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CAJÁ AS A VECTOR FOR DEVELOPMENT: SOCIOECONOMIC IMPACTS IN THE BOQUEIRÃO REGION OF CAJAZEIRAS, PARAÍBA

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ABSTRACT

Objective: This study aims to analyze cajá (Spondias mombin L.) as a vector of local development, seeking to understand its socioeconomic impacts in the region of Boqueirão de Cajazeiras, Paraíba, Brazil.

Method: This is a qualitative study with a descriptive and exploratory approach, conducted with 26 members of the Association of Rural Producers of the Boqueirão de Cajazeiras Region (ASPRUBOC). Data collection was

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carried out through a structured questionnaire applied directly to the members, and the data were analyzed using simple descriptive statistics, organized into tables and charts.

Results and Discussion: The results indicate that the cajá production chain contributes significantly to the generation of supplementary income, the strengthening of social organization, and the permanence of families in rural areas, although it still faces limitations related to income levels, educational attainment, and access to markets.

Research Implications: The findings support the formulation of public policies, technical assistance initiatives, capacity-building actions, and the strengthening of rural associativism.

Originality/Value: The study adds value by empirically highlighting the role of cajá as a strategy for territorial socioeconomic development in the semi-arid region of Paraíba.

Keywords: Cajá, Local Development, Family Farming, Rural Associativism, Semi-Arid Region.

O CAJÁ COMO VETOR DE DESENVOLVIMENTO: IMPACTOS SOCIOECONÔMICOS NA REGIÃO DE BOQUEIRÃO DE CAJAZEIRAS-PB

RESUMO

Objetivo: O objetivo deste estudo é analisar o cajá (Spondias mombin L.) como vetor de desenvolvimento local, com o intuito de compreender seus impactos socioeconômicos na região de Boqueirão de Cajazeiras-PB.

Método: Trata-se de uma pesquisa qualitativa, de natureza descritiva e exploratória, realizada junto aos 26 associados da Associação dos Produtores Rurais da Região de Boqueirão de Cajazeiras (ASPRUBOC). A coleta de dados ocorreu por meio de questionário estruturado, aplicado diretamente aos associados, e os dados foram analisados mediante estatística descritiva simples, com organização em tabelas e gráficos.

Resultados e Discussão: Os resultados evidenciam que a cadeia produtiva do cajá contribui de forma significativa para a geração de renda complementar, fortalecimento da organização social e permanência das famílias no meio rural, embora ainda enfrente limitações relacionadas à renda, escolaridade e acesso a mercados.

Implicações da Pesquisa: Os achados subsidiam ações de políticas públicas, assistência técnica, capacitação e fortalecimento do associativismo no meio rural.

Originalidade/Valor: O estudo agrega valor ao evidenciar empiricamente o papel do cajá como estratégia de desenvolvimento socioeconômico territorial no semiárido paraibano.

Palavras-chave: Cajá, Desenvolvimento local, Agricultura familiar, Associativismo rural, Semiárido.

CAJÁ COMO VECTOR DE DESARROLLO: IMPACTOS SOCIOECONÓMICOS EN LA REGIÓN DE BOQUEIRÃO, EN CAJAZEIRAS, PARAÍBA

RESUMEN

Objetivo: El objetivo de este estudio es analizar el cajá (Spondias mombin L.) como vector de desarrollo local, con el fin de comprender sus impactos socioeconómicos en la región de Boqueirão de Cajazeiras, estado de Paraíba, Brasil.

Método: Se trata de una investigación cualitativa, de carácter descriptivo y exploratorio, realizada con 26 asociados de la Asociación de Productores Rurales de la Región de Boqueirão de Cajazeiras (ASPRUBOC). La recolección de datos se llevó a cabo mediante un cuestionario estructurado, aplicado directamente a los asociados, y los datos fueron analizados mediante estadística descriptiva simple, organizados en tablas y gráficos.

