I CONGRESSO INTERNACIONAL
CIÊNCIAS BIOLÓGICAS
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PRODUCTIVE CONSTRAINTS IN THE MUNICIPALITY OF QUIRINÓPOLIS

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ABSTRACT

The article analyzes the productive constraints, limits and opportunities of small-scale agriculture in Quirinópolis-GO, in a context dominated by the sugarcane expansion. It is based on secondary data, literature review and questionnaires applied to small producers, highlighting the use of the soil and the influence of the sugar-alcohol sector.

Keywords: Small-scale agriculture. Sugar and alcohol sector.

INTRODUCTION

This article presents agricultural production, what are the productive constraints and the limits and possibilities of small-scale agriculture in the Municipality of Quirinópolis-GO in a scenario of large sugar-alcohol production. The analysis was structured based on data collected through secondary data, literature review and application of a questionnaire with small producers, seeking to understand aspects such as land use and productive diversity.

The data are presented in the form of tables and graphs, followed by a critical analysis based on the scientific literature and the application of a questionnaire. In addition, the influence of the expansion of the sugar-alcohol sector on small farmers is discussed.

OBJECTIVE

The productive constraints and the limits and opportunities of small-scale agriculture in the Municipality of Quirinópolis-GO were analyzed. Highlighting the indicators of agricultural production in the municipality in the last 20 years.

METHODOLOGY

To carry out this study on the productive constraints in the Municipality of Quirinópolis-GO, a descriptive research was adopted with bibliographic review, analysis of secondary data and application of a questionnaire with small rural producers in the region.

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DATA COLLECTION

Primary data collection was carried out through the application of structured and semi-structured questionnaires with small farmers in the municipality of Quirinópolis-GO. The questionnaires contained mixed questions (open and closed).

The universe of the survey is made up of 711 small rural producers, according to data provided by Emater. To determine the sample size in a statistically representative way, criteria were adopted that consider a confidence level of 90% and a margin of error of 10%. Based on these parameters, the final sample was composed of 63 producers, ensuring that the data collected reflect, in a meaningful way, the reality of the group analyzed.

The choice of these statistical criteria allows for a more accurate analysis of the conditions and challenges faced by smallholders. The sample was defined in order to balance the feasibility of data collection with the reliability of the results, ensuring that the information obtained can be used to understand trends, difficulties and potentialities of this agricultural segment.

The questionnaire was applied in the municipality of Quirinópolis-GO, covering different locations where small rural producers are concentrated. The survey was carried out between January and February 2025, to capture updated information about the reality of these farmers. Data collection was conducted in person, ensuring greater interaction with producers and enabling more detailed and contextualized answers.

The questionnaires were applied in the rural properties of the interviewees, distributed in different regions of the municipality. To reach the sample of 63 small producers, detailed logistical planning was necessary, considering the geographical dispersion of the properties. The visits were previously scheduled whenever possible, with the support of local associations, which help in contacting farmers and identifying the most representative locations.

The researcher used his own vehicle and transportation provided by local partners to travel to the properties. Most of the route was carried out by side roads, some of which had access difficulties due to precarious conditions, such as stretches of land with erosion and flooding in rainy periods. In some cases, it was necessary to park the vehicles at strategic points and continue the route on foot, especially in more remote areas.

The application of the questionnaires followed a semi-structured format, containing closed and open questions. The average application time was 30 to 40 minutes per producer, depending on the level of involvement of the interviewee and the need for clarification of some questions. The reception of farmers was, in general, positive, as many showed interest in reporting their difficulties and expectations in relation to agricultural

production in a scenario dominated by the sugar-alcohol culture.

Among the difficulties encountered in the process, the initial resistance of some producers to answer the questionnaire stands out, due to mistrust about the use of the information collected. However, with the proper explanation of the objectives of the research and the guarantee of confidentiality in the answers, this barrier was gradually overcome. Another challenge faced was the tight schedule of farmers, since many were busy with daily activities on the property, making it necessary to reschedule some interviews.

Even in the face of these obstacles, the application of the questionnaire was successful, allowing the collection of essential data to understand the challenges and opportunities of small rural producers in Quirinópolis-GO in the context of the predominance of sugar and alcohol production in the municipality.

