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POTENTIALITIES AND CHALLENGES OF THE SERTÃO DO ARARIPE - PE TERRITORY: AN ANALYSIS OF PRODUCTION CHAINS AND SUSTAINABLE DEVELOPMENT

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Abstract: The Sertão do Araripe - PE territory, made up of ten municipalities, has great potential for the development of production chains, especially manioc farming. This study analyzes the geographical and demographic characteristics, natural resources and socio-economic aspects of the region, with the aim of identifying sustainable strategies. Cassava is an important source of income, but productivity is limited by the use of traditional techniques and a lack of modern inputs. The region has favorable conditions for expanding production, but faces challenges of poor infrastructure and water availability. Investments in structural improvements, the introduction of modern technologies and sustainable agricultural practices are essential. Training farmers and public policies that encourage sustainable practices can increase productivity. The formation of cooperatives and partnerships between the public and private sectors are key to overcoming challenges and promoting economic growth and improved living conditions in the region. **Keywords:** Sertão do Araripe, Production Chains, Sustainable Development, Natural Resources, Infrastructure.

INTRODUCTION

The Sertão do Araripe Territory - PE is a region made up of ten municipalities: Araripina, Bodocó, Exu, Granito, Ipubi, Moreilândia, Ouricuri, Santa Cruz, Santa Filomena and Trindade. This area is characterized by a diversity of geographic and demographic aspects that give it significant potential for the development of various production chains. The region, located in the semi-arid northeast, has a significant territorial extension, with areas ranging from small to large municipalities in terms of surface area and population. The Territory therefore covers a significant area with diverse potential and challenges.

This study seeks to analyze the potential and challenges faced by the Sertão do Araripe Territory, with a special focus on the dominant and promising production chains, especially manioc farming. The approach adopted includes identifying and analyzing the geographical and demographic characteristics, natural resources, infrastructure and socio-economic aspects of the region. The aim is to develop strategies that promote sustainable development, improving the efficiency of production chains and helping to improve the living conditions of local populations.

Considering the importance of cassava production and its products for the socio-economic development of the Sertão do Araripe - PE territory, this work aims to identify and analyze the geographical and demographic characteristics, natural resources, infrastructure and socio-economic aspects of the region, focusing on the cassava production chain, as well as proposing sustainable development strategies.

MATERIAL AND METHODS

The geographical location of the Sertão do Araripe Territory is strategic, situated between parallels 6°02'12" and 8°19'18" S and meridians 34°45'54" and 38°45'45" W (Table 1).

The study used a multidisciplinary approach to collect and analyze data, combining quantitative and qualitative methods. The methodology included the collection of secondary and primary data, geographical and socio-economic analysis, as well as interviews with local actors. The methodological procedures adopted are detailed below.

Municipality	Distance to the capital (km)	Area (km ²)	Geodetic location
Araripina	680	2.037,39	7°38'049" S; 40°28'062" O
Bodocó	667	1.621,79	7°36'230" S; 40°00'389" O
Exu	615	1.336,79	7°30'500" S; 39°42'330" O
Granite	587	521,69	7°42'440" S; 39°36'520" O
Ipubi	654	693,914	7°39'410" S; 40°08'370" O
Moreilândia	587	404,287	7°38'010" S; 39°33'030" O
Ouricuri	623	2.381,57	7°52'570" S; 40°04'540" O
Santa Cruz	678	1.245,98	7°56'320" S; 36°13'540" O
Saint Philomena	631	1.005,34	8°09'450" S; 40°36'560" O
Trinidad	646	295,765	7°45'550" S; 40°16'060" O

Table 1. Geographical aspects of the municipalities that make up the Sertão do Araripe Territory - PE.

DATA COLLECTION

SECONDARY DATA: DATA WAS COLLECTED FROM A VARIETY OF SOURCES, INCLUDING:

1. Government Reports: Sustainable Rural Development Plans and Agricultural Zoning.
2. Academic and Technical Studies: Scientific articles and technical reports on the region, its geographical, demographic and socio-economic characteristics.
3. Research Institutions: Data from IBGE (Brazilian Institute of Geography and Statistics) and Embrapa (Brazilian Agricultural Research Corporation).

