Journal of Agricultural Science; Vol. 14, No. 3; 2022
ISSN 1916-9752 E-ISSN 1916-9760
Published by Canadian Center of Science and Education

Management of Açai Areas in the Sustainability-Oriented Supply Chain in the Municipality of Abaetetuba-Pará

Eldilene da Silva Barbosa[1], Herdjania Veras de Lima[1], Leila Marcia Sousa de Lima Elias[2], Jamile Carla Oliveira Araújo[1] & Artur Vinícius Ferreira dos Santos[3]

[1] Federal Rural University of the Amazon, Belém, Pará, Brazil

[2] Federal University of Pará, Belém, Pará, Brazil

[3] Federal University of Pará, Ananindeua, Pará, Brazil

Correspondence: Eldilene da Silva Barbosa, Federal Rural University of the Amazon, Belém, Pará, Brazil. Tel: 55-91-98958-0375. E-mail: eldilene.barbosa@gmail.com

Received: December 9, 2021 Accepted: January 31, 2022 Online Published: February 15, 2022

doi:10.5539/jas.v14n3p164 URL: https://doi.org/10.5539/jas.v14n3p164

Abstract

The objective of this work is to characterize the areas of Açaí management focused on sustainability and identify impacts caused by its exploitation, in the municipality of Abaetetuba (Pará), Brazil. Therefore, information was collected on the Açaí management system, showing and verifying the impacts of production on the continuity of production based on sustainability. As the methodology, a documental analysis was carried out, which was done through research carried out and data from IBGE (Brazilian Institute of Geography and Statistics) and BASA (Amazon Bank S.A.) in PRONAF (National Program for Strengthening Family Agriculture), INCRA (National Institute of Colonization and Agrarian Reform) and through literature: articles, theses, dissertations, etc. The considerations point out the impacts that intensive management can generate on production and that the use of traditional management that has lesser impacts can ensure less impact on the environment and generate a balance in production, contributing to productive maintenance besides reducing impacts on the environment, providing local farmers with a capacity for sustainability, as it aids families socially, strengthening the economy and balancing the environment.

Keywords: Açaí, management, supply chain, sustainability

1. Introduction

The obstacle that the Brazilian market faces regarding social, economic, environmental, and technological factors, has generated a reflection on the small and medium producers who are part of the country's economic construction (Gomes et al., 2020). They seek to guarantee production in order to maintain a balance in sustainability, to guarantee its market value. As their goal is to remain in such a competitive market, small producers seek to strengthen themselves by creating small groups bearing in mind a balanced distribution in economic, social, and environmental development (Araújo et al., 2014).

Sustainable development has become a major challenge for the global market in the last 20 years to make companies, industries, and rural producers maintain their production, with a balanced vision between the pillars of "social, economic and environmental", to maintain equity between production and commercialization (Adams et al., 2020). This direction still happens, with the thought of creating a sustainable production chain that can guarantee the activities and the future society and with this rethinking how to conduct production (Bolton et al., 2020).

As the technology has progressed in equipment and/or processes, there is a trend in promoting the market and make producers increasingly competitive, as the application of new technologies increases production capacity and reduces impacts on the environment (Santos et al., 2012; Da Silva Melo et al., 2021). Consequently, producers began to seek more knowledge, to improve their production techniques and the efficiency and effectiveness of the process, to ensure production and the use of resources in an optimized way. Therefore, knowledge of the use of management as a way to ensure the sustainability of production was sought (Fernandes et. al., 2021). As a result, this work focuses on the management of the production of Açaí culture by local producers in the municipality of Abaetetuba, as it is a product whose consumption has been continuously growing.

As Açaí is a product with Amazonian characteristics and produced naturally in the floodplains, it was one of the primary ways of feeding the indigenous tribes. The production and collection were completely artisanal, with a low impact production, as it was aimed at household subsistence consumption only. Açaí has become popular and more consumed on the outskirts of cities since the 1960s and 1970s, in which it becomes marked by the importance of the fruit in the diet supplement of the families (Tagore et al., 2018).