Resultados y Discusión: Los resultados evidencian que la cadena productiva del cajá contribuye de manera significativa a la generación de ingresos complementarios, al fortalecimiento de la organización social y a la

permanencia de las familias en el medio rural, aunque todavía enfrenta limitaciones relacionadas con los niveles de ingreso, la escolaridad y el acceso a los mercados.

Implicaciones de la investigación: Los hallazgos respaldan acciones de políticas públicas, asistencia técnica, capacitación y fortalecimiento del asociativismo en el medio rural.

Originalidad/Valor: El estudio aporta valor al evidenciar empíricamente el papel del cajá como estrategia de desarrollo socioeconómico territorial en el semiárido paraibano.

Palabras clave: Cajá, Desarrollo Local, Agricultura Familiar, Asociativismo Rural, Semiárido.

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1 INTRODUCTION

The Northeast region of Brazil is notable for being home to the Caatinga biome, one of the most extensive and unique in the country. The Caatinga covers approximately 862,818 km², which corresponds to about 10.1% of the country's total area, encompassing the states of Alagoas, Bahia, Ceará, Maranhão, Pernambuco, Paraíba, Rio Grande do Norte, Piauí, Sergipe, and northern Minas Gerais. It is a biome marked by high biodiversity and specific ecological adaptations to semi-arid conditions (Silva et al., 2022).

In this context, the Caatinga enables the cultivation and extraction of various native fruit species, which play an important role in food security and income generation for farmers and their families in the Brazilian semi-arid region. According to Embrapa (2023), these species are an important food supplement and represent economic opportunities associated with the valorization of regional products.

Among these species, the cajazeira (*Spondias mombin L.*) stands out, a large tree that can reach more than twenty meters in height, characterized by a trunk with thick, grayish, rough, and cracked bark (Soares et al., 2006). The fruit, known as cajá, has an intense yellow color and juicy mesocarp and is widely used in the production of pulps, juices, jams, ice creams, and liqueurs. This diversity of uses gives cajá significant economic and social potential, especially in rural contexts (Freitas, 2017).

In addition to its commercial value, cajá offers significant possibilities for the reuse of inputs after industrial processing. The use of organic waste, such as pits, contributes to environmentally sustainable practices, with positive impacts on soil conservation and the reduction of environmental liabilities (Oliveira, 2023). Thus, the cajá production chain articulates economic, social, and environmental dimensions of sustainable development.

From this perspective, the Association of Rural Producers of the Boqueirão de Cajazeiras Region (ASPRUBOC), located in the hinterland of the state of Paraíba, stands out for incorporating principles of social, economic, ecological, and territorial sustainability. The association's activities involve the participation of the local community, the generation of income through the commercialization of cajá, the reuse of pits to prevent soil degradation and nutritional impoverishment, as well as contributing to the reduction of rural exodus by strengthening the permanence of families in the countryside.

ASPRUBOC is located in Sítio Cochos, in the rural area of the municipality of Cajazeiras, and carries out its activities in partnership with the Santa Maria University Center (UNIFSM), the Maria José Batista Lacerda Institute (IMJOB), and with the support of the Public Ministry of Labor of Paraíba (MPT-PB). This institutional articulation supports a project focused on the production of cajá pulp and the reuse of waste, with the purpose of reducing negative environmental impacts and, simultaneously, promoting improved quality of life and increased income for members and farmers in the surrounding area.

In this context, the objective of this article is to analyze cajá as a vector for local development, examining its socioeconomic impacts in the Boqueirão de Cajazeiras region, in the municipality of Cajazeiras. We seek to understand how production and commercialization contribute to income generation, the revitalization of the local economy, and the strengthening of family farming, as well as to identify challenges and potentialities associated with the production chain of this crop in the context of regional socioeconomic development.

2 METHODOLOGY

The research is qualitative, descriptive, and exploratory in nature. The qualitative approach was adopted because it allows for an understanding of the meanings, perceptions, values, and social practices of the subjects involved, as recommended by Minayo (2009), enabling the analysis of dimensions of reality that are not restricted to numerical measurement.

