

Land Governance and Development in Brazilian Rural Space: A comparison between Livestock and Agricultural production in Mato Grosso do Sul state.

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SUMMARY

This article presents a comparison for the impact from lack of land governance in Brazil between livestock and agricultural production. It begins with a brief description of the land regulatory system and its development in Mato Grosso do Sul State and Brazil. The methodology was based on focus groups research, conducted by CEPEA/USP (Center for advanced Studies on Applied Economics/University of São Paulo) on local production sites in Mato Grosso do Sul state, where a regional modal farm was established. With these data, a comparison for the importance of land prices in livestock and soybean investment indicators (Net Present Value, Internal Rate of Return) was performed to understand how land speculation process can be described through the traditional succession of these two activities. The results shows how lack of land governance affects in different ways the Livestock and Agricultural production. In livestock production there is lower investment demand, lower risk and lower profitability given a distinguished importance for land appreciation in the investment analysis. As for soybean and corn production, land appreciation showed a less important role, since it has been a clearly profitable activity on its own. Because soybean and corn production has a considerably higher risk and demand for investment, land prices showed a greater importance as the “opportunity cost of land” than speculative uses, what increases the pressure over the owner to be more productive (since the farmer could alternatively lease or sell the land for a lower risk income). Still, the great amount of capital to acquire land tend to keep away new investors from the development of production activities through the acquisition of agricultural land, given its impact on investment indicators.

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1. INTRODUCTION

1.1 Preliminary factors and motivation

Brazil have always been a country economically driven by its agricultural potentialities. Although this is a true affirmative, it is important to note that the process of agricultural development and land occupation are deeply correlated with its fragilities on land governance mechanisms and institutions. As previous articles suggests (Guedes & Reydon, 2012; Reydon et.al. 2015), the characteristics of the Brazilian land institutional framework allow for the occurrence of three main types of land use: speculative use, productive use and exploitative use. These three main types of land use encompass several kinds of activities, some diffuse and other deeply correlated. When it comes to agricultural production and livestock production as a means of land use, characteristics of the legal institutions that regulate land use should (in theory) benefit the productive use of land over the speculative use of land. Still, in practice, evidence has shown that land appreciation play a very important role when considered as an economic asset in livestock production (Santos, 2015). Moreover, it is a decisive factor in livestock investment feasibility when we see it in the investment analysis through financial indicators, such as Internal Rate of Return and Net Present Value (Santos, 2015).

With this in mind, two possible inferences may arise. First, that Brazilian land laws are ineffective to foster productive land use over speculative land use. Second, Brazilian farmers may also be concerned with gains from the appreciation of land, and not only from the profitability of their own economic activity¹. Although not at a first glimpse, both conclusions share a strong connection. This connection clarifies itself when we focus our analysis in a historical perspective. Since the beginning of Brazilian colonization, livestock was crucial to expand territory over natural land (Furtado, 1964; Prado Jr., 1945). In time, the activity became a successful pathway to consolidate property over new areas, especially in newly opened places. The succession from natural land areas, to pasture land, and then to agricultural land have been remarkably common. As perceived by Reydon (2011), the appreciation on land prices that occur through the shift from natural land to agricultural land can reach up to 1.455% in some areas, turning land opening into a very lucrative investment alternative. These gains from the expansion of new areas become even higher if we consider that historically, land occupation grew over public land with no cost of acquisition.

1.2 Historical Aspects of Land Occupation and Land Laws on “Mato Grosso do Sul” State

The state that is known today as Mato Grosso do Sul, once was part of Mato Grosso, a result from the occupational process fostered by the Europeans colonizers, particularly the Portuguese and Spanish enterprises, marked by the Cross-Atlantic distance trade and

¹ Santos (2015) concludes that not only land appreciation, but also the low risk of the activity and historical and cultural characteristics may also interfere on the landowner's decision.

the exploitation of their colonies. The mercantilist economies at that time was based upon the Americans supply for colonial goods destined only for European markets.

By that time, the land ownership regulation in the Portuguese standard was the “Law of Ferdinand Sesmarias”, dated from June 1375, which aimed to reverse the framework of land abandonment and consequent reduction of the production of foodstuffs. The law required "the practice of crop production by the owners, lessees, tenants and others, and other matters". In 1536, with the establishment of Portuguese captaincies in Brazil, the same land administration system was implanted in the colony (Guimarães, cited Barrozo, s / d, p. 44).

