### INSTITUTE OF APPLIED RESEARCH IN SUSTAINABLE ECONOMIC

#### **DEVELOPMENT – IPADES**

## **BEEF CATTLE IN BRAZIL**

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Brazil, until the year 1960 lived a condition of foreign dependence and food shortage in the supply of certain foods, particularly animal protein. This picture has changed, the country has been maintaining since 2004, the position of world's largest exporter of beef, even allocating 80% of its production to supply more than 200,000,000 people. Come to that, in relatively short period of time to the history of a country, has not been a simple task, but still, are major challenges to be faced to the country reach the "State of the art" in this segment of the livestock production.

This article deals with the trajectory of the Brazilian cattle with the stages achieved, and by being hit, focusing on the following aspects of production: breeds, pasture, production system and quality of the product.

Cattle arrived in Brazil in the 16th century, brought by Portuguese colonizers, belonged to the species *Bos taurus taurus*, came from the Iberian Peninsula. After adapting to their new environment, these animals formed the regional biotypes called creoles, among which three stands out as national races: Caracu, Curraleiro, Lageano.

As for the herd Pantaneiro, the registration process as a race is in the Ministry of agriculture, livestock and food supply (MAPA). This work has been conducted by Embrapa Pantanal since 1984, coordinated for eight years by researcher Rachel Juliano, who took over the management of the Center for conservation on the farm in the Nhumirim, Nhecolândia. In addition to the farm of Embrapa, in the Pantanal, at least four core partners of creation must, according to the Brazilian Association of Pantanal Cattle breeders (ABCBP), help to compose the first flocks registered.

These breeds have important qualities and increasingly are in demand in the segment of cattle, primarily for industrial crossbreed. The rusticity acquired over the

years has given them less food requirement and greater resistance to parasites, besides increasing the longevity of players. All these features ensure producers a significant economy in relation to the use of other European breeds in the cross.

But the European breeds have not lost the space in the Brazilian territory, continue to play leading role, especially in the southern region of the country, and at intersections with the industrial ZeBu breeds and landraces. Among them are: Aberdeen Angus, Charolês, Chianina, Devon, Hereford, Limousin, Marchigiana, Shorthorn e Simental.

Only after almost 300 years, the Brazilian livestock, by then based in European cattle, now has the ZeBu species *Bos taurus indicus*, from, mostly, of India, represented by breeds Gir (Gyr), Guzerá (Kankrej) and Nelore (Ongole). Being the Brazil a country predominantly tropical, with weather similar to the region of origin of these animals, the adaptation was quick. With the improvements in the conditions of creation, in general, the zebu was slowly absorbing the original herd creole.

Currently an estimated 87.7% of the herd of national cut of origin of zebus only 8,000 cattle imported until 1962. Among the zebu, 121,600,000, 78% of all Brazilian cut herd, has the Nelore in their genetic makeup.

The evolution and prevalence of the zebu breeds in herd cut Brazilian beef depend on two major factors. The first is the adaptability of these animals to the "new" environment. The second, is mister recognize, competent work of selection and promotion of these races, led for decades by breeders and Brazilian technicians, making them increasingly efficient and productive. In this regard, register the work of technical cooperation initiated in 1979, between the Brazilian Agricultural Research Corporation (Embrapa in Portuguese) and the Brazilian Zebu Breeders' Association (ABCZ in Portuguese).

In the early 1980, so pioneer throughout Latin America, the first genetic evaluations were carried out, with launch of national summaries of bulls. This technology, today consecrated along the production chain, opened the way for other programs, such as the Evaluation Programme of Young Bulls (ATJ in Portuguese), created by Embrapa, pioneered in 1991, and the breeding program Geneplus-Embrapa, released in 1996, which also provided important results. These initiatives, along with other similar institutions, provided to climb the Brazilian main genetic zebus provider in the world. As an example of this advance in genetic improvement quote if

the Expo-genetic, held annually since 2007 by ABCZ, in Uberaba (MG), as genetic zebus improvement practice.