The exploratory nature contributed to broadening knowledge about the object under investigation and deepening familiarity with the phenomenon studied, while the descriptive aspect enabled the observation, recording, and interpretation of facts without interference from the researcher (Gil, 2010).

The study was conducted in the district of Engenheiro Ávidos (Boqueirão), located in the rural area of the municipality of Cajazeiras, in the state of Paraíba. The municipality has a

territorial area of 562.703 km² and an estimated population of 63,239 inhabitants, according to data from the Brazilian Institute of Geography and Statistics (IBGE, 2025).

The choice of location is justified by the socioeconomic relevance of the cajá production chain in the region and the organized activities of rural producers, which favors the analysis of the fruit as a vector for local development.

The research population consisted of the members of the Association of Rural Producers of the Boqueirão de Cajazeiras Region (ASPRUBOC), totaling 26 members. Considering the small number of participants, the sample corresponded to the entire population, covering 100% of active members.

Only members who were up to date with their obligations to the association and who formally agreed to participate in the research were included in the study, while inactive members or those who did not agree to participate in the study were excluded.

A structured questionnaire was used as a data collection tool, administered directly to ASPRUBOC members. This tool allowed for the collection of standardized information about the participants' profiles, production practices, cajá marketing, and perceived socioeconomic impacts. The use of the questionnaire allowed for greater objectivity in the collection of information and contributed to the systematization of the data necessary to achieve the research objectives.

Data analysis was performed using simple statistics, employing descriptive procedures such as absolute and relative frequencies. The results were organized and presented in tables and graphs to facilitate the visualization, understanding, and interpretation of the information collected, allowing the identification of trends, patterns, and relevant relationships between the variables analyzed, in line with the descriptive nature of the study.

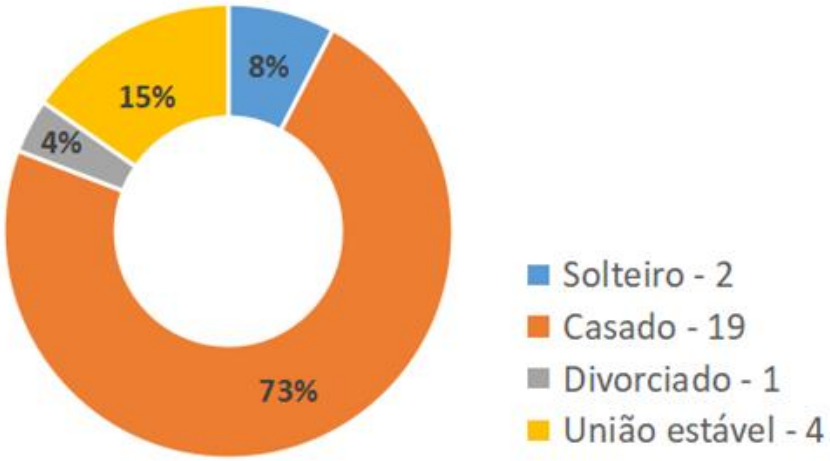
With regard to ethical aspects, the research was submitted to the Research Ethics Committee for review, respecting the ethical principles governing studies involving human subjects. Data collection took place only after the project was approved, registered under number CAAE: 78573724.8.0000.5180. All participants were informed about the study's objectives, the procedures adopted, the confidentiality of the information, and the voluntary nature of participation by signing the Free and Informed Consent Form, ensuring respect for the dignity, autonomy, and rights of the subjects involved.

3 RESULTS AND DISCUSSION

Figure 1 shows the distribution of marital status among members of the Association of Rural Producers of the Boqueirão Region of Cajazeiras.

Figure 1

Marital Status



Source: Research Data, 2024.