The rise in the consumption of the Açaí fruit increased the need for extracting the fruit, but the upgrading of the Açaí palm led to a large felling of palm trees, which was driven by the reduction in the production of the Juçara palm tree (Homma, 2014; Nogueira & Homma, 2014). So, from the 1980s onwards, the Açaí palm heart assumed this market as a substitute product representing about 95% of the domestic production (Mourão, 2010).

The popularization of Açaí attracted a growing market, as in the case of consumers in the fitness segment due to the energy properties found in it, transforming the fruit into highly consumed food by a public with higher purchasing power rather than being only a source of food for riverside and periphery families (Santana, 2007; Nogueira & Santana, 2016).

The demand for Açaí valued the fruit resulting in the need for increasing production. Such production was more predatory, where the proper management was not considered. It was based on thinning and cutting of the tallest and oldest stem, the harvesting was performed through "peconhas" (handcrafted way to climb palm trees and collect the fruits), but the increase in consumption has led to the adoption of more competitive methods (Tagore et al., 2018).

The use of more competitive extraction methods led to an increase in the environmental impact and, consequently, reduced the production of the fruit. Such events led to a debate on the application of less impact management so to ensure balance and more sustainable production. Investments in lower-impact management provide the farmer a greater efficiency and effectiveness in the production of Açaí, resulting in a more sustainable chain for riverside families, for industries, and the consumer market (Bastos et al., 2019).

The concern with the management of Açaí resulted from the fact that the fruit has become one of the main sources of food and income, where 60% of the fruit is consumed by the local market, 35% is distributed to other regions and approximately 5% is for export trade (Tavares & Homma, 2015).

Based on this context, this paper proposes to study the importance of Açaí management in the supply chain direct towards sustainability in the municipality of Abaetetuba. This study is relevant due to the myriad of consequences that unmanaged exploration can have within a commercial relationship and the maintenance of sustainability.

Therefore, the objective of this work is to characterize the areas of Açaí management focused on sustainability and identify impacts caused by its exploitation, in the municipality of Abaetetuba (Pará), Brazil.

2. Materials and Methods

2.1 Data Source

Sustainability is to provide a balance between economic, social, and environmental factors to ensure a productive future. Sustainability aims to guarantee the needs of generations in the present and future, without generating an imbalance in the pillars of sustainability (Almeida, 1998). From an economic perspective, growth is based on the real value of production, which must remain constant and lasting. This impacts social development by giving families the possibility of purchasing power. Thus, this work sought to discuss theoretically the theme of sustainability based on sustainable management in the production of Açaí in the municipality of Abaetetuba.

The methods adopted for this work were based on bibliographical reviews, documents, articles, theses, dissertations, among others, to provide the necessary foundations about the proposed theme.

A debate and collection of the information were carried out for this study in works that refer to the production of Açaí in the municipality of Abaetetuba, mesoregion in northeastern Para state which was chosen because it is one of the major municipalities in production, extraction, and processing of the Açaí fruit. The IBGE (2019) ranking highlights that the municipality is third in the state and national production with 111,200 tons, behind the municipalities of Igarapé-Miri with 400,000 tons and Cametá with 159,450 tons.

2.2 Study Area

The 2020 IBGE census indicates that the municipality has an area of 1,610.654 km² with an estimated population of 159,080 inhabitants, according to 2019 data, the average monthly salary was 1.6 minimum wages, with a proportion of 7.5% of employed people, in face of the total population (IBGE, 2021).

Another important point for choosing the research locus was because it is an area of productive relevance, indicated by the Technical Assistance and Rural Extension agency of the State of Pará (EMATER-Pará) and public financial resources have been invested in the last 13 years. The PRONAF and PAE are part of the family farming program.

The methodology adopted for the study was descriptive, which used secondary data (Silveira andCórdova, 2009). This work used the documentary research method that consists of analyzing secondary data (Godoy, 1995), provided by the census from IBGE in the period from 2015 to 2019, INCRA information, articles, thesis, and other sources.

This work was discussed according to the script on sustainable development, followed by the use of intensive management in the production of Açaí. Next, it was discussed the impact of intensive management in the economic and social dimensions and finally, the importance of sustainable management for the maintenance of the Açaí production chain in the municipality of Abaetetuba.