In 1718, the discovery of gold in La Plata region, under Spanish control, represented a major threat to Portuguese metropolis, due to its proximity to their trading routes. Consequently, the foundation of Cuiabá was a direct result of it, an attempt for Portugal to force its presence and power upon the growing markets. In the metropolitan point of view, gold production was central to its trade balance while in the colony, the maintenance of this source of revenue implies institutional changes and also movements towards a political and spatial reorganization of the region. While these goals are pursued by the metropolitan authorities within the colony local interests, different from those fed by Lisbon, start to take their own course. Smuggling runs rampant in the mining areas (Maxwell, 1996).

The Dismemberment of São Paulo capitania created the Mato Grosso capitania in 1748. The strategic position of the capitania allowed the Portuguese attempts to contain the Spanish advance and expand its territorial occupation (Silva cited Volpato, 1987). According to Silva (2008) a Provision of the King authorized the land grant in Mato Grosso capitania for "men of possessions".

The rigidity of military administration and the clear economic purpose of auriferous extraction distinguished the social and economic dynamics of the western border of Portuguese colonies. The authority enjoyed by landowners, by being not only holders of economic power but also military dignitaries at the service of the crown, contributed decisively for the historical prevalence of structures that favor land concentration in the region. This status is fundamental to understand the process of occupation and possession of land in the Mato Grosso do Sul State region.

Historically, the fundamental institutional framework of Brazil regarding land ownership is definitely the Land Law of 1850, which sets the formal occupation process of the Brazilian empire. Land tenure was already a common practice in the “sesmarial” system, so as the practical ownership of more land than the official limits established by law. Thus, the Land Law is enacted with restrictions on access to land, intended to rationalize it providing institutional support to purchase, sale and use of land, preventing irregular access to unoccupied land; establishing a land registry office of the state (to define unoccupied areas) and turning land into a reliable asset for use as collateral for loans. The Decree No. 1,318 / 1854 brought the administrative procedure to be performed for regularization of possessions, setting deadlines for measurement of previously acquired properties. It was also responsible for the establishment of the General Bureau of Public Lands (Repartição Geral de Terras Públicas), the disciplinary body of the legal regime applicable to public lands. It was up to the bureau to manage and ensure the public property.

With the establishment of the 1889 Brazilian Republic and its Constitution from 1891, the unoccupied lands became responsibility of the federal states. Soon after that Brazil witnessed the birth of several state-based laws on land ownership, use and access. As for Mato Grosso, it has evolved in a peculiar way due to the migration euphoria caused by gold and diamond findings during the 18th century. Its population growth was

exponential, clearly related to the economic activities pursued in the Province, and the expansion of cattle, extensive since its debut, that opened up a wide availability of land.

According to Miranda Borges (2001), the evidence suggests three steps to this process:

- 1st) 1870-1890: limited exports;
- 2nd) 1890-1914: organization and predominance of extractive products (yerba mate and rubber);
- 3rd) 1914-1930: preponderance of livestock exports (live cattle, beef jerky and other animal products).

Figure 1 shows the importance of livestock and its components on Mato Grosso State, throughout the first 30 years of the 20th century.

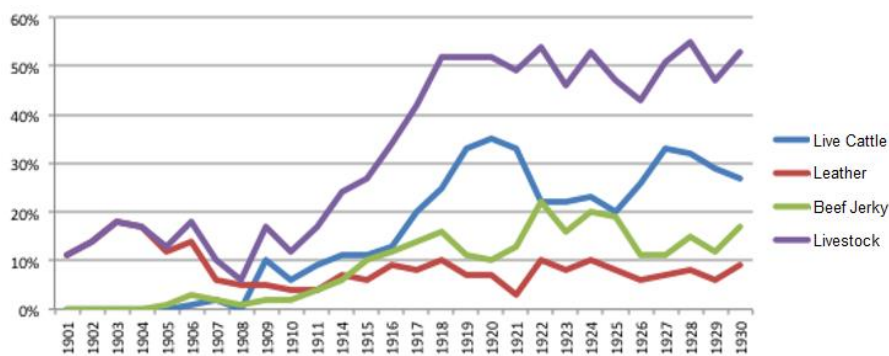


Figure 1 - Livestock and its component in Mato Grosso Exports (1901 - 1930)

Source: Borges (2001).