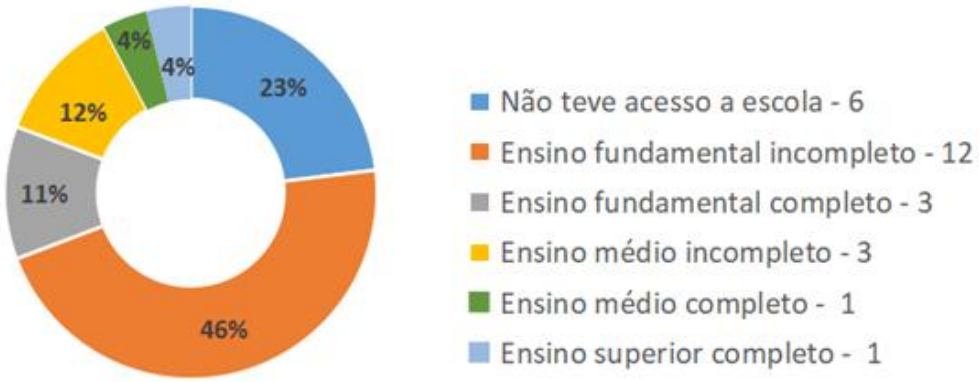
The findings regarding marital status indicate that the majority of members are married, representing 73% of the total number of participants. A smaller proportion are those who live in stable unions (15%), followed by single people (8%) and divorced people (2%), the latter corresponding to a small portion of the population surveyed.

In terms of gender, of the 26 members participating in the survey, 15 are male and 11 are female, corresponding to 57.7% and 42.3% of the total, respectively. These data, collected from the Association of Rural Producers of the Boqueirão de Cajazeiras Region, show a male predominance among members, a result similar to that observed in other studies, in which Ribeiro; Albuquerque & Barros (2021) point out that agricultural activity, especially in rural areas, has a higher participation of men.

Figure 2 shows the level of education of the members.

Figure 2

Level of Education



Source: Research data, 2024.

According to the graph referring to the level of education, it can be observed that the educational profile of the members of the Association of Rural Producers of the Boqueirão Region of Cajazeiras is marked by low levels of formal schooling, with a predominance of incomplete basic education (46%).

In addition, 23% of members stated that they had no access to school, which corresponds to 6 participants, indicating the presence of historical processes of educational exclusion in rural areas.

Regarding those who completed elementary school, it is observed that 11% of the members, corresponding to 3 participants, reached this level of schooling, while another 12%, also equivalent to 3 members, have incomplete secondary education. These data indicate that some of the members managed to advance in their schooling, even without completing higher levels of formal education. In turn, the highest levels of education are underrepresented: only 4% of members completed high school, totaling one participant, and another 4% have completed higher education, also represented by one member.

This overview shows that, although there are isolated cases of higher education, most members are concentrated at the lowest levels of education, which can directly impact management capacity, productive organization, access to public policies, and the adoption of technological innovations. At the same time, the presence, albeit a minority, of members with a high school diploma and college degree can represent a strategic potential for the

dissemination of knowledge, strengthening of collective management, and mediation of institutional partnerships, provided that it is accompanied by continuing education and contextualized education for the association as a whole.

In this sense, the data highlight the relevance of integrated actions to strengthen education and training, such as literacy programs for young people and adults, short courses, workshops on management and rural entrepreneurship, and partnerships with educational institutions, in order to increase the autonomy of members, improve decision-making processes, and enhance the socioeconomic results of the cajá production chain in the territory.

Figure 3 shows the monthly income of members.

Figure 3

Monthly Income



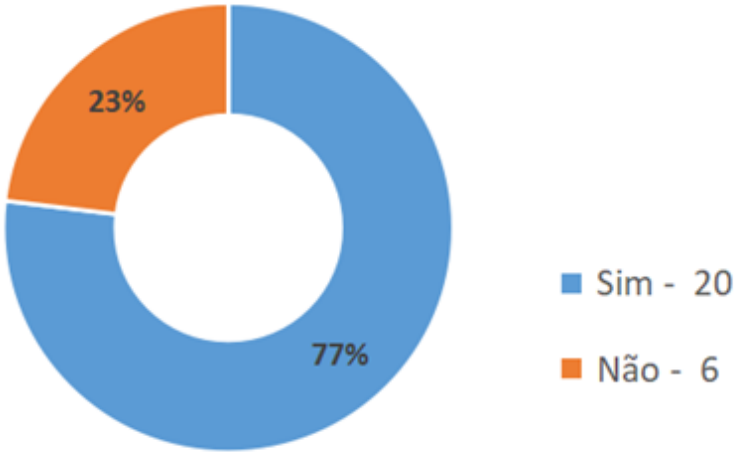
Source: Research data, 2024.

