University of Kentucky
UKnowledge

International Grassland Congress Proceedings

XXIV International Grassland Congress / XI International Rangeland Congress

Brazilian Pampa Rangelands: Challenges in the Face of Soybean Expansion

J. G. Moriera
Universidade Federal do Rio Grande do Sul, Brazil

R. G. Maciel
Universidade Federal do Rio Grande do Sul, Brazil

Paulo D. Waquil
Universidade Federal do Rio Grande do Sul, Brazil

J. F. Tourrand
Universidade Federal do Rio Grande do Sul, Brazil

Follow this and additional works at: https://uknowledge.uky.edu/igc

 Part of the Plant Sciences Commons, and the Soil Science Commons

This document is available at https://uknowledge.uky.edu/igc/24/4/16

The XXIV International Grassland Congress / XI International Rangeland Congress (Sustainable Use of Grassland and Rangeland Resources for Improved Livelihoods) takes place virtually from October 25 through October 29, 2021.

Proceedings edited by the National Organizing Committee of 2021 IGC/IRC Congress

Published by the Kenya Agricultural and Livestock Research Organization

This Event is brought to you for free and open access by the Plant and Soil Sciences at UKnowledge. It has been accepted for inclusion in International Grassland Congress Proceedings by an authorized administrator of UKnowledge. For more information, please contact UKnowledge@lsv.uky.edu.

Brazilian Pampa Rangelands: Challenges in the face of soybean expansion

Moreira, J.G.[*]; Maciel, R.G.[†]; Waquil, P.D.[†]; Tourrand, J. F.[†]

* UFRGS-PGDR, Porto Alegre-RS, Brazil; †UFRGS-PGDR, Porto Alegre-RS, Brazil;
†UFRGS-PGDR, Porto Alegre-RS, Brazil;
† CIRAD-GREEN, Univ. Montpellier, MAAF,
Montpellier, France / UFSM-PPGZ, Santa Maria-RS, Brazil

Key words: Pampa; Paradox; Soybean crops; Ranchers

Abstract

The Pampa biome extends throughout the Uruguayan territory, part of Brazil, Argentina and Paraguay. It is characterized by being a natural pastoral ecosystem, in which livestock represents the best option for sustainable use for food production purposes, and favors the conservation of its rangelands. In addition to contributing to the conservation of natural pastures, it was along with livestock activities that the gaucho's way of life was developed. However, the cultivation of soybeans and eucalyptus plantations in the Pampa in all its extension is the localized version of the global dynamics of valuing the production of agricultural commodities affecting various socio-ecosystems of natural fields around the world. In Brazil, the Pampa is present only in the southern half of the state of Rio Grande do Sul, and is the second most devastated biome in the country. Between 2000 and 2019 there is a dizzying growth in the areas cultivated with soy in the Pampa, with an increase of 24% of the areas cultivated with soy. During the same period, natural fields also decreased by 24%. The expansion of areas cultivated with soybeans is mainly due to the high price of commodities, the availability of land for rent in the region, the strong incentive on the part of the Brazilian State to produce commodities for export and the regularization of genetically modified seeds. Thus, extensive livestock farming considered economically unattractive when compared to more intensive production systems and the lack of incentives for producers to maintain natural fields sometimes imposes difficulties to maintain rangelands. In view of this scenario, the objective of this work is to identify how the advance of soy in the Brazilian Pampa can represent an obstacle to the maintenance of natural fields as a base for livestock.

Introduction

The way in which Brazilian meat is produced has been strongly questioned in recent years, especially meat from animals raised in the Amazon region where deforestation rates increased considerably in 2020, including imposing barriers to the exportation of Brazilian meat produced in areas of illegal deforestation, especially after Rajão et al. (2020) identified that at least one in eight of the 4.1 million head of cattle traded in slaughterhouses each year comes directly from properties that may have been deforested, which represents 2% of the meat produced in the Amazon and 13 % of Cerrado production.

However, it is important to note that Brazil has five more biomes in addition to the Amazon, namely: Caatinga, Cerrado, Atlantic Forest, Pampa and Pantanal, each with different types of vegetation and fauna (Brazil 2015), making any generalization dangerous or simplification in the face of so much diversity.

In the Pantanal biome, for example, sustainable cattle ranching, in addition to adapting to the conditions of the Pantanal biome, guarantees the livelihood and social reproduction of Pantanal cattle ranchers and is capable of meeting the demand for healthy and sustainable animal products (Araujo et al . 2018). The Caatinga is considered one of the most traditional sheep and goat breeding regions, and this is an activity of great economic and social importance for the region, where 91.6% of the population goats are found in Brazil and 57.5% of the number of sheep (Neto 2016).