According to Corrêa (2009) the story of Mato Grosso in the late nineteenth to the twentieth century can be read as the "story of an armed people", especially after the war with Paraguay, that established new leaderships who clashed with the old colonels over control of land and reestablished a political tension that developed into social banditry. At that moment, the participation of the Portuguese in administrative positions was perceived as a privilege inherited from the colonial period and created an insurmountable divide within the Province.

This state of political dispute, mediated by violence between the vested interests affected any intention of economic growth. The exports gained some momentum in the late nineteenth century with increased exports of rubber and yerba mate that accounted together for 80% of the value of exports until near the outbreak of the First World War and the crisis of rubber, when the increase of cattle herds in the state provided the formation of a new set of products. Once exhausted the economic boost provided by mining, the economic stagnation definitively marked nineteenth century, with extractive activities held under way in extremely limited scope, linked to circumstantial demand. Although extensive livestock farming is the hallmark land occupation of Mato Grosso, the use and land tenure do not follow the same path.

By 1920 cattle raising was concentrated in the southern region of the province (what would become the state of Mato Grosso do Sul in the future) and had the important function of integrating the region to new commercial channels in the Empire. Extensive cattle raising was economically interesting for the imperial authority, since it occupied a broad border space, necessary for the defense of the Western frontier. According to Bonjour et al, 2008, 2) Cattle raising in Mato Grosso developed a process of opening

areas as a way to legitimate land use. This dynamic allowed extensive pasture areas to be opened over natural land, without proper ownership.

Thus, between 1892 and 1930 the efforts of the state government focused on legitimating old possessions, even after the federal ban, validating titles that individuals irregularly held, in accordance with their political power/influences. The measuring, recording and marking of areas were the responsibility of a Judge Commissioner, appointed by the President of the Province, and a surveyor. In the case of vacant lands (*terras devolutas*), however, measurement and demarcation were the responsibility of the applicant, being the Judge Commissioner tasked with the approval of the service and the routing of the maps of the areas measured. In the case of Mato Grosso, the legislation allowed the incorporation of surrounding vacant lands to the occupied areas, as long as they did not exceeded the spatial limit of 150 ha. The number of expansions of regularized areas was such that between 1899 to 1929, of 910 land titles issued by this expedient, the process reached the sum of 650,877.50 hectares of possession and 4,294,216 acres of excess area (ie, arising from the merger of neighboring lands) (Moreno, 1999).

The creation of "Measurement Districts" and the Judge Commissioner figure had the objective of assuring that any attempt of regularizing land ownership remained subject to the vested interests of the state, since the Judge should act in consonance with the established powers and also had the last word on local matters pertaining to land regularization. There were so many excesses that the figure of the Judge Commissioner was abolished in 1897.

In this sense, the Revolution of the 1930's impacts on the Mato Grosso socio-political context through the dismantling of the repressive structure and expropriation of the human component. It sets up the opposition to situations like the widespread trafficking in the region, responsible for supplying an agricultural labor system based on - and vastly similar to - enslavement, and the establishment of militias by local political and economic leaders. With regard to land issues, the "Provisional Government" determined that new land adjustments were to be made in court, extinguishing the administrative form as it was until then.

In short, from the establishment of the first institutional framework of land in Brazil to the revisions proposed by the Vargas government, there is a consolidation in Mato Grosso, of the repressive apparatus associated with the ownership of land by large landowners. Marked by a selective flexibility, regulatory institutions of land property had structural deficiencies in their construction, favoring those with sufficient power or resources to assert themselves as owners of the disputed land on the border.

In 1938, the Getulio Vargas government, adopted the "March to the West" initiative, as a form of occupying "empty spaces", motivated by the organization of colonial settlements, the development of infrastructure projects such as hospitals, roads, rural sanitation and the organization of land ownership. With the increase of migration and state interest in the region in the following decades, this situation became even more problematic, as the tensions grew stronger, since land access became more regulated, scarce and valuable.

With the rising of the dictatorship period, the Constitution of 1946 turned its attention to the Amazon region and the state government began to conduct a review of the land legislation, creating a set of liberal laws in order to speed up privatization of unoccupied lands and legalizing ancient particular areas, while at the same time enforcing the federal government colonization plans. Between 1950 and 1964 there was an indiscriminate sale of vacant land, transforming the settlement policy into a profitable business - including the payment of patronage, as decided in 1955 by the Senate.

