

# PRELIMINARY DIAGNOSIS OF AGROFORESTRY BACKYARDS IN THE COMMUNITY OF CARUARU, MOSQUEIRO ISLAND, BELÉM-PA

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**ABSTRACT:** Agroforestry backyards are biodiverse, have social, environmental, cultural, economic and climate-regulating functions. These systems may involve consortia with agricultural, forestry and/or animal species in the same area. The main objective of the research was to diagnose, in a preliminary manner, the current state of the flora and the strata of an agroforestry yard in the community of Caruaru, Mosqueiro, Belém-PA. The research is of the quantitative, qualitative, exploratory and descriptive type, and was conducted in November 2022, in two field visits. We found 42 species: food uses (n = 28.0; 67%) with the majority occupying the upper stratum (n = 22.0; 52.3%); medicinal uses (n = 8.0; 19.0%), most frequently in the lower stratum (n = 5.0; 62.5%), and ornamental uses (n = 6.0; 14.0%), where the majority occupy the lower stratum (n = 5.0; 83.3%). Moreover, it can positively influence the conservation of local biodiversity and sustainability, as well as assisting in the maintenance of the traditional knowledge of that community, as to the use and occupation of the land.

**KEYWORDS:** agro-biodiversity, self-consumption, agroforestry systems.

## DIAGNÓSTICO PRELIMINAR DE QUINTAIS AGROFLORESTAIS NA COMUNIDADE DE CARUARU, ILHA DO MOSQUEIRO, BELÉM-PA

**RESUMO:** Os quintais agroflorestais são biodiversos, possuem funções sociais, ambientais, culturais, econômicas e regulam o clima. Esses sistemas podem envolver consórcios com espécies agrícolas, florestais e/ou animais em uma mesma área. A pesquisa teve como principal objetivo diagnosticar, de forma preliminar, o estado atual da flora e dos estratos de um quintal agroflorestal da comunidade de Caruaru, Mosqueiro, Belém-PA. A pesquisa é do tipo quantitativa, qualitativa, exploratória e descritiva, e foi realizada em novembro de 2022, em duas visitas de campo. Encontrou-se 42 espécies: usos alimentares (n= 28,0; 67%%) com a maioria ocupando o estrato superior (n = 22,0; 52,3%); medicinais (n = 8,0; 19,0%), com maior frequência no estrato inferior (n = 5,0; 62,5%), e ornamentais (n = 6,0; 14,0 %), onde a maioria ocupa o estrato inferior (n = 5,0;83,3%. Assim, conclui-se que a diversificação de espécies ocupando diferentes estratos nos quintais, pode influenciar positivamente na conservação da biodiversidade local e sustentabilidade, bem como auxilia na manutenção dos saberes tradicionais daquela comunidade, quanto ao uso e ocupação do solo.

**PALAVRAS-CHAVE:** Agrobiodiversidade. Autoconsumo. Sistemas Agroflorestais.

### INTRODUCTION

Agroforestry systems (SAFs), which include agroforestry yards, have a high capacity for regenerating environments and regulating the climate, providing improved pollination, environmental preservation, an increase in soil carbon stocks and biomass, and consequently a reduction in the impacts of global warming (MOURA et al., 2021).

In the Brazilian Amazon, especially in Pará, the diversification of SAFs, in the form of backyards, provides economic, socio-environmental and even cultural benefits to the traditional communities that exist there, since the commercial balance and sustainability of large and small-scale production, the marketing of food, medicinal plants, ornamental plants, resources for handicrafts and wood, become alternative sources of income and the supply of local products to the families that have developed them (MORAES et al., 2022).

In the state of Pará, specifically on the island of Mosqueiro in Belém, there are instances of traditional communities cultivating agroforestry backyards, such as the community of Caruaru, which, according to reports from local residents, has been trying to preserve the environment with the use of diversified backyards for over a century, in an area of várzea and terra firme. This practice facilitates an efficient relationship of exchange and care, as well as the maintenance and balance with the environment, since it enables the multiplication of knowledge that is acquired between local generations (CORRÊA et al., 2022).

Agroforestry backyards can be used as a tool for the use and conservation of soil, plants, animals, water and other natural resources, especially food species, contributing to better food security and the preservation of genetic heritage. The aim of this research is to make a preliminary diagnosis of the current state of the flora and strata of agroforestry

backyards in the Caruaru community, located on Mosqueiro Island in Belém - Pará.

## MATERIAL AND METHODS

The study was conducted on Mosqueiro Island, in the Caruaru Community (Figure 1), a district of Belém, the capital of the state of Pará, which is 60 km from the city center, located in the northwestern region of that state. The Caruaru Community is home to 41 families descended from the pioneer residents (SOUZA, 2021). With agroforestry backyards.