DEVELOPMENT

ECONOMY AND PRODUCTIVE SECTORS

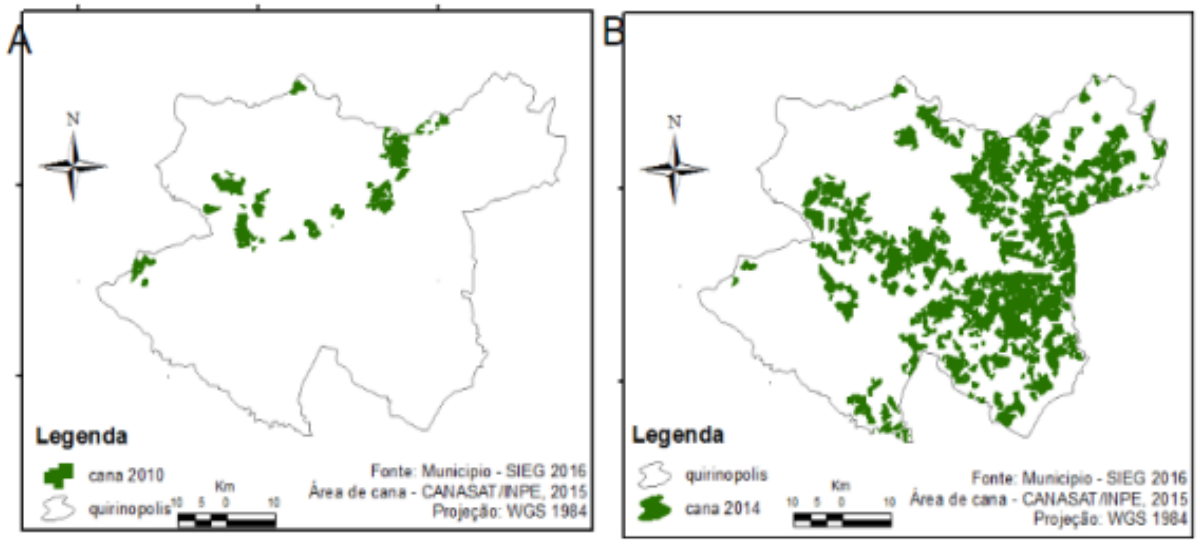
The economy of Quirinópolis, Goiás, is strongly driven by agribusiness, with emphasis on the production of sugarcane, soybeans and corn. In recent years, the municipality has consolidated itself as one of the agro-industrial centers in the state, with growing investments in the sugar-alcohol sector and in the diversification of agricultural production. In 2023, the GDP of Quirinópolis was estimated at R$2.1 billion, distributed as follows: 34.9% in the services sector, 30% in industry, 22.8% in agriculture, and 12.3% in public administration (IBGE, 2023). This economic profile demonstrates the growing participation of the industry, driven by ethanol and bioenergy plants, in addition to the presence of grain processing companies.

The services sector, which leads the composition of the GDP, reflects the expansion of local trade, education and health. Agriculture continues to be an essential pillar, ensuring the productive base for the municipal economy. Public administration, with 12.3% of GDP, continues to play an important role in providing infrastructure and essential services to the population.

For Vieira and Silva (2017), the sugarcane sector is particularly relevant, with the city occupying the fifth place nationally in volume of sugarcane production. According to Torres (2024), sugarcane production has been the main economic activity in Quirinópolis-GO in recent years. Data from the IBGE indicate that, between 2009 and 2021, the municipality stood out as the largest producer of sugarcane in Goiás and, in 2021, it occupied the fourth position in the national ranking. This advance resulted in the rapid occupation of a large

territorial area in the municipality, as illustrated in Figure 01.

FIGURE 01 - Sugarcane cultivation areas in the municipality of Quirinópolis, GO in 2010 (A), and in 2014 (B).



Source: Torres, 2024.

The installation of ethanol and sugar plants from 2006 onwards had a significant impact on the agricultural economy and on the growth of the municipal GDP. Between 2006 and 2021, the GDP of Quirinópolis grew 178.2%, reflecting the expansion of the sugar-alcohol sector and its influence on regional development. In the last five years of this period, the nominal growth rate was 31.3% (IBGE, 2021), evidencing the continuity of this economic advance.