The DTC (Department of Land and Colonization) was closed several times due to land fraud in the state of Mato Grosso, and definitely closed in 1966. However, the DTC closing further encouraged speculation and negotiations with irregular land titles. After acquired, these titles were adjusted to areas not described in other titles and registered in the Registry of Deeds. It was from this practice that the expression "bunk beds titles" ("*beliches fundiários*") arose, with areas been sold and registered to different people, generating title overlaps.

The follow-up to this first national development rapture of the military, with the so-called Economic Miracle (1968-1974), bequeathed to the Brazilian economy similar consequences. Given the limits found by development plans and stabilization of the previous decade, the pressure for land throughout the country acted as a 'safety valve' for directing the attention of the population and some of the major political and economic agents.

As part of this new development perspective, the Cuiabá-Santarém highway was planned and begun to be constructed in the 70's, with the main objective of improving the infrastructure that supported exports, providing the region with an outlet to the sea. Among its secondary objectives was the goal of reducing the impact of the creation of the State of Mato Grosso do Sul on the economy of Mato Grosso.

Along this axis of the highway, occupation and colonization projects were developed by private companies as highlighted by Guimarães Neto (2002) and Santana (2009). The settlement policy motivated 101 settlement companies to operate in the country until 1981, with 42% operating in that State and 49% of the 75 settlement projects developed along the axis of BR-163 road. As form of occupation through the implementation of private colonization projects, large agricultural projects and expansion of logging, the situation with regards to land ownership comprised three different possibilities: Mato Grosso lands were either destined for colonization projects, squatters (settled or not by Incra) or still in possession of the natives.

Under the state land policy, the government of Mato Grosso came to take three great historical impact measures. The first was the resumption of the granting of lots, now at 25 hectares in size and with a term of 10 years for effective occupation. Second, to develop the first state land code, which aimed for the systematization of guidelines involving the issue of land ownership and access. And the deployment of the Delegacia Especial de Terras, from the period of 1950 to 1966 (Moreno, 1999).

This culminated in the federalization of the state land, through Decree 1164/71, which placed under the guardianship of the Union about 60% of Mato Grosso land, reducing much of the state autonomy to formulate, implement and manage its own land policy. In 1977 the breakup of the Mato Grosso granted the condition of State to Mato Grosso do Sul region in 1978, along with the repeal of Decree 1167/71 that returned land shares to the "new born" state. Its first elected governor only came in 1982 (Reydon, et.al, 2014).

2. OBJECTIVE

Considering the historical process aforementioned, this article will perform a comparison between the importance of land appreciation in livestock and soybean investments at Dourados region in Mato Grosso do Sul State. The idea is to perform an analysis that can depict how weak land governance and the resulting appreciation of land, affected the economic aspects of agricultural and livestock activities and investment.

3. METHODOLOGY

3.1 Data gathering

The State of Mato Grosso do Sul, where the analysis was focused, encompasses traditional agricultural and livestock producers municipalities. Its relevance resides on the fact that it is simultaneously: a traditional livestock producer State, and has seen a recent growth in cultivated area (42%) in the last seven seasons (Conab, 2016). The data gathering methodology was the same as described by Santos (2015), where focus groups meetings were organized by CEPEA in partnership with CNA (Livestock and Agriculture Confederation) to define a regionally representative production farm. This is also the methodology used by the Research Service of the United States Department of Agriculture (USDA) for the design of agricultural governmental policies since the 1960's (USDA, 2014). The representative rural farm, also known as modal farm, is a theoretical model that represents the production characteristics that are more statistically present in a sample of production farms. This model describes all of the production characteristics, detailing the whole production system, with information of total area utilized, human resources, applied technologies and the productivity obtained (ELLIOT, 1928; PLAXICO & TWEETEN, 1963; FEUZ & SKOLD, 1991; DEBLITZ et al, 1998).

3.2 Agricultural investment analysis

For the agricultural investment analysis, the selected region was the municipality of Dourados. In 2014, its representative agricultural farm had 300 hectares of productive land. In this area, the farm cultivated 300 hectares of soybeans in the summer, and 242.25 hectares of corn as a successive crop after the harvest of the soybean crop. Although in the following years the proportion of the crops cultivated in the land and the size of the representative farm itself changed, these values had to remain in the entire analysis in this work, for the costs and revenues projection to be realized in a satisfactory way.

