Analysis of the New Frontier of Soybean Production in Brazil

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Abstract. Brazil is one of the main country growers in soybean production. With the purpose to maintain this position, the production is going to the new areas in the country seeking the low cost of land. In this sense, the Piaui state appears as a new frontier of growth. However, it causes a direct impact on infrastructure in the corridor of exportation. The study intends to analyze the production of soybean in Piauí state, Brazil, and the main logistics barriers. The work was carried out through qualitative research that allowed to characterize the producers regarding the size, productivity, costs, the origin of the input, transport, and issues in logistics infrastructure. The results showed the competitive advantages of soybean production in Piaui, as well as the main challenges pointed out by producers.

Keywords: Food Supply Chains · Production Management · Soybean · Logistics

1 Introduction

The agricultural sector is essential to the Brazilian economy. In 2017, the agribusiness supply chains are responsible for 23% of country GDP [1]. Among the several products commercialized, the country is the world second soybean grower facing the US for the first place. Moreover is the largest soybean exporter [2]. However, soybean market are controlled by large multinational corporations that operate all stages of the production chain, offering seeds, pesticides, machinery, fertilizers, transport, and storage. Therefore, they have direct influence over the costs and competitiveness of commodities in all the countries.

Soybean production in Brazil is controlled by Archer Daniels Midland, Bunge, Cargill, Louis Dreyfus, CofCo, Glencore. Moreover in Brazil we have Amaggi, Caramuru, and Algar [3]. The soybean complex comprises a production chain that involves grain production and export, and the processing of the product using a industrial processes called crushing where soybean is transformed in oil and soybean meal [4,5]. Of the crushed grain, approximately 80% is converted to soybean meal and the rest to oil [6].

Among the factors that contribute to the increase the world consumption of soybean is mainly the growing purchasing power of the population in developing countries, which has been causing a change in eating habits. Thus, the exchange of cereals for beef, pork, and chicken is increasingly observed. All of this results in a greater demand for soybean as an ingredient that makes up 70% of the feed for these animals [4]. Soybean meal is the fundamental input for animal production, being used in the feeding of poultry and pigs to produce meat and eggs. The intensification of soybean crushing has caused an increasing link among industry, agriculture and livestock.

All this demand is pressing soybean supply chains to find out new areas of production. In this sense, Piaui emerges due to favorable aspects such as productivity and landing low cost. One of the main areas of production in the south of the state where Uruçui has an important role in the production [7].

This research investigated the soybean production in Piaui to identify productivity, costs, logistics and reason to production to be implemented in that area. To do so, we conducted a survey in 20 farms of the state in the municipalities of Bom Jesus, Ribeiro Goncalves and Uruçuí.

2 Methodology

The present study consists of a survey of soybean growers in Piaui state, Brazil. The investigation was based on the dialectical method[8] which seeks to understand the causes of a process in a way to argue, analyze, and promote a synthesis, whose technical procedures were based on bibliographic, documentary and survey research.

The survey took place through interviews with a structured questionnaire. Table 1 presents a summary of the subjects covered in the survey, which accounts for a total of 18 questions.

Table 1: Content of Survey

Questions By Subject	**Quantity**
Characterization	4
Agricultural Inputs	2
Suppliers	2
Storage and Transport	2
Advantages of Soybean Production	3
The role of Companhia Nacional de Abastecimento	1
Soybean Price	1
Logistics	2
Profitability	1

The questionnaire was applied between January and February 2020 with the 20 soybean producers in Piaui. Among them, 18 farms are located in the

municipality of Uruçuí, 1 in Ribeiro Gonçalves and 1 in Bom Jesus, Figure 2. The locations were established based on the availiability of growers to meet the researches. The Uruçuí was the main place due to assistance of local cooperative.