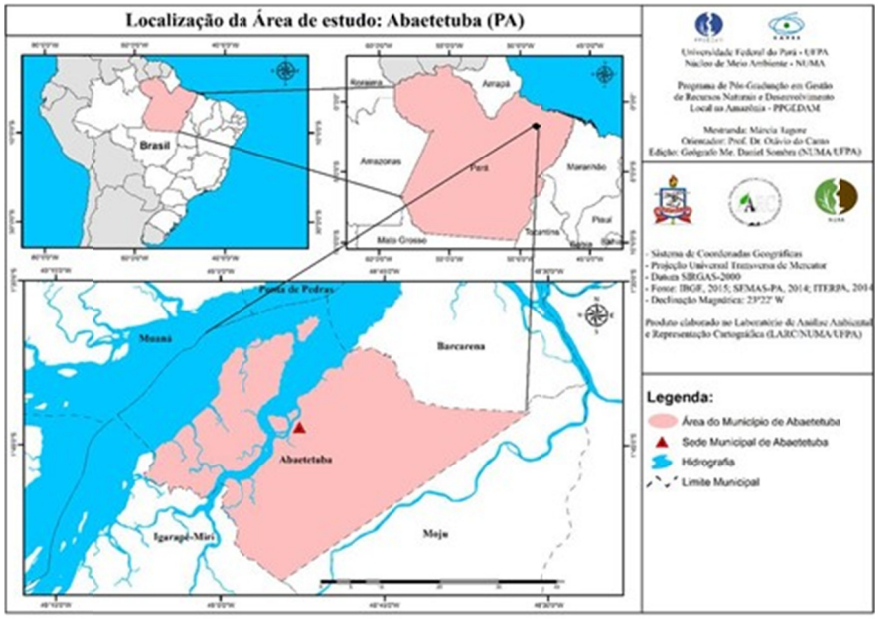

Figure 1. Map of the municipality of Abaetetuba

3. Results and Discussion

3.1 Sustainable Development in the Municipality of Abaetetuba

The Agro-extractive Settlement Program (PAE) was created with the aim of regularizing land for rural workers whose income is from extractivism. The areas that were regularized were legally transferred to the families who lived and worked on the land (INCRA, 2016). With the regularization of the land, the families now have the right to produce and manage their activities within the area that had been granted to them by the PAE. As a result, they began to collect fruits, oils, medicinal plants, among others as long as they used sustainable management for agricultural production activities (INCRA, 2016).

According to Article 1 of the ordinance of the Federal Heritage Secretariat in 2005, rural producers needed to use management activities, given that regularization sought to organize the thinning of the Açai palm areas and the harvesting of the Açaí fruit through sustainable management.

Approximately 24 PAEs were created from 2003 to 2015 in the city of Abaetetuba. They had as a focus of implementation for being traditionally collectors so they started to receive a considerable volume of financing focused on the production of the Açaí fruit. The projects benefiting from the financing were those that were already fit into PRONAF, a program intermediated by Banco da Amazonia. It is noteworthy that PRONAF made about 25 projects feasible, which aimed to serve riverside dwellers who were not being served by the INCRA project.

Over the last 20 years, institutions dedicated to research with the support of Technical Assistance and Rural Extension (ATER) have sought to promote and encourage rural producers to apply sustainable management in the production of Açaí, considering that it is an activity that seeks to provide the economic and social development of the location and reduce environmental impacts, considering that the practice of handling techniques with low impact on the environment will result in a higher yield production (Nogueira, 1997).

Despite the evolution of technologies (equipment and processes) much has to be done regarding the process of implementing sustainable management in the Abaetetuba region, given that the areas are native to islands, the difficulty in accessing the communities, regarding the reception and dissemination of information alluding to the use of technical and scientific guidelines, impacting the production by not following the assessed information (Tagore et al., 2018).

3.2 Intensive management in Açai Production and the Risks to the Environment

As the consumption of acai has increased in the market, the extraction of the fruit and palm heart led to the felling of the Açai palm areas, as the greater use of labor is a characteristic of the intensive management without many innovative techniques and technologies. Such methods lead to direct impacts on production and the environment, considering that there is greater destruction of vegetation and, consequently, mangroves, as this is characteristic of the land in the municipality of Abaetetuba.

Other issues resulting from the use of intensive management are related to the depredation of other species, causing erosion and consequently the siltation of rivers that affect the image of the environment (Kato & Azevedo, 2007).