To contextualize this evolution, it is important to compare it with previous periods. Before the arrival of the mills, between 1990 and 2005, the economic growth of the municipality was more modest, during this period, the main economic activity of the municipality was traditional agriculture, with the production of soybeans, corn and beef and dairy cattle. The municipality's tax collection was limited, around R$ 3 million in 2004. With the arrival of the mills in 2007, the local economy underwent a transformation and tax collection quadrupled in a decade, reaching approximately R$ 9 million. As Silva and Almeida (2019) point out, the modernization and industrialization of agribusiness represented a watershed for the local economy, promoting increased productivity and greater dynamism of the labor market.

When comparing with the period from 2010 to 2015, in the IBGE databases, it can be seen that GDP growth remained expressive, although at a more stable pace. According to the National Confederation of Industry (CNI, 2020), the consolidation of the sugar-alcohol sector in this interval strengthened the local economy, but also highlighted challenges such as dependence on monoculture and the need for productive diversification strategies.

Thus, the historical analysis shows that the installation of the mills from 2006 transformed the economic dynamics of Quirinópolis, promoting an accelerated growth of the GDP and consolidating the municipality as a center of the sugar-alcohol sector in the state of Goiás, as shown in table 01. However, as highlighted by Embrapa (2021), it is essential to assess future challenges, such as the need for economic diversification and environmental sustainability in the face of the expansion of sugarcane, ensuring balanced long-term development.

TABLE 01 - GDP of Quirinópolis from 2006-2021.

GDP at current prices	**2006**	**2021**
Retropolated series	339.742,00	2.147.553,13
Closed series	319.004,00	-
GROSS VALUE ADDED AT CURRENT PRICES		
Retropolated series	308.416,00	1.944.936,75
Agricultural	52.337,00	443.389,28
Industry	33.256,00	583.877,83
Services - Exclusive Administration, Defense, Public Education and Health, and Social Security	158.987,00	678.505,37
Administration, Defense, Public Education and Health, and Social Security	63.836,00	239.164,27

Source: IBGE, 2021.

This growth is a reflection of the expansion of agribusiness and the attraction of investments that have improved local infrastructure. With a GDP per capita of approximately R$ 41,843, higher than the state average, the municipality has consolidated itself as an important center in the economy of the Midwest, although it faces challenges related to the cost of living and the social adaptation of rural workers.

AGRICULTURAL INDICATORS IN THE MUNICIPALITY OF QUIRINÓPOLIS-GO

The analysis of agricultural production in Quirinópolis reflects broader trends observed in the state of Goiás, according to the IBGE, especially with regard to the diversification of activities and fluctuations in production over the years. In this context, family farming also plays a fundamental role in the agricultural economy of Goiás, contributing significantly to income generation and supplying the domestic market. Data from the 2023 Statistical Yearbook of Family Farming and the 2023 Agricultural Census highlight the representativeness of this sector, showing that, despite the predominance of large properties and agribusiness, family farming continues to have a significant impact on the state's economy.

In Graph 01, data shows between 1998 and 2023, agriculture in Quirinópolis underwent significant changes, reflecting oscillations in milk production, in the size of cattle,

pigs, and poultry herds. Milk production, for example, grew from 42,000 liters in 1998 to a peak of 55,900 liters in 2006, but from 2013 onwards it began to decline, reaching 24,451 thousand liters in 2016. Although there was a slight recovery in the following years, the volume remained below previous levels, registering 25,400 liters in 2023. This drop may be associated with the reduction in the number of milked cows, which went from 34,000 head in 2006 to 15,680 in 2023, suggesting a possible migration to other agricultural activities or difficulties in the dairy sector.

The cattle herd also showed oscillations over the years. In 1998 and 1999, the municipality had 380,000 head, but in 2005 that number dropped to 298,000, followed by a recovery until 2006 (356,000 head). However, as of 2011, there has been a continuous decline, resulting in 241,299 head in 2023.

In the poultry sector, the data show great variation. The number of chickens increased from 125,000 head in 1998 to a peak of 523,000 in 2003, but fell sharply to 90,000 in 2008. After a significant drop in 2013 (12,000 head), there has been a sharp recovery in recent years, reaching 470,000 in 2022 and remaining at high levels.

Pig farming, on the other hand, had a more stable behavior over time. The number of pigs varied between 10,700 and 13,400 head until 2014, when it began to decline, reaching 7,443 head in 2017 and remaining close to this level until 2023 (7,800 head). This decrease indicates a reduction in interest in pig farming in the region, possibly due to changes in the market or challenges in competitiveness with other regions.

