

Original Research Article

AGROBIODIVERSITY OF HOMEGARDENS IN MARANHÃO, BRAZIL

Household use for these species included

ABSTRACT

The research aimed in inventory to agrobiodiversity of homegardens in Maranhão/Brazil. Were visited 25 homegardens, and catalogued 105 specimens, distributed in 47 genera and 29 families. The families with largest species numbers was Rubiaceae, Malvaceae, Lamiaceae, with four species each, followed of Solanaceae, Euphorbiaceae (three species each), Myrtaceae, Crassulaceae, Anacardiaceae (two species each) and the others families one only specie each. From species diversity found, of these, 52% presents food use, 35% medicinal and 13% ornamental use. The mantenedors has a good knowledge about yours cultivs, major in question of maintenance of the homegardens, where, the womens was the major responsible for management and conduction of the hoemgardens agroforests. However, the homegardens researched, has a culture character, that however, reveals the importance of this, how resource of build and transmission of knowledges, about of the informations of management, use type and conservation of community identity.

Keywords: Agroecosystems, Plant cultivs, Food safety.

For the most part women were the primary care takers of the agroforest homegardens, and they had good knowledge about cultivars, and garden maintenance.

The survey revealed that the home gardens had a strong cultural character highlighting their value as an important community resource for the creation and transmission of knowledge, an thus serving as a source of information management, for the preservation of community identity.

1. INTRODUCTION

~~The~~ ^{as a component of} Agrobiodiversity ^s ~~constitute~~ ~~is an~~ agricultural system that associates conservation and management with sustainable development, and consists of the diversification of plants, animals and microorganisms used directly or indirectly for food and agriculture [1]. This definition includes all planned agrobiodiversity and the natural biodiversity of agroecosystems, as well as ecological services, interactions between living beings and ways of dealing with the land and technologies of the social groups involved [2].

A reservoir of agrobiodiversity in rural or urban communities ^{are} the domestic homegardens [3,4], these are also used intentionally for the *in situ* conservation of germplasm of species of commercial interest [5]. According to [6], ~~the~~ homegardens comprise a set of plants with arboreal, shrub, climbing and herbaceous species, and present a diversification in the species, which present the most different habits of life and, therefore, forming multiple strata, resembling to the structure of tropical forests [7]. The genetic variability maintained in these homegardens, when put together, can represent a considerable sum of variation, so conservation of resources, using this procedure, would have the advantages of the homegardens sustainability in relation to the environment [5].

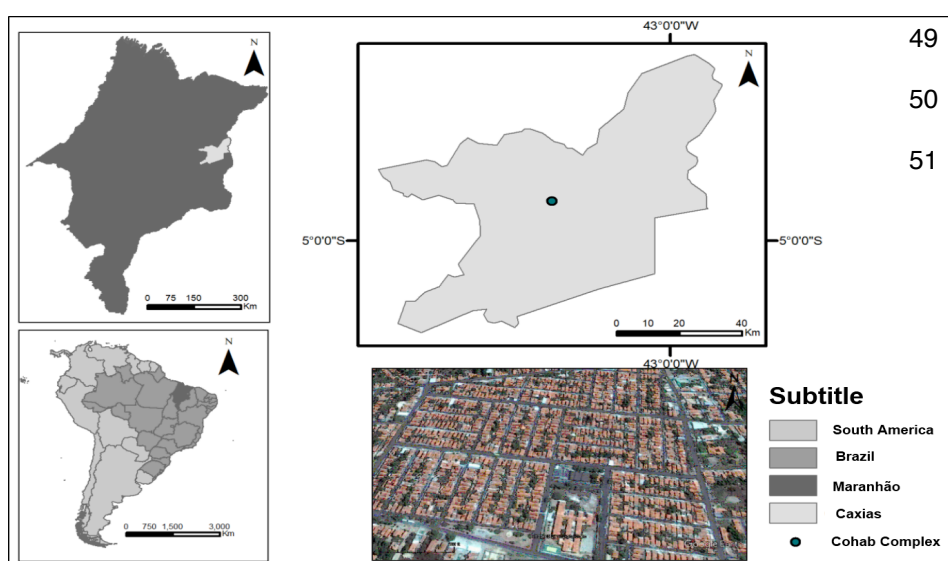
^{Duarte and Rocha [8]} ^{that} [8], suggest the use of the homegardens and other agroforestry systems as models of family agricultural production associated with conservation, ^{are} being essential for a link between scientific and popular knowledge. ~~The~~ agroforestry homegardens are related to cultural factors, since they can be results of information, or traditional knowledge passed down by generations [7,9]. In this sense, ~~the~~ homegardens constitute links between rural and urban settlements through products, germplasm and resident members [10]. ~~In~~ Urban agriculture is an activity of tradition among the families, being exercised in the ~~homegardens of the~~ residences where the destination of the products is ^{for} predominantly the autoconsumption, with little trade [11].