Historically, the brazilian livestock species, the variety and cultivar of forage have always been chosen based on the "fad of the season". This search for "miraculous" already put some grass forage in the "podium" of pastures. The jaraguágrass (*Hyparrhenia rufa*) were fashionable from the years of 1940. In the late 1970 and during the following decade emerged two "stars", the *Brachiaria decumbens*, then the braquiarão-grass (*Brachiaria brizantha*), this became the ideal grass. Currently, these two species occupy around 75% of the area of cultivated pastures in the country. Whit the *Brachiaria brizantha* happens the problem of the death syndrome of the braquiarão-grass. However, this "fad" is losing power, and the new option must follow step-by-step the concepts and the adoption of techniques and technologies from agronomic research, as is already occurring in agricultural activity.

To this end, the country has advanced a lot in the improvement of forage species and cultivars and management of pastures, what has taken place in all national biomes. However, the pasture stocking rate is still low, ranging from 0.3 to 0.8 animal per hectare of pasture (0.3; 0.8 AU/ha in Portuguese), mostly in the areas of livestock, but research in agrostology already indicates up to 5 stocking rate AU/ha, that is, the rancher is distant to harness the full potential of forage plant, and you replace it with another. The maximum use of that potential goes through the maintenance of soil fertility in level consistent with the nutritional requirement of species and/or cultivates fodder, and the correct management of grazing. To get pasture back the producer makes a path opposite of degraded: transforms the one ending and leads up to a maximum of their production. Once seized the recovery of grassland, the cattleman never leave the pasture degrade, the productivity of pasture and weight development of the herd can be persuaded to continue. As the replacement of forage species should be based on technical justification.

Not only the search in agrostology has advanced as well as the adoption by the ranchers to adopt the kind of fodder more adapted to the climatic conditions in which climate is your property. Also, the agricultural policy starts to be an ally in the renewal or restoration of grasslands. Is what you want the Government of Mato Grosso do Sul, to launch in March, the State program of Recovery of Degraded Pastures, disclosed popularly as Good Land Program, which reduces the tax burden of producers which reform areas with degraded pastures. The rancher will pay less tax by oxen slaughtered from reclaimed areas. The program is based on five points: i) mobilization

and capacity building of producer; II) technical assistance; III) financing; IV) fiscal incentives; v) infrastructure. To reclaim areas of degraded pastures, this policy aims to increase production and maintain these productive areas.

The program established in crop-livestock-forest integration system (ILPF, in Portuguese) is ambitious and foresees significant results after five years: i) increase in the average capacity of the pastures of 0.8 to 2.4 UA/ha; II) recovery of 2,000,000 hectares of degraded pastures; III) increment of 768,000 tons in the production of bovine meat; IV) 7,600,000 tons of grain; v) 12,000,000 tons of cane sugar; vi) 17,700,000 cubic meters of timber.

The cattle settled in Brazil by the known and secular extensive system of secular establishment until today still present in large areas of the national livestock. Two factors contributed to the expansion of this production system: the availability of land and the very low technological level employee, based on the overthrow and burning of the biomass followed by vegetable seed or planting of seedlings of fodder. Livestock based on this system was one of the factors responsible for the internalization of the Brazilian territory. The irradiation centers were the Captaincies of Bahia and Pernambuco, with the divisor the São Francisco River. Of Bahia were toward the captaincy of Minas Gerais packed by the gold cycle, which demanded for meat produced on farms of the high rive. Of Pernambuco followed northwards, crossing the river and entering the backcountry, which at the end of the 17th century begins to be occupied by the interior of the current state of Piauí.

The progression of the farms did not cease in Piauí, crossed the river and advanced in Maranhão with those farms coming up the coast which climbed by Itapecuru River. East also reached the Ceará, meeting with the stream that was coming in the opposite direction from Pernambuco. Completed the occupation of the entire Northeast interior, even very irregularly. The farms there formed would provide jerked meat to the more populated regions of the colony.