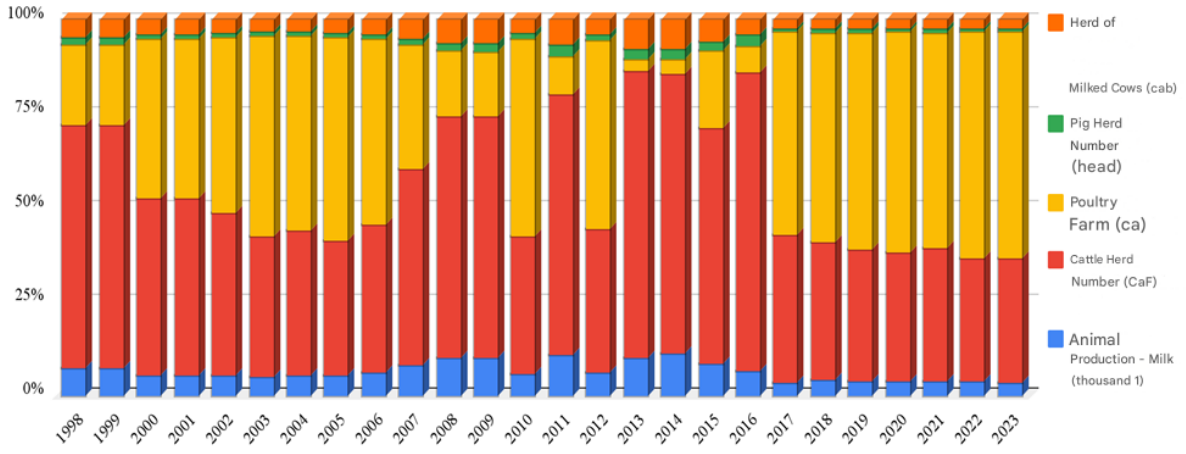
In general, the data reveal a decline in milk production and cattle herd, while poultry farming has shown a strong recovery in recent years. The oscillations observed may be related to factors such as the modernization of agriculture, production costs, changes in the consumer market, and public policies aimed at the agricultural sector. The dynamics of agribusiness in Quirinópolis reflects the constant need for producers to adapt to economic conditions and market demands.

The oscillations in agricultural production in Quirinópolis are related to the expansion of sugarcane. Studies show that, between 2004 and 2010, there was a significant change in land use in the micro-region, with sugarcane occupying about 7.23% of the total area. This growth occurred mainly over pasture areas, but without completely eliminating the production of grains, such as soybeans and corn, which also expanded in the period (Silva et al., 2011)

In addition, the expansion of sugarcane was driven by government incentives and technological advances, which contributed to increased productivity and mechanization in the sugarcane sector. These factors have changed the local economic dynamics, promoting

growth, but also generating challenges for other regional agribusiness production chains (Rodrigues, 2024).

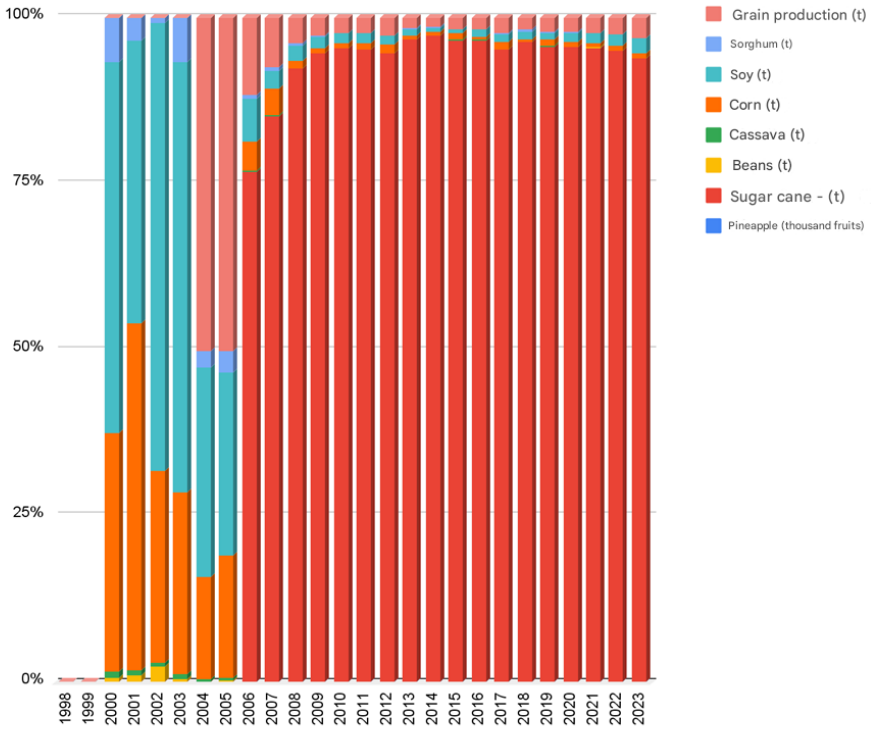
GRAPH 01 - Quantity of Agricultural Production in the Municipality of Quirinópolis, between the years 1998-2023.