As highlighted by [12], ~~the~~ homegardens are considered an "economic mystery", because even with the economy showing a market superiority, ~~the~~ homegardens have long stood out as the basic function of livelihood. In Brazil, there is a considerable amount of floristic studies ^{on} ~~in the~~ homegardens, where the majority presents qualitative data with descriptions of the structure, composition, organization and maintenance of these practices [13,14,15]. In this sense, the objective of the

research was to know the agrobiodiversity of the homegardens in the municipality of Caxias, Maranhão, Brazil.

2. MATERIAL AND METHODS

The study was realized in the homegardens of the Cohab complex (figure 1), located in the Nova Caxias neighborhood, in the municipality of Caxias, in the state of Maranhão / Brazil. The surveyed quarter is located at the coordinates 04° 52' 10" Latitude South and 43° 20' 26" Western Longitude. It is characterized by 58.82% of households consisting of houses, houses or similar and 41.18% of



buildings or
residential
units [16],

establishments have ~~pipd water with daily supply~~ as well as electricity. The economy is well developed with enterprises from different sectors.

daily access to potable

62

63

64 **Figure 1.** Map of municipality of Caxias with emphasis in Cohab complex,
65 Maranhão/Brazil

we

66 We visited a total of 25 homegardens at random with the prior consent of the resident, with the
67 starting point at 01 avenue. Subsequently, the methodological processes were interviews with
68 residents with socioeconomic questions, such as: How old are they; How long you reside in this place;
69 **gender** What sex, What profession; How many people live in the house; What is the main source of income.
70 In addition to questions about the management techniques of plants grown in homegardens, namely:
71 **were asked** **used in the** **of external inputs, and if so,** **used**
72 Use some material in the management of plants; If it is used, what would it be; Here are some criteria
for selecting the plants to be grown; Who is responsible for maintaining the yard.

73 The answers were tabulated and expressed in the form of graphs and tables. The plant specimens
74 were photographed in their growing habitat. The botanical identification was carried out in the field,
75 when possible and / or with the help of specialized literature.

76 3. RESULTS AND DISCUSSION

rephrase

77 **we identified specimens**
78 In the 25 homegardens visited, 105 individuals belonging to 47 species, 41 genera and 29 botanical
79 families (Table 1). With two or more plant species for homegarden, only a botanical variety was found
80 in three homegardens.

plant

81 The families with the greatest number of species numbers were: Rutaceae, Malvaceae, Lamiaceae,
82 with four species, followed by Solanaceae, Euphorbiaceae, with three species each; and Myrtaceae,
83 Crassulaceae, Anacardiaceae, presented two species, while the other families presented only one
84 species (Figure 2). The representativeness of these families is closely related to the various resources
85 **they provide.** that their representatives propose them. In relation to the genera, *Citrus* (Rutaceae) with four species,
86 followed by *Hibiscus* (Malvaceae) and *Capsicum* (Solanaceae) both with two species. The other
87 genera presented only one species.