In the case of the Pampa biome, which represents only 2% of the Brazilian territory, and 63% of the state of Rio Grande do Sul, beef cattle was the first and most fruitful economic activity adapted to the natural pastures of this biome, becoming a basic component of the gaucho identity and inseparable element of the landscape of this territory (Litre 2010). With degradation levels higher than the Cerrado and the Amazon, with less than half of the native vegetation preserved, the Pampa was only recognized as a biome in 2004 and is the least protected biome in Brazil, even though there are approximately 3000 species of plants in the Pampa biome, with more than 450 varieties of grasses, in addition to about 500 species of birds and 100 of terrestrial mammals (Brazil 2015; Fontana and Reed 2019). Natural grassland is one of the main natural resources of this biome that can also be characterized as a rangeland, defined as "the land where the potential

native vegetation is predominantly grasses, grassy plants, herbaceous plants or shrubs" (Kauffman and Pyke 2001).

Nabinger et al. (2005) affirm that the natural pasture resource represents a unique source of forage genetic material, still little studied regarding its different aptitudes to form cultivated pastures or even for other uses such as landscaping, leisure, etc. and be an incomparable substrate for adding value to products from domestic ruminants, it is no longer enough to produce at any price, but it must be produced in an ecologically acceptable environment and with measurable socio-economic reflexes. However, in the year 2000, as natural pastures represent 85% of the vegetation of the Brazilian Pampa, and in 29 that number dropped to 61%. During the same period, the crop that expanded the most in terms of area was soybean crops, going from an area of 14% to 38% (Mapbiomas 2020; IBGE / PPM, 2020).

For many producers, soy represented a great economic strategy and to maintain livestock activity, however, less capitalized ranchers or those who prefer to maintain their natural fields are experiencing difficulties in resisting the economic, social and environmental pressures exerted by the soy production dynamics. Thus, the objective of this work is to identify how the advance of soy in the Brazilian Pampa can represent an obstacle to the maintenance of natural fields as a base for livestock.

Methods and Study Site

This research is characterized as quantitative and qualitative, considering that it gathered mathematical data to describe the evolution of livestock production and soy cultivation in Rio Grande do Sul. According to (Gerhardt et al. 2009) the combined use of qualitative and quantitative research allows to collect more information than could be achieved in isolation. The main instrument for collecting qualitative data was the semi-structured face-to-face interview. According to (Gerhardt et al. 2009) the interview is an alternative technique of collecting undocumented data on a given topic, a technique of social interaction used to collect essentially subjective data, which are related to values, attitudes and opinions of the interviewed subjects.

The municipality chosen for the study was Dom Pedrito, located in the Brazilian Pampa, in which soy production dynamics is more consolidated. In 2000, soybeans occupied only 4,000 hectares of the municipality's agricultural area, and in 2019, that number increased to 110,000 occupied by the cultivation of the grain. As soybeans gain space, the number of hectares occupied by natural pastures has dropped from 320,000 in 2000 to 240,000 in 2019 (Mapbiomas 2020). During the same period (2000-2019), the cattle herd in the municipality of Dom Pedrito decreased by 25%. The reduction in the rangelands areas and the decrease in the number of cattle can be an indication of intensification or even replacement of livestock activity by cultivation of crops, considering that in the previous decade (1990-2000) the number of cattle increased by 4% at the end of that period (IBGE / PPM 2020).

In order to identify the challenges for the maintenance of the natural fields of the Brazilian Pampa in the opinion of the ranchers, 14 interviews were conducted with ranchers in the municipality of Dom Pedrito-RS, with the support of EMATER / ASCAR-RS[1] and the Farmers Association, in the year 2018. Some interviews is part of the data collection for the Global-Rural[2] - Rural Change and Development in Globalization project coordinated by the Department of Geography and Earth Sciences at Aberystwyth University (UK). The data analysis technique was Content Analysis, considered by (Bardin 2002) to be suitable for studies that seek to understand the opinion of individuals on a given topic.