Figure 1 - Location map of the Caruaru Community. Mosqueiro Island, Belém, Pará.

Source: Souza, (2021).

The study in Caruaru was originally of a primary nature, with quantitative and qualitative approaches. As summarized by Ferreira (2011). The former allows numbers to be translated into statistics (e.g. mean, absolute and relative frequencies). For the second, this author informs us that this approach expresses the dynamic relationship between the subject and the environment, as the natural environment becomes the best means for collecting data and researchers are the key instruments in this action; the exploratory investigation was carried out using electronic links from the Marlene Freitas da Silva Herbaria, of the State University of Pará, and the Federal University of Pará; among others, to check the type of plant and identify the scientific name and family to which they belong.

The on-site investigation took place over two trips (November 9 and 10, 2022). An area was randomly selected at the site. The plant species were then visually identified to check for the presence of food, fruit, forest, medicinal and ornamental species in the three vertical stratifications of the community systems (RAYOL, B.; RAYOL, Y., 2021):

- 1) lower stratification (more creeping plants close to the ground, such as herbs); 2)

middle stratification (plants over 1m high, such as a shrub), and 3) upper stratification with plants whose heights were close to the climax of the system, such as trees.

## RESULTS AND DISCUSSION

### Uses and strata of the botanical species identified

Analysis of the data obtained indicated that the 42 species have a variety of uses (Figure 2a), with a predominance of those whose main use is food ( $n = 28.0$ ; 60.0%) with palm trees (*Areaceae*) in greater quantity ( $n = 5.0$ ; 22.7%), and a small number of ornamental species (Figure 2b).

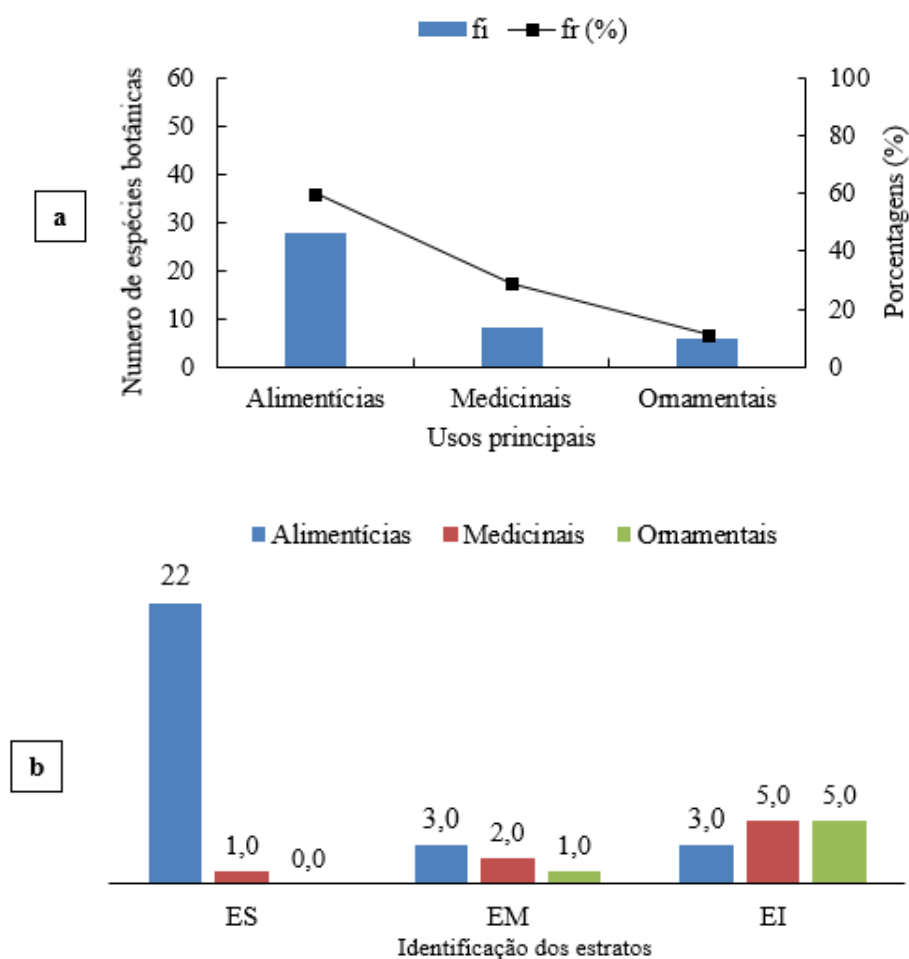


Figure 2. a) Absolute (fi) and relative (fr%) frequency values of the botanical species identified; b) Distribution of these species in the upper (ES), middle (EM) and lower (EI) strata. Caruaru Community, Mosqueiro Island, Belém, Pará.

