

THE STATE OF BRAZILIAN LIVESTOCK PRODUCTION, TRENDS, AND CHALLENGES

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The future scenarios of Brazilian livestock production are central not only to economic and environmental agendas in Brazil and the world but also to the understanding and implementation of sustainable and inclusive rural development policies. A study conducted by the Public Policy Group of ESALQ/USP in 2022 showed that **the social dimension of livestock production is an essential aspect for identifying opportunities and risks, especially in the context of increasing demand in the international market.**

The guiding questions of the study were: **What are the current and projected changes in the beef supply-chain in an increasingly globalized agricultural sector? How do these changes affect different producer profiles and supply-chain links? What kind of policies and actions are necessary to deal with these differences?** To answer these questions, the study relied on literature review, quantitative secondary data collection, interviews, and validation events with various key actors in the livestock chain, representing the productive sector, industry, research, government, and organized civil society. Five cross-cutting themes permeated the study: (i) Intensification of livestock: ethical, environmental, and social issues; (ii) Importance of livestock and market niches; (iii) Production system; (iv) Public policies, technological progress, and productive intensification; (v) Production scale and sanitary risks. The surveys and collection of

perspectives from different actors contributed to the development of an understanding of the state of Brazilian livestock, its trends, the main challenges for the sector, and the demands for strategic public policies specifically targeting small and medium-sized producers.

STATE OF BRAZILIAN LIVESTOCK AND TRENDS

IN THE ECONOMIC DIMENSION

- According to the Agricultural Census of IBGE, since the 1970s, **pasture have predominated in Brazilian farms, covering an area 2 to 3 times larger than agriculture, regardless of producer size**, whether small, medium, or large, family or non-family farming, poor or wealthy landowners.
- **From 1975 to 2017, agricultural use (agriculture + pasture) increased** by approximately 27.4 million hectares. However, the **pasture areas decreased** by about 7.0 million hectares (4.2%), **while the national cattle herd grew** by approximately 70%, reaching 172,719,164 animals in 2017. **These data demonstrate the process of cattle ranching intensification in the recent years, with implications not only in the economic field but also in the environmental and social contexts.**

- Between 2006 and 2017 (the dates of the last censuses), **the economic importance of livestock increased compared to agriculture**. In 2017, about 1.8 million rural establishments had livestock as their main economic activity, although the number of establishments with cattle breeding decreased by about 6% during the period.
- Currently, **Brazil holds the position of the second-largest beef producer**, second only to the United States, **and the largest exporter of the commodity**. The recent dynamics (2015-2020) demonstrate a significant growth in the volume of exports. This dynamic is expected to continue, largely due to the increasing demands of the Asian market, with a focus on China, which has been increasing its consumption of beef. There is also a trend of increasing domestic meat and milk consumption.

IN THE ENVIRONMENTAL DIMENSION

- **Livestock farming, especially cattle farming, plays a significant role in greenhouse gas emissions (GHG)**, both directly through the digestive processes of animals and emissions from degraded pasture soils, and indirectly through deforestation and burning field for reforming pastures.
- **Intensification has been widely advocated as a pathway to reduce GHG emissions**, as it would “**save land**” by increasing productivity in a smaller area, allowing land to be used for other purposes, including the conservation of native vegetation. However, it cannot be stated definitively that this causal relationship exists in Brazil. Paradoxically, **the opposite may occur (the so-called “rebound effect”)**, where increased production efficiency makes the activity more attractive and profitable, leading to further expansion of land over native ecosystems with intensified production. Thus, **the productive intensification of conventional livestock farming should not be treated as a simplistic economic and environmental solution. Trade-offs need to be considered.**
- From an environmental perspective, well-managed **extensive livestock farming can contribute to biodiversity conservation and the provision of ecosystem services**. It can also act as a buffer, absorbing the expansion of intensive agriculture. Livestock farming is also considered **a strategic activity for ecological transition, especially for small-scale producers and in areas with high rural, peri-urban, and even urban social vulnerability**, positioning animal production as part of, rather than in opposition to, climate solutions.