In the South, the European races with better adaptation to the subtropical climate, and grasslands were of great importance to the expansion of cattle ranching. This provided valuable contribution to the integration of Southern Brazil. The concern of the Portuguese Crown to maintain primacy in the leather trade, allied to extend his domain to the river of the silver, they took her, deliberately, to found the colony of Sacramento. Thus, the southern Colony became par excellence, a vendor in addition to leather and beef jerky, camel and cattle also horses for the growing market of mining

region of the Captaincy of Minas Gerais. The trade in these animals was as trading post the Captaincy of São Paulo, mainly in the region of Sorocaba.

Amazon has their livestock with pasture planted since the end of 1950, in the current municipality of Paragominas (PA), with the opening of the Belém-Brasília Highway and later with the other roads that were being opened in the region. Five factors have marked this initiative: i) State lands or low price; ii) colonião-grass (*Panicum maximum*); iii) the zebu breeds, which were gradually being dominated by Nelore; iv) the entrepreneurial action of producers; v) the subsidized financing offered by the Programa de Redistribuição de Terras e Estímulos à Agroindústria do Norte e Nordeste (PROTERRA).

In the final years of 1970 donates, the first were degraded pastures, when so the Projeto de Melhoramento de Pastagens da Amazônia Legal (PROPASTO), partnership among the Centro de Pesquisa Agropecuária do Trópico Úmido (CPATU), today Embrapa Amazônia Oriental, the Amazon Bank, and ranchers started with regional coverage surveys in agrostology. This work was successful and continuity, the answers began appearing in 1990 with the revitalization and expansion of livestock in all States of the region. The Legal Amazon, in 2014, kept a herd of bovine heads 53,000,000, 26.86% of the national herd. This is the more atomized and expressive segment of the agricultural regional economy.

In the second half of the 20th century the extensive creation system began to undergo changes towards a better use of pastures with the slow introduction of rotational grazing, system is divided into a number of plots, which are successively grazing by animals, until they return to first. This when used with daily rotation, became known in Brazil as the Voisin, French physician and naturalist's surname, André Voisin, which published some books on rangeland study, mainly about their physiology, where described and recommended this management mode. Is most used with dairy cows in good production, being used with electric fences.

From the years of 1980 the Brazil began to search for a new system of training and use of pasture that was termed integrated crop-livestock system (ILP, in Portuguese). This system that in practice it was already used by ranchers with the planting of upland rice before forming the pasture, as a means of reducing the cost of deployment of pasture, came to be researched by Embrapa Rice and Beans, which initially received the names of system Barreirão e Santa Fé. It's a technology of recovery and/or renewal of pasture in consortium with annual crops, especially soybeans and corn. From the years of 1990, with the advance of the research on this production system, and more environmental pressure, surveys extended to crop-livestock integration-forest (ILPF, in Portuguese), which has become as viable alternative for recovery and/or renewal of pasture in the tropical region for economic and environmental benefits that has presented. With the introduction of forestry component to the system, this has diversified in the following systems: crop-livestock integration (ILP); livestock integration-forest (IPF); crop-livestock-forest integration (ILPF). Add to these systems the tillage technologies (PD in Portuguese), and the biological nitrogen fixation (BNF).

The ILPF is based on three pillars. One of them is a better use of rural assetsland, machines and/or human resources, allowing more intensive use of the same asset and the integration of new assets. This is possible as the Brazil a tropical country, where there is a predominance of the sun, with longer period of photosynthesis all year round. The second is to give producers the opportunity to generate revenue continued throughout the year, in more balanced flow, reducing the effects of climate and economic risks. The third is the balanced production from an environmental point of view; how to add value in agriculture, not only in the economic aspect, but also with the environmental preservation.

The ILPF, the PD and the FBN count from 2010 with specific funding through the Low Carbon Agriculture Program (ABC, in Portuguese), which encourages the recovery of degraded pastures in this system, as a way of avoiding deforestation also new areas of forest to pasture. These are technologies that are here to stay and to transform the Brazilian cattle business, strengthening and giving respectability to Brazilian agribusiness. The Brazilian Government took over international commitment at COP 21 in December 2015, in Paris, of the country arrive in 2030 with 20,000,000 acres in integrated systems of agricultural production.