BIBLIOGRAPHIC REVIEW: THE BIBLIOGRAPHIC REVIEW INCLUDED THE COMPILATION OF INFORMATION ON:

1. The region's main production chains.
2. Environmental and ecological aspects of the caatinga biome.
3. Challenges and potential for sustainable development in the northeastern semi-arid region.

PRIMARY DATA: PRIMARY DATA WAS COLLECTED THROUGH QUESTIONNAIRES APPLIED ON SITE:

1. Personalized Questionnaires: Prepared by the Technology and Innovation Center of the Espírito Santo Technology Foundation (NTI/FEST) and applied in 2023. The questionnaires were developed to collect detailed information on the production processes of different sectors involved in the production chains prioritized within each Territory of the Northeast + Sustainable Program. The planning of the field activities developed within the scope of this progression was made possible by a research project previously approved by the Research Ethics Committee (CEP) of the Federal University of Espírito Santo (UFES) under opinion No. 6.084.590.
2. Sample of interviewees: In the Sertão do Araripe Territory - PE, interviews were conducted with 41 people, including 35 producers, 4 representatives of associations and 2 of cooperatives, all involved in the cassava production chain.

DATA ANALYSIS

GEOGRAPHIC AND DEMOGRAPHIC ANALYSIS: USING GEOPROCESSING TOOLS, THE GEOGRAPHIC AND DEMOGRAPHIC ASPECTS OF THE SERTÃO DO ARARIPE TERRITORY WERE ANALYZED:

1. Mapping Cultivation Areas: Identification and mapping of cultivation areas and land use.
2. Spatial distribution: Analysis of the spatial distribution of production chains and existing infrastructure.

SOCIO-ECONOMIC ANALYSIS: EVALUATION OF THE REGION'S SOCIO-ECONOMIC DATA, INCLUDING:

1. Socioeconomic Profile of Farmers: Socioeconomic characterization of farmers and their families.
2. Production Structure: Analysis of the main production chains and their economic relevance.
3. Access to Markets and Resources: Assessment of access to markets, credit and technical assistance.

NATURAL RESOURCE ANALYSIS: EVALUATION OF THE REGION'S NATURAL RESOURCES:

1. Characterization of Soils and Climate: Analysis of soils, climate and hydrography.
2. Limitations and potentialities: Identification of the limitations and potentialities of natural resources for sustainable agriculture.

Based on the analysis of the data collected, sustainable development strategies were

developed for the region:

STRATEGY DEVELOPMENT

STRENGTHENING PRODUCTION CHAINS: PROPOSALS TO IMPROVE THE EFFICIENCY AND SUSTAINABILITY OF EXISTING PRODUCTION CHAINS:

1. Appropriate Technologies: Introduction of technologies to increase productivity and reduce environmental impacts.
2. Training Farmers: Training in sustainable soil and water management practices.

INFRASTRUCTURE AND LOGISTICS: PROPOSALS TO IMPROVE INFRASTRUCTURE AND LOGISTICS:

1. Improving Vicinal Roads: Implementing improvements to vicinal roads and transportation systems.
2. Storage Systems: Development of efficient storage and distribution systems for agricultural products.

PUBLIC POLICIES AND PARTNERSHIPS: RECOMMENDATIONS FOR PUBLIC POLICIES AND PARTNERSHIPS:

- 3.3.1. Incentives for Sustainable Practices: Creation of incentives for sustainable agricultural practices.
- 3.3.2. Partnerships between Sectors: Promoting partnerships between government, the private sector and NGOs for development projects

This methodology aims to provide a comprehensive understanding of the potential and challenges of the Sertão do Araripe - PE territory, enabling the development of effective and

sustainable strategies for economic growth and improved living conditions in the region.