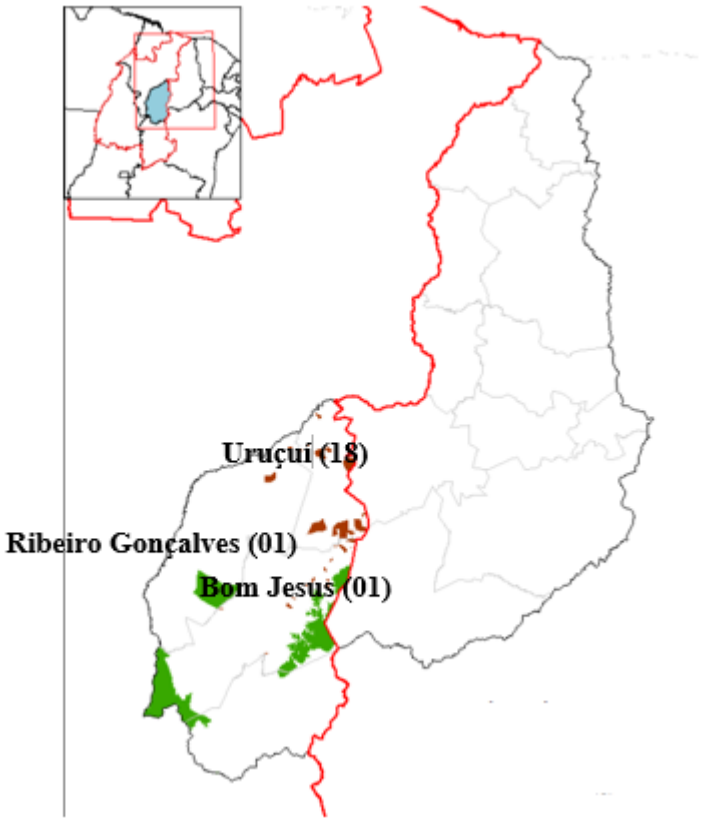

Fig. 1: Municipalities where the Survey was Conducted

3 Results and Discussion

3.1 Productivity and Reasons to Produce in Piaui

The productivity data in the 2017/2018 crop year in Piaui was 3,4 metric tons per hectare [9] while among 20 producers was slightly less, around 3,3 metric tons per hectare. The source of the productivity results is according to the Brazilian organization responsible for providing statistical indicators on agricultural production.

Most parts of the growers are migrants from the south of the country that bring the culture and knowledge of soybean production. The main reason to produce in Piaui according to the survey is the cost of land acquisition and productivity (86%), Figure 3. This result confirm the advance of agriculture production in the state [10].

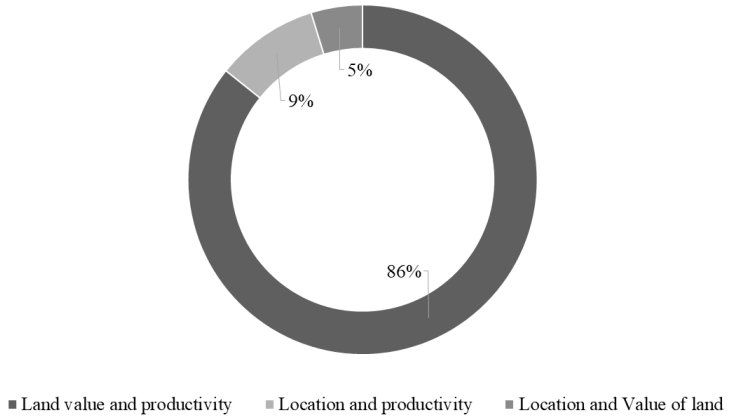

Fig. 2: Benefits of Soybean Production in Piaui

3.2 Costs

The present work identified from the interviewees the perception of the costs of inputs (fertilizers, seeds, fertilizers, and machinery), Figure 3.

On average, the costs of inputs represent 58.75%, where 5 of the 20 interviewed, or 25%, pointed out the lowest percentage of 50% as shown in figure 3. Only one producer indicated a cost of 75% of the total. It is known that these costs are very important to guarantee a margin for growers.The national average cost is 61.6% [11]. This result showed the importance of the area to Brazilian agriculture production.

3.3 Logistics

The studied scenario considers a flow of soybeans through road transport, as it is the only mode of transport used in the operation to the sea port. Located in the North of the region, covering approximately 700 km.

One of the aspects that draw attention in the research is the assessment of road conditions in the savanna of Piaui states. This aspect was highlighted by

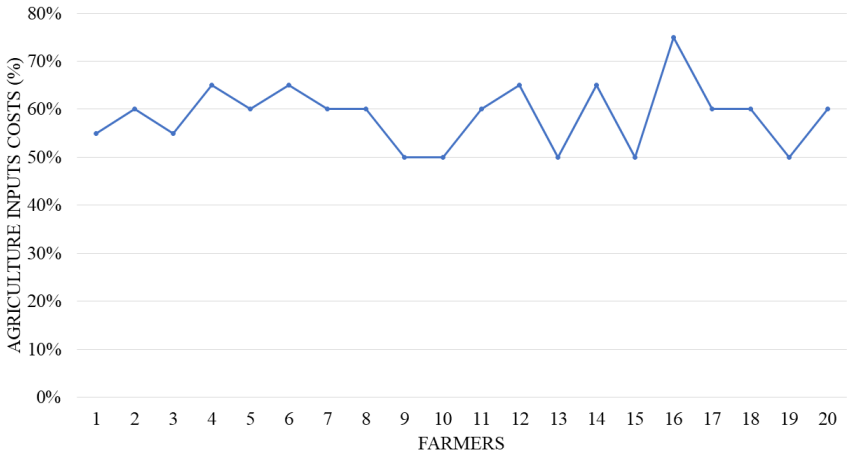

Fig. 3: Percentage of Agricultural Input Costs

all interviewees as the point of greatest logistical di culty for the grower in the region. Around 75% of the growers evaluated the conditions of the soybean roads in Piaui as poor and very bad. Moreover, the other 25% classify the roads as regular. This is a relevant factor in the research because of the logistical costs and waste increase with the compromise of the conditions of the roads, in addition to lagging the service level of the production chain, as the lead time becomes longer.

It is known that there are many unpaved stretches of both state and federal highways, such as BR's 135/324 and PI's 392/397 with an extension of more than 250 kilometers. Figure 4 depicts the reality of one of the main highways in the Piaui region, Transcerrados.