The progress that the Brazilian cattle business has been showing from the second half of the last century hits at the moment a paradigm shift with the adoption of sustainability practices and product quality, making it a rule for those who want to continue the activity. These attributes are being achieved through certifications that can bring benefits such as: i) **different values** in marketing, in the form of awards or bonuses; II) **positive status to the farm**, the producer feels proud to have your work recognized and they become a reference to its neighbors; III) **access to new markets**, generally more demanding; IV) **improvement of the management of the property**.

In the case of meat, the adherence to commitments related to sustainable production is growing, causing supermarket chains and fast food purchasing commitments 100% of the beef produced on systems not linked to deforestation in the Amazon.

The certification of beef cattle in Brazil has taken place through various institutions and programs. She works with three objectives: increased productivity; quality of the product; sustainability of production. The following are some of these certification programs.

**Good Agricultural Practices (GAP) – Beef Cattle.** The GAP of Embrapa, refers to a set of standards and procedures to be observed by farmers, that in addition to making the most profitable production systems and competitive, and they make the food supply safe from sustainable production systems.

The contents of the manual GAP and their respective checklist contains the main points that must be observed by farmers, in order to ensure the profitability and competitiveness of production systems, such as: i) rural property management; ii) social function of rural property; iii) management of human resources; iv) environmental management; v) rural facilities; vi) pre-slaughter handling; vii) animal welfare; viii) pastures; ix) food supplementation; x) animal identification; xi) sanitary control; xii) reproductive management.

**Certified Angus Beef Program.** Is a partnership between the Brazilian Angus Association and the cooling industry, for production of high quality meat. Aims the promotion of meat from animals Angus and his cross, get a valuation and payment for quality to producers engaged, foster the growth of the Angus breed, strengthen and integrate the supply chain, in addition to the production of high quality meat in accordance with criteria valued by the market, seeking to meet the most demanding consumers.

The Angus beef is certified by the Brazilian Angus Association, by identifying the housing in the fridge by accredited technicians, certified refrigeration plants. The identification is performed from the inspection of animals at slaughter and corrals again in line for slaughter, where they are evaluated individually as the coat, the conformation of the head and carcass, age and degree of finishing, being awarded a certification stamp on slaughter line to those animals which are approved in the final evaluation.

Boning, packing and shipment are also accompanied by the technicians of the program, certifying the high quality standard of the process. All the meat is vacuum-

packed and receives a different label, where the certification seal of the Brazilian Angus Association is visible.

**Carbon Neutral Meat (CCN).** It's another Embrapa certification which involves criteria established by Embrapa Beef Cattle and Embrapa Forest. The main purpose of the brand-concept CCN is certifying the production of beef cattle on systems with the compulsory introduction of trees as a different. Under these conditions, the presence of the tree component in integration systems of type silvipastoril cattle-forest. (IPF), un Portuguese) or agrossilvipastoril crop-livestock-forest, (ILPF, in Portuguese) neutralizes the enteric methane (exhaled by animals), one of the main greenhouse gas that causes global warming.

**Rainforest Alliance.** The Rainforest Alliance seal validates good production practices that ensure the preservation of the ecosystem, wildlife and water resources; the proper management of soil; the provision of good working conditions for employees; the lower use of agrochemicals; the good waste management and the mitigation of carbon emissions.

**Xingu Herd.** This certification, also known as the beef herd of São Félix do Xingu is a town and municipality in the southeast of the State of Pará, is a pilot project the result of unprecedented partnership among ranchers, industry, retail and enveloped in civil society program "From Farm to Table", which wants to prove that it is possible to produce meat without clear. Starting in 2013, the program is led by the environmental organization The Nature Conservancy (TNC), by Marfrig and at Walmart, along with producers. The TNC helps ranchers to establish a new mode of production, with pasture rotation, soil management, protected areas conservation and genetic improvement of cattle. The Marfrig agrees to buy and slaughter the ox and Walmart to sell the meat. This meat receives the seal of origin "Xingu Herd" how marketing activity to enhance the beef produced in the Amazon.

