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Production and marketing aspects of bacuri fruits (*Platonia insignis* Mart.): A survival strategy for producers in Marajó, Eastern Amazon

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Abstract *— This research sought to evaluate the aspects of production, commercialization and management of bacuri trees carried out by small producers and collectors in the Marajó. Semi-structured questionnaires were applied to 52 small bacuri producers in the municipalities of Cachoeira do Arari, Ponta de Pedras, Salvaterra and Soure. The results show that 15 small producers manage native bacuri trees (28.8%), and 37 do not (71.2%). Therefore, there is a need to implement courses on the management of sprouting of native bacuri trees for small producers, in order to enhance the production of bacuri fruits and promote the processing of the pulp in the communities themselves instead of selling the fruit in natura. The results of this research showed that with the dissemination of bacuri tree management techniques it would be possible to triple the current production, since less than a third of the interviewed producers adopted this practice. By tripling the current managed area, it would be possible to transform degraded areas into bacuri orchards and generate income for part of the small producers and collectors in Marajó.*

I. INTRODUCTION

The management and extractive collection of the fruit of the bacuri tree (*Platonia insignis* Mart.) has been carried out by small producers and collectors in Marajó as a survival strategy [5]. This information will be important to promote the dissemination of management techniques for the regrowth of native bacuri trees [2].

The practice of managing native bacurizal has low cost for the small producer, because it is carried out only in areas where there is a natural occurrence, not requiring the production of seedlings and expenses with inputs, in addition to not needing to plant, only to manage, once that the bacuri tree has a natural aggressiveness that is manifested by its high capacity to regenerate naturally [6].

The management also allows the small producer to cultivate between the lines of the bacuri trees, with traditional crops such as cassava (*Manihot esculenta* Crantz), cowpea (*Vigna unguiculata*), corn (*Zea mays* L.), pumpkin (*Cucurbita* spp.) and watermelon (*Citrullus lanatus*). This management also provides for the implementation of agroforestry systems, having the bacuri

tree as the tree component, in addition to enhancing the sale of bacuri fruits [2,5].

The bacuri fruit provided benefits for small producers and collectors who adopted the practice of managing native bacuri trees. Several producers in the Amazon have the cassava crop as their main source of income. Therefore, they need a financial supplement when they are not in the cassava harvest season. In this context, the marketing of bacuri fruit is an economic alternative for these small producers and collectors [1]. However, it is noteworthy that the integration of the bacuri fruit into the market does not occur uniformly, since the strategies of small producers and collectors are different, causing different production and marketing modalities in Amazonian municipalities [5].

This research evaluated the aspects of production, commercialization and management of bacuri trees carried out by small producers and collectors in Marajó, aiming to expand this possibility to other producers.

II. METHOD

The research was carried out in the Immediate Geographic Region of Soure-Salvaterra, in the municipalities of Soure, Salvaterra, Cachoeira do Arari and Ponta de Pedras (Fig. 1), as they are the main bacuri producing municipalities in Marajó (IBGE, 2017).

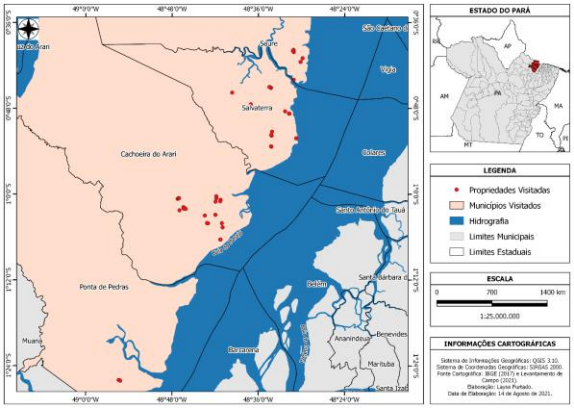

Fig. 1: Municipalities studied in Marajó, with the location of the agricultural properties of the small producers and collectors interviewed, 2021.

The field survey was carried out with an intentional sampling [4], to consider only small producers who had at least 50 bacuri trees in their agricultural establishment, as well as those who participate in extractive and managed collection of bacuri fruits. This sampling was also adopted to represent the most representative spatial distribution possible.

The methodological procedures were based on a quali-quantitative analysis. Semi-structured questionnaires with objective and subjective questions were applied to 52 small bacuri producers and collectors, 25 of whom were interviewed in Cachoeira do Arari (48.0%), 2 in Ponta de Pedras (3.9%), 15 in Salvaterra (28.8%) and 10 in Soure (19.3%).

Field data collection was carried out after testing the questionnaires, the first from 12/14 to 12/18/2020 and the second from 07/05 to 07/13/2021. The questionnaire consisted of questions related to the practice of handling native bacuri trees, the level of satisfaction with the sale of bacuri fruits, and the commercial and productive dynamics of the bacuri fruit.

This research was approved by the Research Ethics Council of the University of the State of Pará, of the Center for Biological and Health Sciences, with a Certificate of Presentation for Ethical Appreciation: 44593021.9.0000.5174 and by the Authorization and Information System in Biodiversity (authorization nº 78288 -1 / authentication code: 0782880120210513).