Results

According to Otte et al. (2017, p. 1) “livestock production has significantly changed over the past decades with industrial systems and their associated value chains being dominant in developed countries and becoming increasingly important in developing countries where traditional livestock production still provides an important source of income for a large share of the population ”. In general, the authors point out as the main characteristics of industrialized systems of rearing, the large number of animals of similar genotype being reared, predominantly in confinement, with high rates of turnover of the animal population in a single location with major transformations in the global production of feed for animals, one of the main ones is the replacement of fodder by industrialized feeds dense in nutrients (Otte et al. 2007).

Unlike industrial production systems, animal husbandry based on the natural pastures of the Rangelands systems, in addition to being the oldest, is considered the most appropriate strategy for

[1] Association of Technical Assistance and Rural Extension Enterprises / Southern Credit and Rural Assistance Association of the State of Rio Grande do Sul

[2] More information https://globalruralproject.wordpress.com/

promoting human well-being, as it provides means of adequate livelihoods, offer important ecosystem services, promote wildlife conservation and maintain traditions and cultural values in these territories (Blench, 2001; Dong et al. 2016; Coppock et al, 2017), as is the case with traditional productive systems of the Brazilian Pampa.

However, soy advances over the Pampa natural pasture areas, increasing the challenges for the maintenance of natural fields as a basis for livestock farming in the Brazilian Pampa. During the interviews carried out with small, medium and large producers in the city of Dom Pedrito, some reports stand out and illustrate the view of producers about these challenges imposed on them in the face of this advance.

Unlike industrial production systems, animal husbandry based on the natural pastures of the Rangelands systems, in addition to being the oldest, is considered the most appropriate strategy for maintaining human well-being, as it provides means of adequate livelihoods, offer important ecosystem services, promote wildlife conservation and maintain traditions and cultural values in these territories (Blench 2001; Dong et al. 2016; Coppock et al, 2017), as is the case with the Brazilian Pampa.

However, as previously discussed, soy advances over the natural pasture areas of the Pampa, increasing the challenges for the maintenance of natural fields as a basis for livestock farming in the Brazilian Pampa. During the interviews carried out with small, medium and large producers in the city of Dom Pedrito, some reports stand out and illustrate the view of producers about these challenges imposed on them in the face of this advance.

According to (Moreira et al 2019), one of the main factors for the expansion of soy in the Brazilian Pampa is the economic factor, considering the rapid financial return generated by crops, either by leasing the areas for or producing the grain itself. Making this relationship of economic return between livestock, soy and livestock based on natural fields, one of the producers interviewed in our survey claims to be concerned with the destruction of the fields and states that: "*... very good fields are being destroyed by man that way without concern, and it is not for lack of technique, we are full of techniques. Improving the native field*[3] *with implantation of winter pastures, making a summer pasture, it is possible to earn much more than soybeans, sheep and cattle earn from soybeans in terms of economic return*".

In this sense, results of several experiments with native fields, show a significant increase in the productivity of cattle only with the intensification of the use of process technologies (which do not involve the use of inputs), going from 60 kg of live weight per hectare year to about 230 kg live weight per hectare year, and which can reach 900 kg live weight per hectare year in the case of implementation of species, such as winter forage, for example (Nabinger and Jacques 2017) corroborating the producer's speech. In other words, the challenge identified here is to find ways to pass on management techniques to viable and achievable producers in the short, medium and long term so that extensive livestock farming becomes competitive against soy.

Another challenge posed by soybeans is to regain autonomy after leasing the areas for growing the grain. One of the producers argues that: "*When it is decided to let soy enter the property, and the cattle are removed, the cattle are not always acquired again, and there is no longer that exceptional field. Surely you will be swallowed by the soybean planter, this is a natural thing in this culture*". Another producer explains that: "*The cultivation of soybeans requires cultivated pasture. As you will not have the return of the native field, then you need capital to implement the pasture later*".

Corroborating with the speech of cattle ranchers, (Moreira et al 2019) identified as a consequence of these reconfigurations the reduction of areas destined to livestock on natural pastures, the suppression of the biome and loss of biodiversity, factors that are potentially capable of generating replacement of livestock activity based on fields by livestock dependent on cultivated pastures. There is also a pressure from the political-institutional sphere for modernization of livestock activity, using more and more agricultural pastures among other "modernizing" factors (Severo and Matte 2020).

The section in which the producer states that it is possible to be "*swallowed by the soybean planter*" draws attention, which may indicate reflexes in the socio-cultural dimension of the Brazilian Pampa, with the reduction of traditional livestock in an extensive way (Severo and Matte 2020). .