**Organic Livestock.** The process of creating the "Organic Ox" requires certification. The certification requires, among other things, the supplementation with plant foods, of which 80% must be organic; the restricted use of allopathic medicines, the prohibition of the use of pesticides and synthetic fertilizers and compliance with environmental legislation and of the Brazilian forest code. The "Organic Ox" is regulated by the MAP with the following criteria: i) obey the instructions regulatory determinations 18 and 46; ii) excludes use of urea in feeding; iii) prohibits use of chemical fertilizer; iv) excludes vermifuge, chemical based medicine to combat carp louse and chemical based antibiotics; v) the sick animal can be treated with these

products but should be isolated for long variable, as the problem; vi) does not accept genetically modified grains use in animal nutrition; vii) does not allow for fixed time insemination (IATF), just natural and conventional insemination; viii) does not specify race and animal pattern, which is defined in the trade agreement.

**New Field Program**. Is being employed in Legal Amazon of Mato Grosso for Life Center Institute (ICV), which has helped the ranchers to adjust production to reduce environmental impacts using the adoption of good agricultural practices of Embrapa. This is being done with financing of investment funds and commercial agreements with refrigerators and fast food networks.

All this advances by which come passing the Brazilian cattle is reflected positively in the numbers from the table below.

Total herd	Million heads	210,60
Beef herd	Million heads	155,80
Slaughter	Million heads	42,00
Equivalent carcass product	Million tons	10,07
Export	US\$ billion	7,10
Export	Million tons	2,09
Year per capita consumpti	Pounds	39,00

#### BRAZIL: BEEF CATTLE in 2014

Source: Ministry of Agriculture, 2014; Brazilian Association of Meat Exporters.

Not only the cattle, but the agriculture is going through a revolution of its production process. Anyone who can't adapt to she will end up along the way.

In the second half of the last century, several specialists wrote saying that large companies entered the farming only when large subsidies or were managed in the monopoly position. Large companies where heavy government subsidies appeared encouraged by SUDAM, SUDENE, SUDECO and Proálcool.

The reason for this was explained by low profit rate due to various causes, such as: i) idleness of capital, for example, a combine harvester worked less than half of the year; ii) lack of control of the production process, how to predict climate change, time interval of growth of crops, lack of control over the labor productivity; iii) purchase of production inputs (seeds, pesticides, fertilizers) of oligopólicas organizations; iv) sale in perfect competition with profits squeezed. How to compare this activity with an assembly line, for example? It is worth remembering that capitalism evolved from independent artisans to the Assembly line, so that the process could be completely controlled and idleness of the capital was reduced to zero.

Almost half a century later, the technology has evolved in order to improve the control of the productive process with increased productivity, greater and better land use, integrated production systems (ILPF). These allied production systems no-tillage technology and biological nitrogen fixation beyond increasing productivity and preserving the environment, also reduce very idleness of capital and in the medium term reduce costs. Add itself whether the improvements in forecasting climate controls. This entire new portfolio available to the sector of agricultural production contributes, therefore for the rate of profit in an industry that has guaranteed and growing demand for its products.

In its edition of 11 June 2016, The Economist magazine featured a set of articles discussing the main technological bottlenecks in agriculture and innovations that could increase the control over the production allowing the green revolution can progress.

Among those controls include: i) smart farm that use new technologies in an integrated manner; ii) the plants of the future, namely what genetics can still do; iii) technology in livestock, raising productivity and animal welfare; iv) in a general way the impacts of new technologies on agriculture in the future.

In the 21st century are increasingly distant from the old-fashioned farms because many properties are already true "industrial units", with the use of satellites, mechanized brigades and advanced computer systems and irrigation, with advanced genetic engineering, planning and management, efficient. This is the new paradigm of farming. The Brazilian cattle is already adapting to him.