IN THE SOCIAL DIMENSION

- **The social dimension of livestock farming, although less known and explored, will be most impacted by Brazil’s integration into the international market**, considering the multifunctionality of livestock farming and **the pressure on family farmers and small to medium-scale producers who depend on the activity**. This is due to the trend of intensification, specialization, and production concentration.
- **Livestock farming is one of the main activities of family farming (FF)**. According to the Agricultural Censuses, between 2006 and 2017, FF’s revenues from crop production decreased by 21%, while revenues from animal production increased by 70%. **Animal production represents nearly half of the total value generated by FF, and its relative importance in Gross Production Value (GPV) tends to be nearly twice as high for small and medium-scale agricultural establishments compared to large ones.**
- There is a **pyramid pattern (Figure 1)** representing the categories of rural establishments where cattle farming is the main activity. This pyramid shows that 88% of establishments with cattle (2.3 million establishments) have herds smaller than 100 heads (small producers). Medium-scale producers (intensive or not) follow with 215,000 establishments and a herd of 47 million heads. Finally, at the top of the pyramid, there are large producers with 76 million heads. **The trends of livestock intensification affect each group of producers differently, and the solutions (policies) must also be differentiated for each of the categories.**



- Despite the lack of studies on the subject, **the resilience of small and medium-scale animal production establishments is possibly connected to and favoured by: (i) the difficulty of economic viability in commodity agriculture**, which is increasingly under pressure from economies of scale; (ii) **aging rural population**, resulting in resistance to innovations and exposure to inherent risks in annual crop production; (iii) **increased income from non-agricultural activities**, leading to gradual production deactivation.
- In beef cattle farming, **small and medium-scale establishments have a higher participation in calf rearing** (18% and 33%, respectively). **The majority of the slaughtered volume comes from large establishments** (63%), followed by medium-scale (26%) and small-scale (11%).

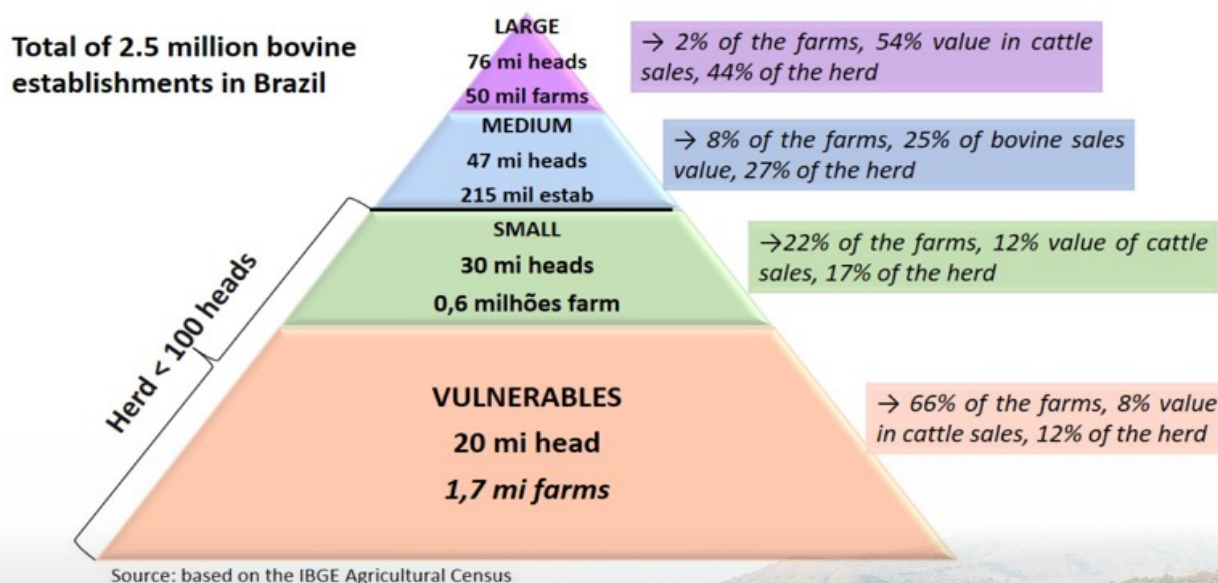
IMPACTS OF INCREASED BEEF INTEGRATION IN THE INTERNATIONAL MARKET

- The study revealed that **more than half of the beef supply already complies with environmental legislations**, as a significant portion is absorbed by large slaughterhouses that need to meet the requirements of the international market or major retailers (foreign supermarket chains or those with a strong interest in preserving their positive

environmental image). However, **there is a significant leakage of products with partial or no compliance** (often from uninspected slaughter), **which stems from the domestic market** (both formal and informal, as well as small niches and local trade circuits).