Figure 2 shows that, in the agroforestry yard analyzed, food species occur in greater quantity than the other two categories, which also occur in this area. Regarding the greater presence of fruit species in agroforestry yards, Castro et al. (2020 and Corrêa et al. (2022) carried out studies in Santarém-PA and Mosqueiro Island, respectively, concluding that this predominance is indicative of the maintenance of agroforestry yards and the community's predilection for these species. In these studies, bacuri (*Platonia insignis* Mart. Family Clusiaceae), açai (*Euterpe oleracea* Mart. Family Arecaceae) and Brazil nut (*Bertholletia excelsa* Bonpland. Family Lecythidaceae) were found to be the species with the greatest presence, belonging to the food category.

### List of botanical species identified

The species found in the agroforestry yard were identified, and the botanical family, scientific and vernacular name, and the main use of each species by the Caruaru community were listed.

Families	Scientific name	Vernacular name	U.P	ES	EM	EI
Anacardiaceae	<i>Anacardium giganteum</i> Hancock ex Engl.	Cashew from the forest	A	X	-	-
	<i>Mangifera</i> spp.	Mango	A	X	-	-
	<i>Spondias mombin</i> L.	Taperebá	A	X	-	-
Arecaceae	<i>Astrocaryum vulgare</i> Mart.	Tucumã	A	X	-	-
	<i>Bactris gasipaes</i> Kunth	Pupunha	A	X	-	-
	<i>Cocos nucifera</i> L.	Coconut	A	X	-	-
	<i>Euterpe oleracea</i> Mart.	Acai	A	X	-	-
	<i>Oenocarpus bacaba</i> Mart.	Bacaba	A	X	-	-
Asparagaceae	<i>Sansevieria cylindrica</i> Bojer ex Hook.	Ogum's whip	Or.	-	-	X
	<i>Sansevieria</i> sp. Thumb.	Sword of Joan of Arc	Or.	-	-	X
	<i>Sansevieria trifasciata</i> Prain	Sword of St. George	Or.	-	-	X
Averrhoaceae	<i>Averrhoa bilimbi</i> L.	Cayenne lemon	A	X	-	-
Bignoniaceae	<i>Mansoa alliaceae</i> (Lam.) A. H. Gentry.	Garlic vine	M	--	X	-
Costaceae	<i>Costus spicatus</i> (Jacq.) Sw.	Canarana	A	-	-	X
Bromeliaceae	<i>Ananas comosus</i> L.	Pineapple	A	-	-	X
Caricaceae	<i>Carica papaya</i> L.	Papaya	A	X	--	-
Clusiaceae	<i>Platonia insignis</i> Mart.	Bacuri	A	X	-	-
Dennstaedtiaceae	<i>Pteridium scolentum</i>	Fern	Or.	-	X	-
Euphorbiaceae	<i>Manihot esculenta</i> Crantz.	Cassava	A	-	X	-
Fabaceae	<i>Canajus cajan</i> (L) Millsp.	Guandú beans	A	-	X	-
	<i>Senna</i> spp.	Paramarioba	M	-	-	X
Humiriaceae	<i>Endopleura uchi</i> (Huber) Cuatrecasas	Uxi	A	X	-	-

Lamiaceae	Coleus sp.	Bilberry	M	-	-	X
	Plectranthus amboinicus (Lour.) Spreng.	Malvarisco	M	-	-	X
	Vitex agnus-castus L.	Pau D'Angola	M	-	X	-
Lauraceae	Ocotea corymbosa (Meissn.) Mez	Cinnamon	M	X	-	-
Lecythidaceae	Bertholletia excelsa Bonpland	Brazil nuts	A	X	-	-
Malvaceae	Theobroma cacao L.	Cocoa	A	X	-	-
Mimosoideae	Inga edulis Mart.	Ingá	A	X	-	-
Myrtaceae	Psidium guajava L.	Guava	A	X	-	-
	Syzygium malaccense (L.) Merr. & L. M. Perry	Jambo	A	X	--	-
Moraceae	Artocarpus heterophyllus Lam.	Jackfruit	A	X	-	-
Musaceae	Musa paradisiaca L.	Banana	A	-	X	-
Oxalidaceae	Averrhoa carambola L.	Carambola	A	X	-	-
Piperaceae	Peperomia pellucida (L.) H.B.K.)	Jaboti herb	M	-	-	X
Portulacaceae	Chaptalia nutans (L.) Polk.	Cow tongue	M	-	-	X
Rutaceae	Citrus limon (L.) Osbeck	Lemon	A	X	-	-
Sapotaceae	Pouteria caimito Ruiz & Pav.	Abiu	A	X	-	-
Sterculiaceae	Theobroma grandiflorum (Willd. Ex Spreng.) Schum.	Cupuaçu	A	X	-	-
Umbelliferae	Eryngium foetidum L.	Chicory	A	-	-	X
Zingiberaceae	Alpinia purpurata (Vieill.) K. Shum.	Alpine	Or.	-	-	X
	Zingiber spectabile Griff.	Shampoo	Or.	-	-	X

Captions: U.P. = Form of use by the community M = Medicinal; A = Food; Or = Ornamental. ES = Upper stratum, trees; MS = Middle stratum, shrubs; EI = Lower stratum, herbs and others. Based on data collected by the authors.