The illustration referring to monthly income indicates that the members of the Association of Rural Producers of the Boqueirão de Cajazeiras Region are predominantly concentrated in the income bracket between one and two minimum wages. This distribution shows relative economic homogeneity among members, revealing a socioeconomic profile marked by limited incomes that are heavily dependent on activities carried out in rural areas. This condition may imply restrictions on access to goods, services, and productive investments, while reinforcing the importance of collective initiatives as a strategy for economic strengthening.

Figure 4 highlights whether members have other sources of income.

Figure 4

Other Sources of Income



Source: Survey data, 2024.

The graph for the variable “Other income” shows that most members of the Association of Rural Producers of the Boqueirão de Cajazeiras Region (77%) have complementary sources of income in addition to their main activity, while 23% depend exclusively on a single source of income. This result indicates the adoption of economic diversification strategies by members, a common feature in rural areas, especially in contexts marked by income limitations and production instability.

Among the main complementary activities developed, we highlight the raising of small and medium-sized animals, such as chickens, pigs, and goats, as well as agricultural production for family consumption and the sale of surplus produce. These practices contribute to the food security of families and the generation of additional resources, albeit in a limited way.

In this sense, it should be noted that, although the income obtained through activities linked to the association is still insufficient to guarantee, on its own, the full subsistence of member families, this income plays an important role as an economic supplement. Thus, the association's activities constitute an important source of financial support, strengthening the permanence of families in rural areas and contributing to local socioeconomic sustainability, even though advances are needed to increase its impact on family income.

Family farming associations also face structural difficulties that compromise their consolidation and continuity, especially in the context of the semi-arid region. As highlighted by Lima & Pase (2025), these organizations deal with limitations related to the scarcity of

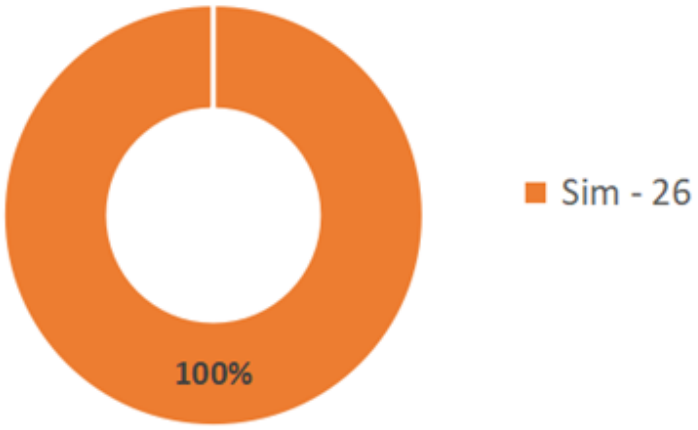
financial resources, the fragility of productive infrastructure, low administrative management capacity, and dependence on public policies that are not always continuous or adequate to local realities.

Furthermore, the lack of permanent technical assistance and the difficulty of accessing formal markets reduce the economic potential of associations, discouraging members and, in some cases, weakening collective participation. The authors emphasize that these obstacles reveal that associations, although fundamental to strengthening family farming, need consistent institutional support, continuous training, and governance strategies that ensure autonomy, economic sustainability, and greater resilience in the face of social, productive, and environmental adversities (Lima & Pase, 2025).

Finally, Figure 5 shows the relevance of associations in social and economic aspects.

Figure 5

Relevance of Associations in Social and Economic Development



Source: Research Data, 2024.

The graph shows unanimous consensus among members of the Association of Rural Producers of the Boqueirão de Cajazeiras Region regarding the relevance of the association for the social and economic development of its members. This perception reinforces the understanding that collective organization is a central instrument for promoting social well-being, strengthening community ties, and expanding economic opportunities in rural areas, especially in contexts marked by structural vulnerabilities and limited access to public policies.