The production costs considered were obtained through focus group meetings realized in 2014. After 2014, an average cost was projected until 2026, so that the investment horizon could reach 12 years. For the operational costs projection, we considered the average growth of the input prices since 2010, and then utilized this growth rate to design the future scenarios until 2026. The values for these inputs are gathered monthly by Cepea, since 2003, in several production regions in Brazil. The productivity indicator utilized was the amount of produced sacks (weighing 60 kilograms) per hectare, and the revenue was calculated considering the regional annual average price of sack for soybean and corn, also considering the succession of both harvests (one of soybeans, and one of corn, in the same production area), the traditional regional production system. The productivity value utilized was 47.63 sacks per hectare, a value that Cepea considers typical for the region, this productivity was replied for all years of the investment project.

Regarding the cost structure, the methodology will consider the Total Operational Cost (TOC) of the farm (Matsunaga, 1976). The TOC considers all operational expenses (costs with workforce, all inputs, fuel, general costs) and the depreciation of the machinery used in the season. Also as a cost, the payment of the index rates applied over the capital obtained with financial institutions was considered.

As mentioned before, the 12 years agricultural investment project was established to verify its feasibility through financial indicators. The TOC considers the depreciation rate

of constructions and machinery of the farm (tractors, combines, among others). Still it does not considers the initial amount of capital invested to acquire these productive factors in the beginning of the activity. To analyze it, the financial indicators of the Net Present Value (NPV), and the Internal Rate of Return (IRR) were calculated. The NPV brings to the present value (hypothetic moment of the investment decision) the annual monetary net revenue of the activity for each year, discounted by an interest rate that reflects the minimum remuneration that the investors are willing to apply their capital, minus the amount of capital invested in the first year. The NPV is represented in the expression (1) (Buarque, 1991):

$$NPV = \sum_{t=1}^n \frac{R_t - C_t}{(1+i)^t} - I \quad (1)$$

Where:

NPV = Net Present Value

R_t = Period Revenue

C_t = Period Cost

(R_t-C_t) = Net cash flow in the period

i = Interest Rate

t = Time in years

I = Initial Investment

To be considered feasible the NPV must return a positive value. In this study the interest rate utilized was 3.6%, the same as in Santos (2015) to compare the results with livestock production. To verify the impact of land appreciation in the agricultural investment, we stipulated two scenarios: one that considers land acquisition, appreciation and selling at the end of 12 years, and one scenario where we excluded the land factor from the analysis, and evaluated only the revenue from the activity.

To complement the feasibility analysis of the investment we utilized the Internal Rate of Return (IRR) in both scenarios. This tool represents the interest rate that will nullify the NPV (Noronha, 1981), represented by the expression (2):

$$0 = \sum_{t=0}^n \frac{R_t - C_t}{(1+tir)^t} - I \quad (2)$$

Where:

R_t = Revenue on period t;

C_t = Cost in period t;

(R_t - C_t) = Net Revenue in the period;

tir = Internal Rate of Return;

t = Time in years;

I = Initial Investment.

3.3 Land appreciation analysis

To analyze land appreciation, the Agriannual Report (FNP, 2003-2015) was considered as the main source for land market prices in Mato Grosso do Sul State. With a historical series of land prices in several types of occupation, it was possible to establish an average rate of appreciation for the municipality of Dourados. This average rate was considered in the agricultural investment analysis, so that we could comprehend its impact on the feasibility of the activity. The type of occupation was “high productivity agricultural land”. The average growth rate of the land price in Dourados was established based on the average growth from 2003 to 2014. This average growth rate was considered to establish estimates for the projection of the land appreciation from 2016 to 2026.

4. Results and Discussion

4.1 Financial Indicators

The comparison between the two scenarios in the agricultural investment showed the following results (Table 1). First, it became clear that the agricultural activity in Dourados region is feasible in both scenarios, although the projections did not consider climate related risks that could diminish the productivity of the activity. Second, compared with livestock activity, land appreciation takes a secondary part in the feasibility of the agricultural farm. That is possible to affirm because the difference between the NPV values in both scenarios for agricultural production is R\$ 1,893,959, what in fact represents the contribution from land appreciation in the investment. That value represents only 16.4% of the NPV value of the scenario that considers land appreciation.

