companies so that they can face competition from the supermarkets.

Butcher shops have seen that in order to survive they must offer differentiated services that add value to the product, says Manuel Henrique Faria Ramos, president of the Fresh Meat Retail Association in the State of São Paulo. That is no abstract tendency, but a reality, and those who do not follow it run the risk of having to close their doors, he states. According to Ramos, modernisation is necessary for butcher shops set up in more well-to-do neighborhoods, but is also important for establishments operating in less prosperous regions. According to the association, there are around 17 thousand butcher shops in the State of São Paulo. Of those, around 80% have incomes of up to BRL 240 thousand per annum, and only 2% go beyond BRL 2 million.

But to be a success, it is not enough to have a pretty shop; one must have the best products and the best services. Shop owners who do not modernize will become stuck in place. Consumers are more demanding. Besides direct sales to consumers, some stores organize courses that teach people how to barbecue. Specialists indicate that the movement towards modernizing butcher shop facilities is natural and similar to what happened earlier with bakeries: a movement to provide more comfort and wellbeing to the consumer. The butcher shop environment must be clean, but need not be uninviting, all in white [45].

6. Sustainable beef in Brazil

Sustainable consumption may be the result of a decision-making process that considers not only the individual needs of consumers (related to taste, price and convenience), but also perceptions and attitudes related to social responsibility (environment and fair trade), labelling (brand and seal) and sustainable food production (traceability, CO₂ emissions and animal wellbeing). Sustainable products tend to be perceived by buyers and having better quality and greater social, environmental and economic value. The beef sector must recognize this consumer behavior in order to improve sustainability and to develop actions for meeting legislation related to that demand.

Food safety has become a point of interest to various economic agents, and the result is pressure coming from the institutional environment, because of the perception that there are probable risks to health due to consumption of adulterated or contaminated foods. The perception that a certain food is safe is now a strong requirement for differentiating its price. The origin of a product and the assurance of soundness during its production and sale processes have come to be valued by consumers. Traceability throughout the different stages of the chain can be a form of validating a products “quality”.

A study by Imaflora “Comportamento e consumo verde dos brasileiros - o caminho para uma atuação social e ambientalmente responsável (Green behaviour and consumption among Brazilians – the path to socially and environmentally responsible action)” [46] indicates that 51% of the interviewees are considered to have an “interested” profile. They are concerned with illegal deforestation, the destruction of native forests and the depletion of natural resources. They also have

concerns that are reflected in their day-to-day and consumption habits. Persons with this profile are beginning to inform themselves about sustainable practices, value local production and choose products that can be recycled. Water pollution, illegal deforestation and destruction of native forests are among the socioenvironmental issues that most concern Brazilian consumers. In the food sector the main factor in choosing foods is price, followed by Origin and Provenience (48%). The results of this study reinforce the importance of using seals and certificates to demonstrate socioenvironmental commitments, and help to direct communications activities that can promote and differentiate products and brands.

The beef sector is working to continuously improve its sustainability in order to achieve more desirable results in environmental, social and economic terms, which are increasingly more important for consumers. There are clearly observable efforts underway in the retail networks that encourage conscious consumption and that seek to help their clients think about how sustainability can become a part of the consumer's daily lives, by presenting them with initiatives they can participate in. In this case, with conscious consumption, consumers reflect on their purchasing habits and on the factors that determine their choices. They are provided conditions for analyzing the impact they can have on the ecosystem.

In this context, retail networks are demonstrating interest in selling products with socioenvironmental attributes; however, they emphasize that the lack of knowledge among final consumers makes it difficult to execute a policy of premium prices for "green" products. Since 2015, the three main retail networks in Brazil have been developing sustainable ranching platforms, demonstrating a strong commitment to monitoring the origin of the beef sold in their stores. Origin of the beef refers here to socioenvironmental practices by the ranches that produce the animals that will be slaughtered and offered for sale at the national retail level.