In the Brazilian context, the consolidation of productive activities in family farming is directly related to the degree of organization and collective participation of rural communities. As highlighted by Moreira, Santos & Lucena (2021), solid associative structures favor the

construction of economic autonomy, the capacity for political advocacy, and the strengthening of local governance. In this sense, associativism is a fundamental strategy for addressing common challenges, defending territorial interests, and formulating collective solutions that reinforce identity, cooperation, and social cohesion, especially in semi-arid regions.

Furthermore, the cooperative and associative logic differs from the individualized business model by prioritizing relationships based on solidarity, mutual trust, and a more equitable distribution of the benefits generated. Associations focused on family farming have been widely recognized as effective mechanisms for coordinating access to credit, training, technical assistance, appropriate technologies, and marketing channels (Oliveira & Bertolini, 2022). This organizational capacity contributes not only to reducing costs and strengthening the local economy, but also to the inclusion of farmers in government programs and institutional markets, increasing the economic and social sustainability of the families involved.

In the contemporary context, data presented by the Cooperative Yearbook (2024) show that agricultural cooperatives have established themselves as a strategic axis of Brazilian rural development. By integrating producers into different links in the production chain, this organizational model expands access to inputs, technologies, technical assistance, storage structures, and marketing channels, strengthening the sector's competitiveness, stimulating value addition, and promoting a dynamic of cooperation capable of driving socioeconomic development on a regional scale.

In particular, the Cooperative Yearbook (2024) reveals the significant presence of cooperatives in the states of the northeastern Semi-Arid region, an area historically marked by climatic, social, and structural vulnerabilities. In Paraíba, the sector comprises 24 cooperatives, bringing together 2,541 members and employing 119 workers, generating R$ 68.44 million in revenue and R$ 17.87 million in surpluses.

The indicators for 2024 reinforce this relevance by pointing to the existence of 1,172 agricultural cooperatives in the country, bringing together 1,091,560 members, representing a 4.2% growth over the previous year. In addition, the sector is responsible for generating 268,279 direct jobs, a figure that corresponds to an increase of 4.3% when compared to 2023 (Cooperative Yearbook, 2024).

These results show that agricultural cooperatives remain one of the pillars of the national economy, contributing consistently to income generation, productive inclusion, and the promotion of more sustainable rural development.

4 CONCLUSION

This study aimed to analyze cajá as a vector of local development in the region of Boqueirão de Cajazeiras-PB, based on the identification of its socioeconomic impacts. The results showed that the production and commercialization of cajá contribute to the generation of complementary income, the revitalization of the local economy, and the strengthening of family farming in the investigated territory. In this context, the work of the Association of Rural Producers of the Boqueirão de Cajazeiras Region (ASPRUBOC) proved to be fundamental in structuring the production chain, enabling collective commercialization, and encouraging families to remain in rural areas.

Regarding the profile of ASPRUBOC members, the data indicate a predominance of married individuals, mostly male, with monthly incomes concentrated between one and two minimum wages. It was also observed that most members have complementary sources of income, which shows that the activities carried out within the association, although relevant, do not constitute the main economic base of families, acting predominantly as a financial supplement.

In terms of educational attainment, there was a predominance of low levels of formal education, with a concentration in the early stages of schooling or no schooling at all. This condition may limit access to information, public policies, and more qualified management processes. Thus, the profile identified reveals a socially vulnerable but organized group, whose associative structure plays an important role in the socioeconomic support of families in the rural context studied.

It can therefore be concluded that cajá plays an important role as a vector of local socioeconomic development, linking production, income, and social organization. However, the effects of this activity are still conditioned by structural factors, such as access to markets, the availability of technical assistance, and the continuity of public support policies. Thus, the achievement of the proposed objective highlights the potential of the cajá production chain to boost local development in Boqueirão de Cajazeiras-PB, reinforcing the importance of associativism as a strategy for the valorization of regional products and the strengthening of the rural economy.

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