Source: IMB, 2025.

In Graph 02, agricultural production in Quirinópolis underwent significant transformations between 1998 and 2023, with emphasis on the expansion of sugarcane, which went from 600,000 tons in 2006 to 6,631,419 tons in 2023, driven by the sugar-alcohol sector. Soybeans also grew significantly, from 70,000 tons in 2000 to 148,800 tons in 2023. On the other hand, traditional crops such as beans suffered sharp declines, with rice disappearing from production after 2014 and beans falling from 2,835 tons in 2002 to 602 tons in 2023. Corn showed oscillations gaining space, reaching 71,150 tons in 2017, driven by the adoption of agricultural technologies. Cassava production remained relatively stable, ranging between 900 and 2,206 tons, while the total grains produced grew from 128,184 tons in 2004 to 218,356 tons in 2023, consolidating the municipality as a dynamic and constantly modernizing agricultural hub.

GRAPH 02 - Quantity of Agricultural Production (Quantity Produced p/t) of the Municipality of Quirinópolis, between the years 1998-2023.



Source: IMB, 2025.

There were changes in the economic structure of the municipality, which were felt especially in the agricultural sector, in the labor market, in infrastructure and in socio-environmental aspects, these changes are:

With the installation of the mills, the value of sugarcane production in the municipality has grown 94.9% in recent years, evidencing the influence of the sector on the local economy and, consequently, on the price of agricultural land. In addition, municipal revenue increased by 400% in just over a decade, driven by the growth of sugar-energy activity (Diniz, 2024). Quirinópolis began to concentrate on the cultivation of sugarcane, promoting a process of agricultural specialization. This movement resulted in a significant appreciation of land, driven by the growing demand of the sugar and alcohol industry.

There was also a significant increase in job creation with the installation of sugar and alcohol plants. According to Quintana-Sequeira (2023), the sugar-energy industry in Quirinópolis has experienced variations in job creation over the years. At times of peak production, the number of direct and indirect jobs reached almost 10 thousand in the municipality, according to local information, in 2017. During this period, the municipality experienced significant growth in the agricultural sector, especially due to the expansion of agro-industry, agriculture, and livestock activities. The high demand for labor for harvesting and processing activities, added to the presence of large companies in the sector, resulted

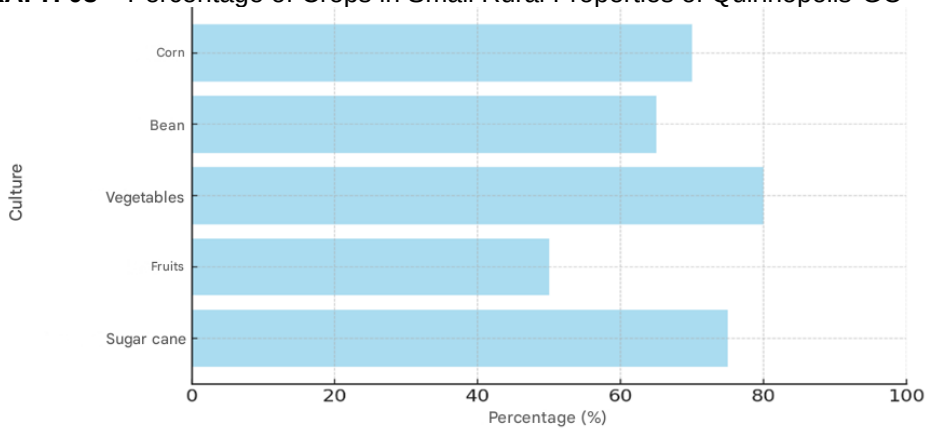
in a high number of jobs in the city. This growth is typical of crop expansion cycles, which generate not only jobs in the field, but also in related areas, such as transportation, logistics, trade, and service provision. However, it has currently stabilized at around 3 thousand vacancies, reflecting a balance in the sector in the face of market fluctuations and technological innovations that have reduced the need for manual labor. However, the seasonality of the sugarcane harvest impacted the stability of jobs.