Sustainability in the beef sector is directly related to several socioenvironmental dimensions. Cattle ranching is considered to be one of the sectors that most contributes towards deforestation in Brazil. Conversion of forests into pasture is the best-known and documented impact coming from the beef production chain. Additionally, issues related to animal wellbeing, slave labour and emission of gases (CO₂ and methane) appear as directly related to the expression "sustainable beef". In practice, the industry (meatpacking plants) and retailers also consider these topics as the basis for defining their sustainable ranching platforms. For these reasons, beef cattle ranching along with Brazilian soy are key commodities in international agreements on climate changes [47].

In addition to the pressure exerted by demand, other actors have shown concern about the origin of the product and compliance with socioenvironmental attributes throughout the Beef supply chain. The lack of an efficient traceability system in the Brazilian beef chain creates unnecessary risks that arise regarding the origin of cattle in the various links of the chain – e.g., meat processing industry, retailers, investors. Recently, international investors have questioned the major Brazilian meat producers, worldwide leaders in Beef production, about the origin of the animals that they slaughter in their plants in order to avoid running the risk of financing deforestation in Brazilian territory. Similar pressure is also being put on the beef production industry by retailers so as to avoid the risk of selling products obtained from areas with socioenvironmental problems (deforestation). Since 2009, the Federal Public Prosecution Service (MPF) has been promoting agreements with retailers and meatpacking companies covering all the links in the ranching chain that can guarantee that cattle are coming from areas without deforestation. Civil society has published studies that demonstrate the importance of monitoring and controlling cattle origin in order to assure that deforestation is suppressed throughout the beef production chain.

In response to these pressures the major Brazilian meat companies announced new platforms in late 2020 seeking to achieve efficient traceability and meet domestic and international demands so as to mitigate risks and promote transparency and environmental conservation. In August 2020, Marfrig, the second largest Brazilian meat exporter communicated its Marfrig Verde+ Plan that set out a programme for achieving a chain free of deforestation by 2030. In September it was the turn for another Brazilian producer, JBS, to communicate that it will monitor its entire supply chain to cut deforestation by 2025. That announcement was made weeks after the Norwegian asset management fund Nordea announced that it would withdraw its participation of some 40 million euros (around BRL 260 million) from JBS because of the company's lack of engagement in environmental issues. In 2019, after forest fires raged through the Amazon Rainforest, a group of 251 investors demanded a reduction in deforestation, identifying environmental impacts as "systemic risks" to their portfolios. Biodiversity and climate changes are important topics to agricultural markets that are exposed to extreme weather conditions, and to environmentally aware consumers, says Matt McLuckie, research director for Planet Tracker, a not-for-profit organization in the United Kingdom that seeks to redirect capital into sustainable development. "The trends have not been positive for agricultural producers, especially in the beef sector" [48].

7. Concluding remarks

The worldwide scenario for the beef chain favors an increase in Brazilian beef exports. Additionally, new markets are being opened, such as Russia, the Middle East and Asia. Therefore, the search for quality products and the satisfaction of needs and tastes among the different consumer markets is crucial for Brazil to remain an exporter of meats worldwide. Thus, Brazilian entrepreneurs from the ranching sector began to work with new concepts such as Traceability, Certification and Certifiers, beginning with institution of the Brazilian System for Registering Bovines and Bubalines (SISBOV), on 01/10/2002 [49].

The study of Burnier et al. [39] enables a better understanding of sustainable practices in the beef supply chain through identification and measurement of activities developed throughout the production process, which can help managers with formulating communication strategies and product/brand positioning in response to consumer concerns over the production process. These communication strategies should be a means of creating opportunities for more efficient modes of production, because they facilitate consumer understanding regarding responsible actions undertaken in the stages of the production process. Aware of consumer willingness to consume products with socio-environmental production attributes, the world's second-largest beef producing company launched the Carbon Neutral Beef initiative (CNB) in 2020, which responds to a call for productive efficiency, reduction of environmental impact and attention to animal welfare [50]. With this new CNB concept, several of the elements present in the scale proposed in this study are clearly communicated (animal welfare, traceability, environmental responsibility).