Table 1. Families, scientific and vernacular names, main use and vertical strata occupied by botanical species identified in the Caruaru Community, Mosqueiro Island, Belém, Pará.

In the study carried out in the west of Pará by Rayol and Miranda (2019), it was found that most of the plants in this type of yard are primarily used for food.

## Food species

Among the food species ( $n = 28.0$ ; 67%), two of them, guandú beans (*C. cajan*) and manioc (*M. esculenta*), in addition to their nutritional value, have commercial values that allow the community of Caruaru to have a composition of plant species with alternating cycles, which makes it easier for them to rebuild their income due to the scarcity caused by the alternating seasonality of these species. Guandú beans (*C. cajan*) and cassava (*M. esculenta*) can and are used in agroforestry systems, which include agroforestry yards, because they are systems whose economic development is widely viable. In this vein, Farias et al. (2022), based on a literature review, concluded that the combination of agricultural species, when associated with forest species, makes rural properties economically feasible. In addition, Sousa et al. (2020), in a study carried out in Santarém-PA, summarized that

these areas are generally located around the homes themselves and that one of the goals is to generate a surplus to make up the income of these families.

It can be seen that the Arecaceae Family ( $n = 5.0$ ; 62.5%), i.e. palm trees, are predominant, although there are other food tree species in this yard. In the municipality of Moju, Nascimento, Cristóvão and Rayol (2021) carried out research in a rural community and concluded that the species *E. oleracea*, *C. nucifera* and *M. indica* are important for food security in rural communities in the Amazon context, which are generally economically insecure, in addition to the distance between homes and the places where goods flow most.

## Medicinal species

Analysis of the data obtained indicated that, in relation to the total number of species identified ( $n = 8.0$ ; 19.0%), the family with the most evidence was Lamiaceae ( $n = 3.0$ ; 37.5%). As for the diversity of medicinal plant families, Moura et al. (2021) carried out a survey in the municipality of Igarapé-Açu-PA and concluded that these plants are frequent, being numerically superior ( $n = 15.0$ ; 31.91%) when compared to ornamental plants ( $n = 7.0$ ; 14.89%) and timber plants ( $n = 7.0$ ; 14.89%).

All the botanical species considered “medicinal” by those communities that grow them in their backyards are intended to meet an urgent need, the solution to which will be the use of one of them, alone or in combination, whether in the form of tea, infusion, ointment or macerated. This is the responsibility of the women, and they do it, according to Rayol and Silva (2019), in suspended wooden structures, then called “jiraus”. Regarding this type of cultivation in agroforestry backyards, Pauletto et al. (2020) carried out a study in the Alto Jari Community, in the municipality of Santarém - PA, and concluded that the maintenance of these areas is carried out by at least two individuals, and that medicinal species are more frequent when compared to vegetables.

With regard to women in this context, Nobre et al. (2020) carried out a study in the municipalities of Capitão Poço, Irituia and Garrafão do Norte, all in the north-east of Pará, and concluded that in addition to contributing to the family’s diet, they also work with vegetables used for therapeutic purposes and thus maintain the traditional knowledge of their ancestors.

## Ornamental species

As for ornamental species ( $n = 6.0$ ; 10.9%), two families, Asparagaceae (three species) and Zingiberaceae (two species), were identified in the area analyzed. In addition to these, there was one individual belonging to the Dennstaedtiaceae family (Table 1). Research such as that carried out by Rayol et al. (2019), in the 344 backyards surveyed in 14 municipalities in Pará, found 23.5% of the 252 plant species identified as ornamental, a greater diversity than that found in our state. In the quilombola territory of Porto Alegre, in Cametá-PA, Dias et al. (2020) identified ornamental species in small quantities, among

the 20 species they identified. Ornamental species are cultivated to improve the landscape effect, in addition to contributing to botanical diversity, as well as serving as habitats for invertebrate species, increasing environmental sustainability in these backyards.

## CONCLUSION

The agroforestry backyards of Caruaru are characterized by the richness of plants occupying the different strata of vegetation, with the prevalence of species belonging to the upper stratum, most of which are food crops. The diversification of species in different strata can have a positive influence on the conservation of agrobiodiversity, serving as a basis for sustainability.

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