Given these problems with the environment and production caused by the use of this type of management, the economic impacts stand out, as low production means that local riverside dwellers no longer have a way to obtain income, which has a social impact due to the imbalance in the distribution of income, resulting in their failure to provide their children with education, hygiene, and adequate food and, consequently, it will lead to an increase in the exploitation of other environmental resources, increasing its depreciation.

The effects that may be generated by this type of extraction generate opportunities and threats. Such debate is due to the fact of deciding to take an opportunity without evaluating the risks and as a consequence lead to large losses (Tagore et al., 2018; Beck, 2010).

Firstly, this type of production is intended for the maintenance of local subsistence, that is, it would be a production to produce food for local families, where a large production is not needed and becomes a sustainable production based on a smaller demand (Tagore, 2017). Thus, it should not be applied to greater demand, considering that it will need a greater production capacity, which requires the application of production based on sustainable management that requires financial investments for its application.

However, it should be pointed out that the current changes in the configuration of the natural Açai palm areas environment put at risk the sustainability of the floodplain ecosystem as a whole, as well as the homogenization of the landscape (Oliveira & Net, 2005).

3.3 The Importance of the Sustainable Management of Açai

Management is a technique aimed at preserving and renewing productive resources, whose principle is to guarantee production for a long-term cycle, which will provide production sustainability (Soares et al., 2020). The objective of sustainable management is to preserve the resources that are the basis for the production of family farming and other means of production. Adequate management can provide continuous production and prevent resource depletion and environmental degradation.

The concept of management seeks to elucidate the importance of ensuring adequate production with the environment and ensuring that future generations can use the environmental resources, without affecting production in the present. Therefore, it is worth noting that riverside dwellers have implemented three types of management: 1) Intensive Management: it tends to eliminate all vegetation, preserving only the Açaí trees; 2) Intermediate management: species that do not have monetary value and/or utility for families are eliminated; 3) Moderate Management: in this case, only a few species of flora are removed (Grossmann et al., 2004).

The application of management becomes important for the maintenance of Açaí production, as its extraction has provided the state of Pará and riverside families with their economic development, through the generation of income and jobs, considering that the fruit has become one of the main sources of nutrients and that wins the international market (Oliveira & Net, 2005) as shown in Figure 2.

Figure 2. Açaí production management area in Abaetetuba, Pará, Brazil

In this context, the economic valuation of Açaí should be in agreement with Tagore, do Canto and Sobrinho (2018) also financed and promoted with the implementation of public policies of the state, which have purposely led to the implantation of plantations and management models that jeopardize the environmental balance where they are settled.

Another important point that is worth mentioning is that the Açaí palm allows the maximum of everything that is produced in the palm, which ranges from the fruit, palm heart and even the core of Açai that has been used in the jewelry, cosmetics, and civil construction segments and also the leaves that are used to cover the houses (Bastos Tagore et al., 2019; Pinto et al., 2020). Figure 3 represents the product under discussion.

Figure 3. Production and extraction of Açaí, from producers in the municipality of Abaetetuba, Pará, Brazil

The rise in the commercialization of the fruit for the local, domestic and international market leads to an increase in the maintenance of the production chain, as a way to guarantee the sustainability of production, which is influenced by the demand and cultural values presented in the region (Bastos Tagore et al., 2019). Therefore, it starts to increase the promotion of financial investments for Açaí producers, with the concern to guarantee not only the maintenance of production but also to avoid the environmental impacts that can be caused by unmanaged exploration.

It should be highlighted that in the form of management, environmental risks must be considered in the process, which, according to Beck (2011), risks are technical-scientific consequences of the production process, which need to be considered in the space that they occur, as they are associated with political and/or economic choices. One should observe that the relationship between public policies to encourage production and the environmental risks derived from them are self-evident.

However, this does not remove environmental production problems, which Science and technology have not been able to achieve in the form of prediction and control of ecological, chemical, nuclear, genetic, and other risks (Tagore et al., 2018).

Therefore, the production chain was benefited from State programs and financing agents such as PRONAF, which is offered by BASA, SEDAP (Secretariat for Agricultural Development), EMATER-PARÁ and other financial incentives to be applied to ensure sustainable production So, understanding the costs involved in managing the Açaí production is important so that producers can see the benefits of production based on appropriate techniques (Figure 4).