Table 1 - Financial Indicators Results for Agriculture and Livestock Farms in Dourados - Mato Grosso do Sul State

Production System	NPV without land	NPV with land	IRR without land	IRR with land
Agriculture production Soybean+Corn	R\$ 9.614.581,49	R\$ 11.508.540,52	27%	8%
Livestock "Cria" production system (Santos, 2015)	-R\$ 1.261.325	R\$ 522.389	13,56%	4,34%
Livestock "Recria-Engorda" production system (Santos, 2015)	-R\$ 3.209.552	-R\$ 1.789.410	-	1,38%

Source: Santos, 2015; Elaborated by the authors.

For both the investments (agriculture and livestock), the difference in the Internal Rate of Return between the two scenarios resides on the fact that the amount of capital invested for the acquisition of land in the first year have a negative impact on the indicator. If we perform the same comparison between the livestock scenarios, the smaller difference (than the one between the two scenarios of the agricultural investment) resides on the fact that the value for pastureland are also significantly smaller than the price of high productivity agricultural land on the municipality (Table 2). It also shows that the opportunity cost of land for the agricultural investment is significantly higher than in the livestock activity. With a considerably higher amount of initial investment (land, machinery and implements), the opportunity cost of land sums up to the pressure on the agricultural farmer to be more productive.

Table 2 - Land Prices, Dourados (MS) region

Land Classification	Annual Average (R\$/hectare)			Variation (%)	
	2006	2014	2015	2015/2006	2015/2014
Cerrado Natural Land	1.923	9.467	11.917	619,71%	125,88%
High Support Pastureland (Dourados)	4.671	13.667	14.833	317,56%	108,53%
High Support Pastureland (Ponta Porã)	4.281	13.667	13.500	315,35%	98,78%
Low Support Pastureland (Dourados)	3.726	10.500	10.833	290,74%	103,17%
Low Support Pastureland (Ponta Porã)	3.712	10.467	11.500	309,81%	109,87%
High Productivity Agricultural Land (Dourados)	5.446	20.333	23.250	426,92%	114,35%
High Productivity Agricultural Land (Ponta Porã)	5.174	19.833	20.500	396,21%	103,36%
Low Productivity Agricultural Land (Dourados)	4.221	17.683	19.000	450,13%	107,45%
Low Productivity Agricultural Land (Ponta Porã)	3.812	17.367	17.750	465,63%	102,21%

Source: FNP – Agrianual, (various years)

It is important to note that in the scenarios established, the gains obtained through land appreciation can only be realized if the selling of land occurs in the final year of the activity, so its value is only added to the revenue in the last year of the cash flow of the scenarios. With that in mind, as a secondary result, if we do consider the acquisition of land in the initial year of the agricultural production, taking the land price of 2014 for high productive agricultural land (R\$ 20.333/hectare), and do not sell it after the 12 years of reasonable agricultural production, the activity becomes unfeasible. In other words, if investors decide to apply their capital in agricultural production (soybean+corn in high productivity areas of Dourados) through the acquisition of land, the analysis shows that in 12 years the investment would still not be feasible.

5. Conclusion

With the results from the financial indicators, we can conclude that land appreciation still plays a very important role in the development of agricultural and livestock activities. The historical process that generated weak land governance instruments, made possible to obtain very significant gains through land speculation. The historical process also explains the situation regarding land concentration in the country. In one hand, high values on land prices puts pressure on the agricultural producers to be more productive, due to a higher opportunity cost of land (that means the farmer could alternatively lease, or sell the high productivity agricultural land in a considerable price). In the other hand, higher land prices discourages new investors to develop agricultural activities through the acquisition of agricultural land. That fact helps to maintain the current agrarian structure, keeping the majority of available land in the hands of the traditional landowners.

By comparing the results between the livestock activity and the agricultural activity it is possible to conclude that the cycle of land transformation (natural land - to pasture land - to agricultural land) is deeply related with the historical land occupation process. The traditional livestock activity (away from recent and interesting attempts to modernize it), with lower initial investment and lower profitability, relies more in the appreciation of land than in the gains of productivity to generate revenue. It is in fact an initial activity of the cycle. In a second moment, after the land consolidation, the investment in agriculture can be realized, with significant revenues from it.

Finally, it is important to note that the issue with land speculation does not rely on the gains from its appreciation itself, but with the fact that the weak land governance mechanisms benefits economically the opening of new land, and the consolidation of its possession through low productivity activities. That will ultimately foster land concentration and a general permanent state of low productivity livestock production.

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