Infrastructure development and expansion of services, the need to drain production and the arrival of new workers encouraged improvements in local infrastructure, such as paving roads and strengthening transport networks. Santos and Almeida (2018) point out that "the plants contributed directly to the development of infrastructure, with investment in roads and essential services for the population, attracting new commercial establishments and improving the quality of life in the municipality" (Santos & Almeida, 2018, p. 60);

Environmental impacts and the adoption of sustainable practices, the expansion of sugarcane cultivation has also brought environmental challenges, such as deforestation and increased water consumption for irrigation. Some mills and the local government have begun to adopt sustainable practices to minimize these impacts, such as the use of technologies that allow the reuse of water in the industrial process. Souza and Carvalho (2020) state that "sustainability in sugarcane production in Quirinópolis has become a growing concern, leading to actions to mitigate the environmental impacts of the sector's expansion" (Souza & Carvalho, 2020, p. 50).

SMALL-SCALE AGRICULTURE IN THE MUNICIPALITY OF QUIRINÓPOLIS – GOIÁS

GRAPH 03 – Percentage of Crops in Small Rural Properties of Quirinópolis-GO



Source: Developed by the author, 2025.

This imposes challenges on small-scale agriculture. However, crop diversification is key to ensuring the economic and environmental sustainability of smallholdings. Next, we

discuss the importance of each crop grown in the region.

Maize (68.7%)

Corn is one of the most cultivated crops, due to its versatility and demand for both human consumption and animal feed. Corn can be a viable alternative in crop rotation, contributing to soil improvement and pest reduction. According to Souza et al. (2021), agricultural diversification with corn allows greater economic resilience for small producers.

Beans (66.7%)

Beans are one of the main foods in the Brazilian diet and, therefore, have a consolidated market. Its small-scale production is feasible and can be integrated into agroecological systems. In addition, beans improve nitrogen fixation in the soil, reducing the need for chemical fertilizers (SANTOS et al., 2020).

Vegetables (87.3%)

Vegetables are the most expressive crop among small producers due to the high demand in the local market and the possibility of production in small areas. They allow for frequent harvests and generate continuous income. In addition, they are essential for the food security of the local population (OLIVEIRA et al., 2022).

Fruits (46.0%)

Fruit cultivation represents an important opportunity for smallholder farmers, especially when directed to regional markets and institutional programs, such as the Food Acquisition Program (PAA). Diversification of production with fruit growing can improve the income stability of family producers (MACHADO et al., 2021).

Sugarcane (22.9%)

Unlike large producers, who have a mechanized structure and extensive cultivated areas, small sugarcane producers in Quirinópolis face challenges such as limited access to credit, less capacity to invest in technology and difficulties in negotiating prices. Many of these farmers adhere to the model of supply contracts with the mills, thus ensuring the commercialization of their production. These contracts may include technical support from the mills, supply of inputs and payment terms adjusted to the production cycle.

Another common model is land leasing, in which small producers cede their properties to large mills or larger farmers in exchange for a fixed income or a percentage of

production. This model, although it offers financial stability in the short term, can limit the productive autonomy of family farmers, who end up depending on the pricing policy and the conditions imposed by the mills.

In addition, there are small producers who grow sugarcane on their own properties, without direct ties to the mills, selling their production to intermediaries or negotiating directly in the market. However, this alternative may be less advantageous due to price fluctuations and the logistical difficulties involved in delivering production.