out of order

88

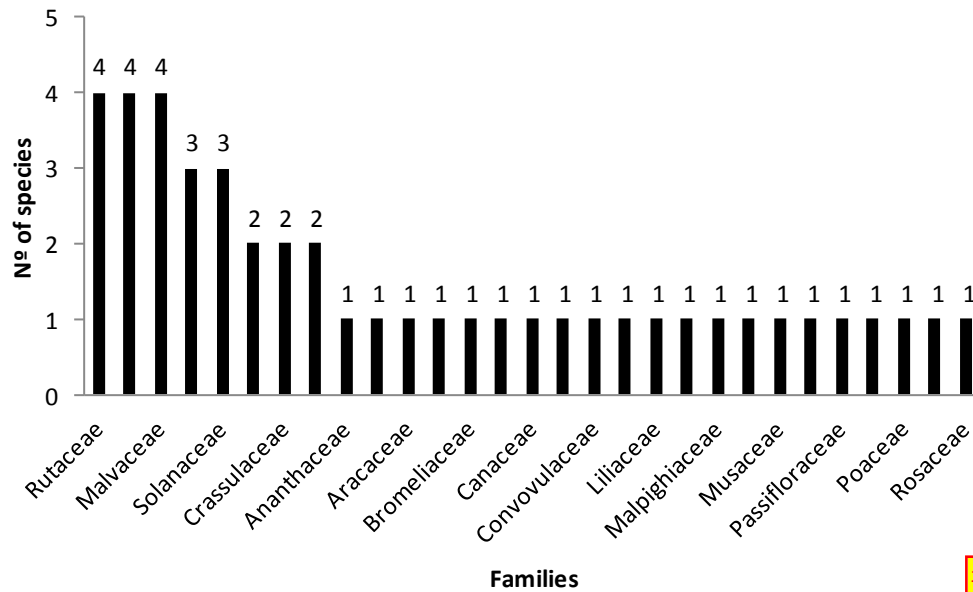
include name of residential area,
city, state, country.

89 **Table 01.** List of inventoried plant species in homegardens agroforestry. ~~Constant in the table: family,~~
90 ~~scientific name, popular name and form of use.~~

91

Family	Scientific name	Popular name	Use
Anacardiaceae	<i>Mangifera indica</i> L.	Manga	Food
	<i>Anacardium occidentale</i> L.	Caju	Food
Ancanthaceae	<i>Chenopodium ambrosioides</i> L.	Matruz	Medicinal
Anonaceae	<i>Annonas quamosa</i> L.	Ata	Food
Aracaceae	<i>Dypsis lutescens</i> L.	Palmerinha	Ornamental
Bignoniaceae	<i>Arrabidaea Chica</i> Verlot	Pariri	Medicinal
Bromeliaceae	<i>Ananas comosus</i> L.	Abacaxi	Food
Cactaceae	<i>Euphorbia ingens</i> L.	Cacto	Ornamental
Canaceae	<i>Canna indica</i> L.	Cana da Índia	Medicinal
Caricaceae	<i>Carica papaya</i> L.	Mamão	Food
Convovulaceae	<i>Ipomoea batatas</i> L.	Batata	Food
Crassulaceae	<i>Bryophyllum calycinum</i> Salisb.	Fortuna	Medicinal
	<i>Bryophyllum calycinum</i> L.	Folha santa	Medicinal
Cucurbitaceae	<i>Cucurbita pepo</i> L.	Abóbora	Food
Euphorbiaceae	<i>Manihotes culenta</i> Crantz.	Mandioca	Food
	<i>Jatropha gossypifolia</i> L.	Pião roxo	Medicinal
	<i>Manihot</i> sp.	Macaxeira	Food
Lamiaceae	<i>Rosmarinus officinalis</i> L.	Alecrim	Medicinal
	<i>Venonia condensata</i> Baker	Boldo	Medicinal
	<i>Ocimum basilicum</i> L.	Alfavaca	Medicinal
	<i>Lippia alba</i> L.	Erva cidreira	Medicinal
Liliaceae	<i>Aloe vera</i> L.	Babosa	Medicinal
Lomariopsidaceae	<i>Nephrolepis</i> sp.	Samambaia	Ornamental
Malpighiaceae	<i>Malpighia glabra</i> L.	Acerola	Food
	<i>Hibiscus sabdariffa</i> L.	Vinagreira	Food