Figure 4. Açaí planting in a lowland area, in the municipality of Abaetetuba, Pará, Brazil

In addition, considering the existing opportunity for the economic valorization of Açai only due to the recognition of its extractive activity, but also calling into question the principles of sustainability of its production chain, which cannot expose the ecosystem to the risk it is originated.

4. Conclusions

The debate carried out in this work allowed us to evidence the growth of the Açaí consumption market and, consequently, the need to raise the production of the fruit is increased. However, this production takes place in a traditional way, where exploration becomes more competitive, directly impacting future production and this being one of the state's economic collaborators, in which it effectively contributes to GDP.

One can observe the concern of financial and environmental agents who are concerned with the maintenance of Açaí production and especially for the balance between economic, social, and environmental development, which started to create sources of financing and bring information to families so that they can apply the management and guarantee the production.

It should be highlighted that riverside dwellers need to have greater control over the production process, taking into account information such as the value of Açaí, the cost of using management techniques, the costs of labor and thus have a real idea of the profit that they have on the commercialization of its production.

For this purpose, this work suggests further works to discuss investment in the productive management of Açaí, seeking to understand the costs involved in the production and to understand in a managerial way how they can impact the Açaí production chain and how this can guarantee the sustainability of riverside families that live off the exploitation of this segment.

The work was limited by the study that was only theoretical, therefore there were not many consolidated discussions on the management of Açaí but related to a managerial view, where the costs involving the entire Açaí production chain are understood.

References

Adams, C., Borges, Z., Moretto, E. M., & Futemma, C. (2020). Governança ambiental no Brasil: acelerando em direção aos objetivos de desenvolvimento sustentável ou olhando pelo retrovisor? *Cadernos Gestão Pública e Cidadania, 25*(81). https://doi.org/10.12660/cgpc.v25n81.81403

Azevedo, J. R. (2010). *Sistema de manejo de açaizais nativos praticados por ribeirinhos* (p. 100). São Luís/MA: EDUFMA.

Azevedo, J. R., & Kato, O. R. (2010). *Sistema de manejo de açaizais nativos praticado por ribeirinhos das Ilhas de Paquetá e Ilha Grande*. Belém, Pará: Embrapa.

Bastos Tagore, M. P., De Abreu Monteiro, M., & Do Canto, O. (2019). A cadeia produtiva do Açaí: estudo de caso sobre tipos de manejo e custos de produção em projetos de assentamentos agroextrativistas em abaetetuba, pará. *Amazônia, Organizações e Sustentabilidade, 8*(2). https://doi.org/10.17648/aos.v8i2.2031

Beck, U. (2011). *Sociedade de risco: Rumo a uma outra modernidade* (p. 383). São Paulo: Editora 34.

Bezerra, V. S., Freitas-Silva, O., & Damasceno, L. F. (2016). Açaí: Produção de frutos, mercado e consumo. *Jornada Científica da Embrapa Amapá, 2*. Macapá: Embrapa Amapá.

Carvalho, R. da C., Alves, L. de F. N., & Carneiro, R. do V. (2021). Recuperação florestal em várzeas do estuário amazônico submetidas ao manejo intensivo de açaizais. *Ambiente & Sociedade, 24*.

Da Silva Melo, G., Costa, F. S., & Da Silva, L. C. (2021). O cenário da produção do Açaí (*Euterpe* spp.) no estado do amazonas. *Brazilian Journal of Development, 7*(7), 71536-71549. https://doi.org/10.34117/bjdv7n7-365

Godoy, A. S. (1995). Pesquisa qualitativa: Tipos fundamentais. *Revista de Administração de Empresas, 35*(3), 20-29. https://doi.org/10.1590/S0034-75901995000300004

Gomes, B. A., João, A. C. P., Bruno, I. S., & Omar, S. (2020). Desenvolvimento de Planilha Automatizada para o Gerenciamento de Propriedades Rurais. *Revista FSA, 17*(3). https://doi.org/10.12819/2020.17.3.7

Homma, A. K. O. (2014). *Extrativismo vegetal na Amazônia: História, ecologia, economia e domesticação*. Embrapa Amazônia Oriental-Livro científico (ALICE).