In Brazil, responding to the need to update traditional and inefficient production models, one can cite initiatives that advocate processes that are safer and valued for socio-environmental aspects such as the use of Integrated Crop-Livestock-Forest Systems (ILPF) for the production of meat, grains and wood. According to Alves, Almeida & Laura [51], among the advantages of these processes are sustainable intensification of land use, diversification of production, soil conservation, better use of natural resources and inputs, reduction of pressure by opening up new areas (earth-saving effect), animal welfare, carbon sequestration and the mitigation of gas

emissions. Thus, the production of beef cattle, through systems in crop-livestock-forest integration (ILPF), makes Brazil an important player in the sector by offering sustainable meat produced in the tropics. On the adaptations that occurred in the production system, Embrapa Gado de Corte created a concept brand for beef, Carne Carbono Neutro (CCN). Alves, Almeida & Laura [51] explain that, among others, the objectives of the CCN concept brand are to offer quality guarantees for a certified product, derived from an innovative business model, concerned with carbon emissions, with the environment, with animal welfare, with the adoption of good agricultural practices and with the compliance with current Brazilian socio-environmental laws. A symbol of greater productive efficiency, reduction of environmental impact and concern for animal welfare, CCN represents a differentiated product that reflects adaptations in animal production systems to meet a new consumption trend.

A study by two Higher Education Institutions, UFMS and ESALQ/USP, in partnership with researchers from Embrapa Gado de Corte aimed to learn about the perception of Brazilians about the consumption of beef and about a Brazilian concept brand developed by Embrapa (Carne Carbono Neutro, or Neutral Carbon Meat). Attention should be paid to an important result obtained by the study. There is a representative consumption behavior in Brazil, attentive to good production practices, in addition to positive attitudes related to the initiatives for presenting innovative products to the market that respond to consumer concerns related to animal welfare and the association of attentive food production. Legal bases and sustainability issues. On the other hand, at least a quarter of the interviewed population is represented by attitudes of indifference in relation to production issues and, also, of denial and disbelief in relation to the CCN concept brand. The variables that best contributed to explain this type of behavior are related to the lack of information or knowledge and the notion of risk. The lack of information or the erroneous information that reaches the final consumer about the problems related to food safety and the risk of consumption represent barriers to the commercialization of conventional protein and, mainly, to the CCN concept brand since it is an innovative product in the market. This study found that innovation was a generating factor of distrust on the part of final consumers. Thus, considering the future challenges for food supply, the research carried out in the national territory and analysis of the proposed typology allows us to state that there is an agenda of opportunities for productive systems that value socio-environmental aspects and responsible production. However, these initiatives will only make sense to the consumer population with a lot of investment in communication campaigns. Being assertive, the availability of most consumers to consume and pay for the differentiated product will be verified.

Another tendency now appearing in Brazil are meat boutiques with premium, gourmet and in some cases sustainable products. Beef Passion is a brand of beef produced in house, that is certified and sustainable and offers 72 exclusive cuts. The company prioritizes animal wellbeing through management that conditions the animals to being docile based on trust between different species, including humans, until the mature age for slaughter. On a daily basis, they use methods for conditioning the animals, such as ambient sound in the SPA and the sound of a cow horn during handling, as well as interaction with balls and people so that they can adapt to different situations in which they will pass through the next stages of their lives. Along with that the team is trained in methods for leading the animals, always with great calm and respect. The Beef Passion team believes that cattle are sacred animals that must be treated throughout their entire life cycles. All the production is tracked, raising is done in under an extensive system in central western Brazil, fattening occurs in a system with intensive supplements and pastures and finishing is done at the bovine SPA in the state of São Paulo. Genetic selection seeks to optimize the fat

and fibers in the carcass. The company crosses the Angus and Wagyu breeds originally from Australia and Japan, producing cuts under the “Australian Passion” and “Grand Passion” seals. After stunning and slaughter, the carcasses rest for 48 hours before being portioned and vacuum-packed. Boneless cuts are chilled, while those with bones are frozen according to the federal inspection norms (SIF) for Brazil.

As a result, the company has a standardized product of high quality and low levels of saturated fat, with 70% of the fat in the meat being unsaturated. Furthermore, the meat is certified as 100% sustainable by Rainforest Alliance, which attests to socioenvironmental excellence throughout the production system [52].

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