III. RESULTS AND DISCUSSION

It was found that 15 small producers managed native bacuri trees (28.8%) and 37 do not (71.2%), evidencing the potential for its expansion. There is a lack of knowledge of management practices for native bacuri trees among small producers in Marajó, with the need to implement courses and training in the locality, to enhance the management and marketing of bacuri fruits and pulp [1,6]. Respondents who stated that they manage, clean around adult bacuri trees, and take advantage of regrowth areas, in addition to pruning and clearing.

Among the 15 small producers interviewed who manage, 5 stated that they started these practices from courses and training in the management of native bacuri trees promoted by Embrapa Amazônia Oriental, EMATER/PA and the Chico Mendes Institute for Biodiversity Conservation (33 .3%), and 10 claimed that they started through the teachings of their parents (66.6%).

As for the main difficulties in relation to the management of bacuri trees or the marketing of bacuri fruits, 28 pointed out the lack of knowledge about the management of bacuri trees and the lack of improvement in learning (53.8%), 11 reported on logistics in transport of bacuri fruits in the rainy winter period (21.1%), 5 addressed the contracted collectors who do not manage correctly (9.7%), and 8 do not have any difficulties (15.4%).

All small producers interviewed stated that the performance of fruit production of bacuri trees varies annually, that is, fruit production may be higher in a given year, and in the following year it may be lower, characterizing an alternation of fruit production. This characteristic is peculiar to the Brazil nut tree and cupuaçuzeiro, and they also claimed that the bacuri fruit harvest period is concentrated between the months of January and April.

The price of bacuri fruit, when marketed in the unit directly from the small producer, can reach the range of R$ 0.50 to R$ 1.20 for large fruits. Usually, the sale is carried out in cents, where most small producers and collectors sell small fruits at prices from R$ 25.00 to R$ 40.00, large fruits in the amount of R$ 50.00 to R$ 100.00, and R$ 25.00 to R$ 50.00 per kilo of pulp.

As for the level of satisfaction in relation to the sale of bacuri fruits, 14 small producers and collectors declared that the commercialization is unsatisfactory (27.0%), 11 stated that it is reasonably satisfactory (21.1%), and 27 considered the very satisfactory sales, accounting for 51.9% of the interviews (Table 1). There is a significant perception in most small producers and collectors in the Amazon that the marketing of bacuri fruits is a survival strategy, which makes a relevant financial contribution to annual income [1,6].

Table 1: Level of satisfaction in relation to the sale of bacuri fruits, carried out by the small producers interviewed, 2021.

Satisfaction level	Small producers	%
Unsatisfactory	14	27,0
Reasonably satisfied	11	21,1
Very satisfactory	27	51,9
Total	**52**	**100,0**

It was observed that 32 (61.5%), 28 (53.8%) and 22 (42.3%) small producers cultivate and sell manioc (*Manihot esculenta* Crantz), açaí (*Euterpe oleracea* Mart.) and pineapple (*Ananas comosus* (L.) Merril.), respectively. These are the crops commonly traded by most of the interviewees, during the period that the bacuri trees are not in the harvest period. It is possible to induce small producers to implement agroforestry systems on their properties, through crops between the bacuri trees, with traditional crops such as cassava [2,5].

With regard to the largest sources of income for small producers, 9 declared that their main income comes from the collection and commercialization of bacuri fruits (17.3%), 8 said that it is from açaí fruits (15.4%), 3 claimed that it is from the fruits of bacuri and mangaba (*Hancornia speciosa*), and from the production of their by-products (5.7%) (Table 2).

Table 2: Major sources of income for small producers interviewed, 2021.

Biggest income sources	Small producers	%
Collection and marketing of bacuri fruits	9	17,3
Collection and marketing of açaí fruits	8	15,4
Collection and marketing of bacuri and mangaba fruits and the production of their by-products	3	5,7
Agriculture in general and fishing	10	19,2
Agriculture in general	17	32,7
Tourism and the commercialization of coconut	1	2,0
Processing of by-products from the seeds of bacuri fruits	4	7,7
Total	**52**	**100,0**

Also, 10 reported that it is from agriculture in general and fishing (19.2%), 17 said it is from agriculture in general, portraying 32.7% of the interviews, 1 announced that it is from tourism and coconut marketing (2.0%), and 4 declared that it is from the processing of by-products from the seeds of bacuri fruits (7.7%) (Table 2).

IV. CONCLUSION

The small producers and collectors of bacuri fruit in Marajó have agro-extractive systems in their productive activities, because, in addition to collecting bacuri as an income generation strategy, in the short harvest period between January and April, they also produce and sell açaí and cassava throughout the year to support families.

The aspects of the productive and commercial dynamics of the bacuri fruit demonstrate the importance of this culture in the financial complementation of the small producers and collectors interviewed, since the majority (51.9%) have the perception that the sale of this extractive product provides economic return, which can be enhanced through management. There is a lack of knowledge about the management of native bacuri regrowth for small producers and collectors, requiring the need to implement courses and training to enhance the production of bacuri fruits and promote the processing of the pulp in the communities themselves instead of selling the fruit in natural.

The results of this research showed that with the dissemination of bacuri tree management techniques it would be possible to triple the current production, since less than a third of the interviewed producers adopted this practice. By tripling the current managed area, it would be possible to transform degraded areas into bacuri orchards and generate income for part of the small producers and collectors in Marajó.

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