The survey also found that supplier logistics involves only national suppliers, including seeds, manure, machinery, and fertilizers. Part of the transport logistics is carried out with its own eet, about 15% of the Producers. This con guration in uences the cost of production calculated at work. Logistical di culties may be associated with increases in production costs, 75% of the survey a rmed that entry costs are up to 60%, considered high for the segment under analysis. Another point that is highlighted is the susceptibility of inputs to changes in exchange, as they are commodities, subject to changes in the dollar exchange. The literature states an average cost that represents approximately 50%, slightly below what the interviewed producers indicated.

4 Final Remarks

According to a study carried out by Paiva et al. [12], it is noted that the growth in soy production is mainly due to the expansion of the planted area. Productivity

Fig. 4: Piaui Roadways

data collected in our study are in line with the national average. In addition, incentives such as the acquisition value of properties in Piaui states being less costly compared to land prices in other regions of savannahs in the country affects this soybean movement.

The relevance of the research will be given by the size of the area corresponding to the Research Producers equivalent to 150,400 hectares. However, the conclusions of this research cannot be universalized, taking into account that the other locations in the region and in the country they are influenced by other variables that modify the production scenario. Rain is considered the main climatic factor that can limit the production of the grain crop according to its frequency and quantity since the vast majority of soybean crops for grain production are grown in large areas and under rainfed conditions.

It is possible to verify the high size of the enterprises in the region covered in the research, considering that 95% of the properties have more than 6,500 planted hectares. The majority, that is, 75% of the producers work with soy stock on the farm, inducing a policy of storage and the presence of silos to store the grain. The growers mention that they prefer the cultivation of soybean over other crops, due to the greater ease of commercialization, pointed out by 80% of the interviewees. Other justifications are the knowledge of the soybean production process and the productivity achieved in the region.

Finally, the challenges permeate the structural conditions, mainly in the roadway logistics, as the roads do not have asphalt pavement and the access conditions are poor. The factor that only increases distribution costs and stores grain. It can generate a tradeoff, low production cost, and high distribution cost.

References

1. Confederation of Agriculture and Livestock of Brazi: www.cnabrasil.org.br/central-comunicacao/boletins
2. USDA: Oilseeds: world markets and trade (2017), https://apps.fas.usda.gov/psdonline/circulars/oilseeds.pdf
3. Pereira, P.: Novos e velhos atores na soja no centro-oeste e no norte do Brasil. Ph.D. thesis, Federal Fluminense, Rio de Janeiro (2016)
4. Freitas, M.: The soybean crop in Brazil: The increase of the Brazilian production and the emergence of a new agricultural frontier. Enciclopédia Biosfera 7(12) (2011)
5. dos Reis, J.G.M., Amorim, P., Cabral, J.A.S.: Effects of Price and Transportation Costs in Soybean Trade. In: Nääs, I., Vendrametto, O., Mendes Reis, J., Gonçalves, R.F., Silva, M.T., von Cieminski, G., Kiritsis, D. (eds.) Advances in Production Management Systems. Initiatives for a Sustainable World, vol. 488, pp. 563–570. Springer International Publishing, Cham (2016), http://link.springer.com/10.1007/978-3-319-51133-7_67
6. Lourega, L.d.O.: Análise da participação do complexo soja nas exportações do Brasil no período de 2004 a 2014 p. 17 (2015), http://bibliodigital.unijui.edu.br:8080/xmlui/bitstream/handle/123456789/3174/La%C3%ADs%20de%20Oliveira%20Lourega.pdf?sequence=1
7. Silva, A.J.d., Monteiro, M.d.S.L., Barbosa, E.L.: Territorialização da agricultura empresarial em Uruçuí/PI: de "espaço vazio" aos imperativos do agronegócio. Caderno de Geografia 27(1), 138–158 (Nov 2017), http://periodicos.pucminas.br/index.php/geografia/article/view/p.2318-2962.2017v27nesp1p138
8. Sposito, E.S., Oliveira, A.U.d.: Geografia e filosofia: contribuição para o ensino do pensamento geográfico. Ed. UNESP, São Paulo (2004), oCLC: 57522797
9. Companhia Nacional de Abastecimento: portaldeinformacoes.conab.gov.br/index.php/safra-serie-historica-dashboard
10. Flexor, G., Leite, S.P.: Land Market and Land Grabbing in Brazil during the Commodity Boom of the 2000s. Contexto Internacional 39, 393 – 420 (08 2017), http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0102-85292017000200393&nrm=iso
11. Meade, B.: Corn and Soybean Production Costs and Export Competitiveness in Argentina, Brazil, and the United States. Economic Information Bulletin 154, 52 (2016)
12. Paiva, M.d.S., Nagano, M.S., Hongyu, K.: Análise da Expansão da Soja: Uma Aplicação de Análise Multivariada e Redes Neurais Artificiais. Sigmae 8(2), 554–563 (2019), http://publicacoes.unifal-mg.edu.br/revistas/index.php/sigmae/article/view/1035, number: 2