Malvaceae	<i>Hibiscus esculentus</i> L.	Quiabo	Food
	<i>Plectranthus amboinicus</i> Andrews	Malva do Reino	Medicinal
	<i>Gossypium arbadense</i> L.	Algodão	Medicinal
Moraceae	<i>Morus alba</i> L.	Amora	Food
Musaceae	<i>Musa paradisiaca</i> L.	Banana	Food
Myrtaceae	<i>Psidium guajava</i> L.	Goiaba	Food
	<i>Eugenia uniflora</i> L.	Pitanga	Food
Oxalidaceae	<i>Averrhoa carambola</i> L.	Carambola	Food
Passifloraceae	<i>Passiflora edulis</i> Sims.	Maracujá	Food
Piperaceae	<i>Piper aduncum</i> L.	Pimenta de macaco	Medicinal
Poaceae	<i>Cymbopogon citratus</i> (DC) Stapf.	Capim Santo	Medicinal
Punicaceae	<i>Punica granatum</i> L.	Romã	Medicinal/ food
Rosaceae	<i>Rosa</i> sp.	Rosa	Ornamental
Rutaceae	<i>Citrus limonum</i> L.	Limão	food / Medicinal
	<i>Citrus aurantium</i> L.	Laranja	food / Medicinal
	<i>Citrus nobilis</i> Lour.	Tangerina	Food
	<i>Citrus aurantifolia</i> L.	Lima	Food
Solanaceae	<i>Lycopersi cumesculentum</i> L.	Tomate	Food
	<i>Capsicum chinense</i> Jacq.	Pimenta de Cheiro	Food
	<i>Capsicum frutescens</i> L.	Pimenta malagueta	Food



rephrase

Figure 02. Number of species per botanical family found in agroforestry homegardens in Maranhão, Brazil

The representatives of the Rutaceae family cataloged in the research have great economic importance, mainly because they catalog only *Citrus* species, with cultivation of their representatives (lemon, orange, tangerine and lime) that in the state of Maranhão is not indicated the crop, due to the low rainfall rates, since they can not suffer water deficiency in the inflorescence phase [17].

Another family that stands out is Malvaceae, where its representatives have cultural, economic and medicinal importance [18]. Species of the genus *Hibiscus* (*H. sabdariffa* and *H. esculentus*) listed in the homegardens, are used to prepare the typical dishes of the region. The cuxá, for example, is a delicacy made with vinegar leaves (*H. sabdariffa*); and caruru, a typical food prepared with okra (*H. esculentus*). Other species of the family, *Plectranthus amboinicus* (kingdom mallow) and *Gossypium arbadense* (cotton) stand out for medicinal use. Regarding the use of species found in backyards, vegetables are ornamental (13%), medicinal (35%) and mainly food (52%) (Figure 3).

Sukopp and Werner [19],

[19], emphasize the importance of backyards, mainly due to the presence of fruits and vegetables, which allow the population to maintain a food autonomy, causing minimal impacts on the

include separate percentages for vegetables (%) and ornamentals (%)

environment, conserving plant resources and cultural richness, based on the knowledge and culture of using natural inputs and promoting the recycling of natural elements.