- **The response to the increased demand for beef (with or without compliance) can be addressed in two main ways by livestock farmers: through the adoption of conventional production systems (with varying degrees of intensification) and through sustainable intensification. Conventional production systems can result in both increased and reduced emissions**, depending on the flow and sequence of actions taken during the path to intensification (e.g., increased emissions due to the input of fertilizers and lime into the system or due to the “rebound effect”). On the other hand, **extensive production systems may or may not lead to an increase in livestock areas**. If they do not result in such expansion and respect the carrying capacity of the environment, they can be sustainable and even reduce emissions. Otherwise, they can contribute to deforestation and increased emissions. External factors to the agricultural system, **such as predatory land grabbing**, contribute to this effect.

Figure 1. distribution of categories of farmers engaged in cattle ranching in 2017



- **The path of “sustainable intensification”** relies on a virtuous cycle of transitioning from conventional production systems to systems that have greater greenhouse gas (GHG) absorption capacity (sinks), such as Integrated Crop-Livestock-Forest (iLPF) systems, Planted Forests (FP), No-till Farming (PD), recovery of degraded pastures (RPD), among other practices recommended in the **ABC+ Plan and TEEBAgrifood study**, along with measures like genetic improvement of the livestock. This path, in theory, **would result in the “land sparing effect,”** as it would enable higher production per unit of land, **eliminating the need for expansion through land-use change and ultimately reducing emissions.** However, **a contradiction arises from this virtuous cycle: the increase in formalization, requirements, and changes in production systems can raise production costs,** favouring producers capable of absorbing these changes and **leading to concentration of production and the displacement of small and medium-scale producers from the activity.**
- Both paths (conventional or sustainable intensification, at small or large scales) are likely to be followed simultaneously. **The ongoing trend is that large producers specialize in the rearing and fattening stages and account for the majority of compliant demand. On the other hand, small-scale intensification requires a set of policies to be effectively implemented** (rural extension, cooperatives, rural credit, connectivity, digitalization, etc.). **For these producers, specialization in the breeding stage is more probable,** and there may also be specialization in the complete cycle (for a specific niche) or in dairy farming. All these possibilities **within small-scale specialization** must encompass **a minority of producers capable of assuming higher risks and investments.** Nevertheless, there is a trend of long-term continuation of low-productivity activity (resilience) due to specific characteristics of the livestock chain that are not shared by agricultural commodity production (different stages of the production cycle operating at various scales; spot market, higher

liquidity, cultural issues, etc.). However, **there is currently no alternative rural development strategy for these resilient small-scale producers.**

- **The inequality in the Brazilian livestock sector has contradictory effects on the industry.** While it **promotes economic concentration among a very limited number of producers who have the potential to quickly respond to increased demand with socio-environmental compliance, it can compromise the efficiency and sustainability of the activity** if public policies are not adequately focused on a large contingent of establishments that maintain production systems with negative externalities.
- From an environmental perspective, the analysis indicates that **the current paths of Brazilian livestock is the tendency of increasing emissions rather than reduce them.** Additionally, **there is a key element that has not yet been addressed: the capacity for evaluating and monitoring greenhouse gas emissions and carbon sequestration, which still lacks a robust data collection network in Brazil.** This hinders understanding of which factors contribute to increasing or decreasing emissions and in what proportion. The limited **number of measurement plots** that assess emissions **is insufficient given the vast diversity of environmental conditions** (biomes, soil conditions, topography, climate, vegetation, etc.) **and production systems found in Brazil.** Consequently, these situations are poorly represented, making it challenging to use reliable parameters in carbon balance models.

POSSIBLE FURTHER DEVELOPMENTS TO EXPLORE INCLUDE:

- **Territorial focus on potential paths:** Explore areas where environmental and social processes occur most intensely and identify locations with the highest likelihood of following the proposed paths (intensification or sustainable non-intensification for small and large-scale production). This will help identify priority areas for policy development based on regional solutions.



- **Evaluation of process speed (kinetics):** Construct a roadmap for the sector with temporal priorities.
- **Investigation of the “rebound effect”** through scientific research.
- **In-depth understanding of the breeding activity carried out on small properties:** Identify territories and conditions where this stage of the livestock chain can represent a relevant **alternative for productive inclusion and economic viability for small and medium-scale agriculture.**
- **Assessment of greenhouse gas emissions balance:** Explore the scale (local, regional, or global) of emissions balance, considering the **impacts of intensification within and outside Brazilian territory and their implications for public policies, instruments, and trade agreements.**
- **Coordination for investment and consolidation of a network for evaluating and monitoring greenhouse gas emissions:** Develop methodologies and evaluation instruments that **consider the diversity of production systems and environmental conditions** in the Brazilian territory.

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