IDAM (Instituto de Desenvolvimento Agrário e Florestal do Estado do Amazonas). (2019). *Relatório de produção agrícola manual dos 63 municípios do Estado do Amazonas*. IDAM, Manaus.

Junior, F. P. C., & Da Silva, F. C. (2021). A Governança no APL do Açaí no Município de Igarapé-Miri e sua Implicação para o Desenvolvimento Local. *Desenvolvimento em Questão, 19*(54), 234-249. https://doi.org/10.21527/2237-6453.2021.54.234-249

Mourão, L. (2010). História e natureza: Do Açaí ao palmito. *Revista Territórios e Fronteiras, 3*(2), 69. https://doi.org/10.22228/rt-f.v3i2.69

Nogueira, A. K. M., & De Santana, A. C. (2009). Análise de sazonalidade de preços de varejo de Açaí, cupuaçu e bacaba no estado do Pará. *Revista de Estudos Sociais, 11*(21), 7-22.

Nogueira, A. K. M., & Santana, A. C. (2016). Benefícios socioeconômicos da adoção de novas tecnologias no cultivo do Açaí no Estado do Pará1. *Revista Ceres, 63*, 1-7. https://doi.org/10.1590/0034-737X2016 63010001

Nogueira, A. K. M., Santana, A. C., & Garcia, W. S. (2013). A dinâmica do mercado de Açaí fruto no Estado do Pará: de 1994 a 2009. *Revista Ceres, 60*, 324-331. https://doi.org/10.1590/S0034-737X2013000300004

Nogueira, O. L. (1997). *Regeneração, manejo e exploração de açaizais nativos de várzea do estuário amazônico*. Tese/Dissertação, Embrapa Amazônia Oriental.

Nogueira, O. L., & Homma, A. K. O. (2014). *Importância do manejo de recursos extrativos em aumentar a capacidade de suporte: O caso de açaizeiros (Euterpe oleraceae Mart.) no estuário amazônico*. Embrapa Amazônia Oriental.

Oliveira, L. D., & Tavares, G. D. S. (2016). *Programa de desenvolvimento da cadeia produtiva do Açaí no Estado do Pará (PRO-AÇAÍ)*. Belém, Pará, SEDAP.

Pinto, C. S., Roberta, R. A. de C., Ricardo, E. de F. M., & Francinei, B. T. (2020). Influências do aumento da demanda no manejo de Açaí na Comunidade Rio Ipanema, Abaetetuba-Pará. *Cadernos de Agroecologia, 15*(2).

Rogez, H. (2000). *Açaí: Preparo, composição e melhoramento da conservação*. Belém: EDUFPA.

Santana, A. C. (2007). Índice de desempenho competitivo das empresas de polpa de frutas do Estado do Pará. *Revista de Economia e Sociologia Rural, 45*, 749-775. https://doi.org/10.1590/S0103-20032007000300009

Santana, A. C., Carvalho, D. F., & Mendes, F. A. T. (2006). *Organização e competitividade das empresas de polpas de frutas no Estado do Pará: 1995 a 2004*. Belém, Unama.

Santos, J. C., sena, A. L. S., & Homma, A. K. O. (2012). Viabilidade econômica do manejo de açaizais no estuário amazônico do Pará. In R. C. N. Guiducci, J. R. Lima Filho, & M. M. Mota (Eds.), *Viabilidade econômica de sistemas de produção agropecuários* (pp. 351-409). Brasília: Embrapa.

Silveira, D. T., & Córdova, F. P. (2009). *A pesquisa científica. Métodos de pesquisa* (pp. 33-44). Porto Alegre: Editora da UFRGS.

Soares, Z. T., De Castro Silva, A. B., & Dias, I. P. R. C. (2020). Manejo sustentável e potencial econômico da extração da *Mauritia flexuosa*. *Brazilian Journal of Development, 6*(9), 67307-67329. https://doi.org/10.34117/bjdv6n9-241

Tagore, M. P. B. (2017). *O aumento da demanda do Açaí e as alterações sociais, ambientais e econômicas: O caso das várzeas de Abaetetuba, Pará*. Semantic Scholar.