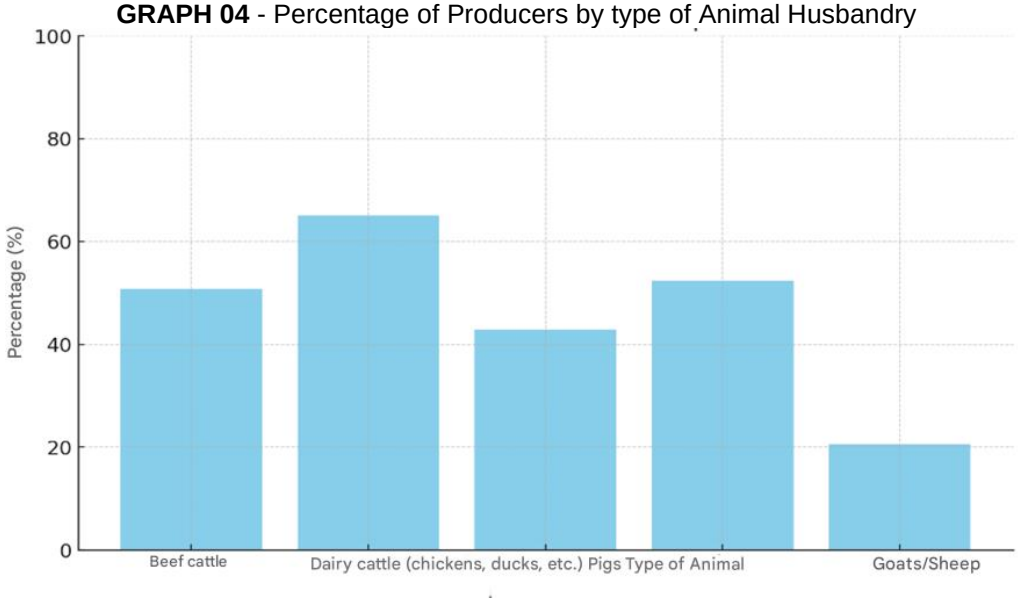
To strengthen the participation of small producers in the sugar-energy sector of Quirinópolis, it is essential that public policies encourage access to credit, technical assistance and infrastructure.

In addition, cooperativism models could increase the bargaining power of these farmers, allowing for better contractual conditions and greater competitiveness in the market.

Livestock plays a relevant role in the economy of small rural properties in Quirinópolis, complementing agricultural production and ensuring the diversification of activities. As shown in graph 04.

LIVESTOCK IN THE MUNICIPALITY OF QUIRINÓPOLIS – GOIÁS

GRAPH 04 - Percentage of Producers by type of Animal Husbandry



Source: Developed by the author, 2025.

However, there are opportunities that can be explored by small producers in the context of productive diversification and the valorization of short marketing chains. Animal husbandry, as demonstrated by the data collected, represents a viable strategy to supplement income, especially in the production of milk and meat for the local market.

CHALLENGES AND OPPORTUNITIES FOR SMALLHOLDER AGRICULTURE

In view of the scenario presented, it is evident that small farmers face a series of structural challenges that limit their competitiveness in the face of the large sugar and alcohol production predominant in the region of Quirinópolis-GO.

However, some opportunities can be explored. The wide coverage of electrification and road infrastructure represents a positive point, enabling investments in agricultural mechanization and efficient transportation of production.

According to Delgado (2012), the modernization of family farming must be accompanied by measures that ensure equity in access to resources and infrastructure, preventing small producers from being excluded from the productive and commercial processes dominated by large-scale agribusiness. Thus, it is essential that the government and entities in the agricultural sector invest in actions that promote the inclusion and strengthening of small-scale agriculture, ensuring its sustainability and economic viability in the long term.

FINAL CONSIDERATIONS

This article allowed us to understand what are the productive constraints and the challenges and opportunities facing small-scale agriculture in the Municipality of Quirinópolis-GO, especially in a context of great expansion of sugar and alcohol production. The data collected showed that small rural producers face significant difficulties related to competition with large enterprises in the sugar-alcohol sector.

However, the study also revealed opportunities to strengthen small-scale agriculture in the municipality, such as productive diversification, organization in cooperatives, and the adoption of agroecological practices that add value to products.

Given this scenario, it is essential to have a strategic look at the balanced development of the municipality, ensuring that the economic growth driven by the agroindustry does not occur to the detriment of small producers, but in a complementary and sustainable way.

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