RESULTS AND DISCUSSION

The geographical position of the Sertão do Araripe - PE territory gives the region a characteristic climate, with high average annual temperatures ranging from 22 to 30°C and irregular rainfall, ranging from 400 to 800 mm per year in the drier inland regions, and can exceed 1,600 mm on the wetter coast. The geomorphology is marked by diversified reliefs, soils of different compositions and a predominantly caatinga biome, which directly influences local farming activities

The study of the potential and challenges faced by the Sertão do Araripe Territory - PE revealed important aspects of cassava farming, which is one of the region's main production chains. The analysis showed that cassava plays a central role in the local economy, both for domestic consumption and for marketing, and is a significant source of income for many family farmers.

The research showed that the majority of cassava producers in the region use traditional cultivation techniques, which, although environmentally sustainable, limit productivity and the competitiveness of products on the market. Average productivity is relatively low compared to other regions where more advanced agricultural techniques are employed. This is partly due to the lack of access to modern agricultural inputs and adequate technical training. The introduction of improved cassava varieties and the adoption of integrated pest management practices are solutions that can significantly increase farmers' productivity and profitability.

Another important point identified in the analysis was the region's potential for expanding cassava production. The geographical location and climatic characteristics of the Territory are favorable to cassava cultivation,

since the plant is well adapted to semi-arid soil and climate conditions. The expansion of cassava farming can be facilitated by the creation of agricultural hubs with adequate infrastructure for processing and marketing the products. In addition, the promotion of sustainable agricultural practices can guarantee the conservation of natural resources and long-term economic viability.

However, poor infrastructure, especially in terms of side roads, represents a significant challenge. Poor transportation routes make it difficult to transport agricultural produce, resulting in high costs and considerable post-harvest losses. Investments in improving roads and building adequate storage systems are essential for reducing transportation costs and improving the competitiveness of cassava products on the market.

The analysis also highlighted the importance of improving cassava producers' access to more lucrative markets. Currently, many farmers face difficulties in marketing their products due to a lack of market information and efficient marketing networks. The creation of regional fairs and participation in national events could increase the visibility of the region's products. In addition, the implementation of digital platforms for marketing can connect local producers to consumers in other regions, broadening the market's reach.

One of the biggest challenges facing manioc farming in the Sertão do Araripe Territory is the limited availability of water, especially during periods of prolonged drought. The adoption of efficient irrigation techniques and the sustainable management of water resources are crucial to ensuring the continuity of agricultural activities. Water collection and storage projects, such as the construction of cisterns and underground dams, can make a significant contribution to farmers' water security.

Sustainable development strategies for cassava farming include training farmers in advanced production techniques and introducing appropriate technologies. Continuous training through rural extension and technical assistance programs can help farmers improve the productivity and sustainability of their farming practices. Partnerships with research institutions and universities are key to promoting technology transfer and the development of new agricultural practices adapted to local conditions.

In addition, the creation of public policies that encourage the adoption of sustainable practices and the conservation of natural resources is essential. Tax incentives and specific credit lines for sustainable agriculture can motivate producers to adopt new technologies and practices. Strengthening policies to support family farming can contribute to the social and economic inclusion of small farmers, ensuring that they have access to the resources they need to improve their production practices.

The formation of cooperatives and producer associations is an important strategy for improving the organization of production and collective bargaining. Cooperatives can facilitate access to inputs at more competitive prices, as well as improving the conditions under which products are sold. The creation of cooperation networks between different

production chains can increase the region's economic resilience and promote the diversification of production.

CONCLUSION

Cassava farming in the Sertão do Araripe Territory - PE has great potential for development, but faces significant challenges related to infrastructure, water availability and access to markets. This study highlights the need to invest in structural improvements, such as roads and storage systems, as well as promoting the adoption of modern technologies and sustainable agricultural practices. Training farmers, along with creating favorable public policies and strengthening cooperatives, can increase the productivity and sustainability of cassava farming, contributing to economic growth and improving the quality of life in the region. Cooperation between the public and private sectors is essential to overcome the challenges and ensure a prosperous future for manioc farming and the farmers of the Sertão do Araripe.

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