[3] Native field is the same as natural pasture

Discussion[Conclusions/Implications]

The speeches of cattle breeders reveal a paradox. On the one hand, the cultivation of soy destroys natural fields, raises the price of land, changes the landscape and changes the habits of producers. On the other hand, it diversifies production, generates more income, creates marketing and fodder alternatives for cattle. Those who feel this dilemma most are the less capitalized ranchers or who prefer to maintain their natural fields, and find it difficult to resist the economic, social and environmental pressures exerted by the soy production dynamics in the Pampa.

Thus, the main obstacles identified to maintain natural fields as the basis for livestock breeding were: the difficulty of implementing rangelands management techniques to gain greater productivity; not to become a "hostage" to cultivated pastures and; resist the pressure exerted by the financial return of the lease of land for the cultivation of soy, or the cultivation of the grain by the producer himself.

In order to contribute to the conservationist practices of producers being valued, we suggest more holistic approaches that can measure the economic, social and cultural value of the natural fields of the Brazilian Pampa. Therefore, as perspectives for future research, it is recommended, for example, a One Health approach, which is capable of studying the human-animal-environment interconnections, and on the effects of livestock activity on human, animal and natural field health, interconnections intensified over four centuries in the Brazilian Pampa.

References

Araujo, A. P. C; Vargas, I. A. de; Bicalho, A. M. S. M. 2018. Sustainable production systems for beef cattle in the Pantanal. In: Agroecology notebooks. 13(2): 1:9 . Campo Grande / MS. AGROECOL - Agroecological Animal Production.

Bardin, Laurence. Content analysis. Ed: Issue 70. Portugal. 2002.

Blench, R. "You can't go home again": pastoralism in the new millennium. FAO Report. 2001.

Brazil. Ministry of the Environment. Pampa: Knowledge and discoveries about a Brazilian biome. 2015. Available at: <https://www.mma.gov.br/biomas/pampa>. Accessed on: 18 jul. 2020.

Brazilian Institute of Geography and Statistics / Municipal livestock research - IBGE / PPM. Number of herds by type of herd. Available at: <https://sidra.ibge.gov.br/tabela/3939>.

Coppock, D. L. et al. 2017. Rangeland Systems in Developing Nations: Conceptual Advances and Societal Implications. In: Briske, David D. (eds). *Rangeland Systems: Processes, Management and Challenges*. Springer Open, 2017. pp. 569-641.

Nabinger, C; and Jacques A. V. Á. 2017. The issue of livestock production in the native field of the Pampa biome: General context. In: Carvalho, P. C.de F. et al (eds.). *Nativão: 30 years of research in the native field*. UFRGS. Porto Alegre-BR, pp.1-14.

Dong, S., Tourrand, J. F., Kassam, K.S; Boone, R.B. 2016. (eds.) *Building Resilience of Human-Natural Systems of Pastoralism in the Developing World: Interdisciplinary Perspectives*. Springer. Switzerland

Fontana, V. and Reed, S. More degraded than Cerrado and Amazon, Pampa is the least protected biome in the country. Available at: <https://www.nationalgeographicbrasil.com/meio-ambiente/2019/10/degradacao-cerrado-amazonia-pampa-bioma-brasil-rio-grande-do-sul-vegetacao>.

Gerhardt T. E; Ramos, I. C. A.; Riquinho, D. L.; Santos, D. L. Structure of the research project. In: Research methods. Gerhardt, T. E.; Silveira, D. T. (eds). URFGS. 1st Ed. Porto Alegre, 2009.

Kauffman JB, Pyke D. 2001. Range ecology, global livestock influences. Pages 33–52 in Levin S, ed. Encyclopedia of Biodiversity, Vol. 5. San Diego: Academic Press.

Mapbiomas. Annual Coverage and Land Use Mapping Project in Brazil. Available at: <https://platform.mapbiomas.org/>. 2020.

Moreira, J.G., Conterato, M. A., Matte, A. 2019. Productive transformations and land use changes in the brazilian Pampa. Campo - Território: Revista de Geografia Agrária. 14. 179-207.

Otte, J., Roland-Holst, D., Pfeiffer, D., Soares-Magalhaes, R., Rushton, J., Graham, J., and Silbergeld, E. (2007). *Industrial livestock production and global health risks.* Pro-poor livestock policy initiative (PPLPI): A living from livestock. Rome, Italy: Food and Agricultural Organisation of the United Nations.

Rajão, R. et al. The rotten apples of Brazil's agribusiness**.** Science Magazine. 2020. 369: 246-248.