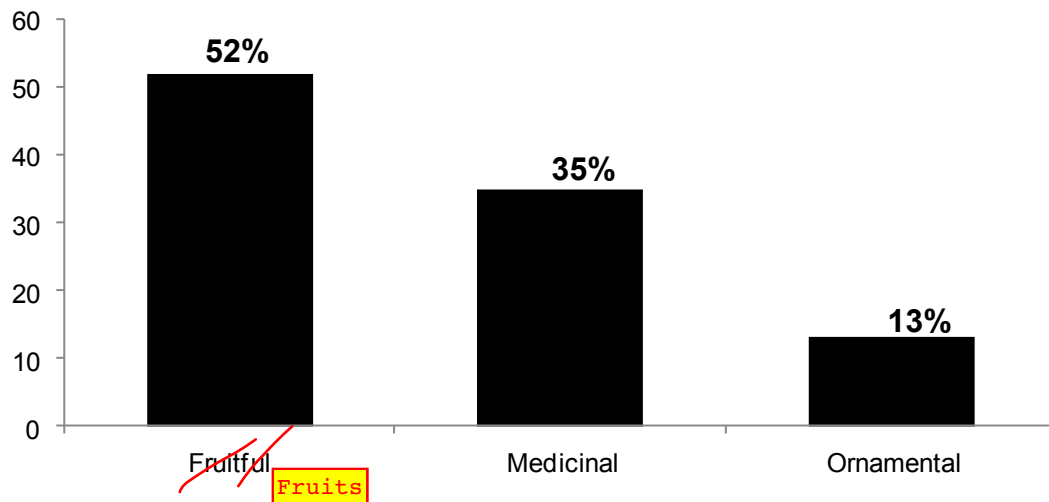


Figure 3. Distribution of plant species according to the category of use in the agroforestry yards in Maranhão / Brazil.

In the research, fruit species were the most frequent, among them *Malpighia glabra* (acerola) 12 individuals present in 11 homegardens, followed by *Pasidium guajava* (guava) with seven individuals in seven homegardens, *Mangifera indica* (mango) with five individuals in five homegarden. These species play an important role in feeding communities. According to [20], the presence of fruit trees in agroforestry yards generates additional profits in the family income, as well as contributing to the

increase of biodiversity and the recovery of degraded and / or abandoned areas so that it is possible to achieve sustainability in family production. For [21], fruit species provide food sources to growers and places of refuge, shelter and food for animals, especially birds [22].

1 to 5x the minimum wage? (list minimum wage here, in USA Dollars, per day or per month, e.g. \$3 USD per day)

care-takers

old.

130 The homegardens maintainers have ages ranging from 26 to 86 years, with an average of 64 years.
131 The majority are ~~women~~ (22 people) ~~who had lived~~ ~~for~~ ~~to~~ between 10 and 30 years. The
132 income ranges from 1 to 5 minimum wages, obtained mainly through retirement income and
133 ~~with the~~ occupation in positions of public sectors.

mainly

earlier

134 Women are ~~the main~~ responsible for the management and conduction of agroforestry homegardens,
135 corroborating ~~with the~~ studies of [23,3,7]. The homegarden structure relates to each owner's cultural
136 experiences and life history. In this sense, one can better understand the conformations of the yards
137 visited according to each resident, which vary according to cultural aspects, available space, function
138 and history of community formation.

home gardeners

The time spent daily in homegardens by different households is difficult to quantify, which

139 The ~~growers of the homegardens~~ have a good knowledge of crop practices, with daily time spent on
140 activities in homegarden of difficult quantification, which According to the owners ~~is in the~~ free time.
141 As in many of the homegardens the person in charge does not perform activities outside the property,
142 ~~the availability of time to be dedicated to the yard only~~ competes with the household chores.

the

takes place during their

most

gardening

daily

because the

already

rephrase

Silva et al. [27],

143 [27], reveal that the benefits of planned agrobiodiversity are more easily perceived where there is
144 care. However, the benefits of natural and unplanned (associated) agrobiodiversity require special
145 attention.

146 In the researched yards, the management of the plants is handmade and carried out by nature, that
147 is, there is no specific care with the plants. The owners demonstrated satisfaction in the
148 accomplishment of the management tasks, where the irrigation process is done ~~artisanal~~ ~~manually?~~, during
149 periods of drought. For the control of the ~~plagues they use sodium hypochlorite (bleach)~~. Fertilization
150 of the soil is done by means of organic fertilization, with the use of coal ash, animal manure, dead
151 palm trunk, as well as food debris, ~~being also observed by [25]~~.

s

wastes?

Materials such as

?

4. CONCLUSION

pests, there are minimal interventions other than the manual removal of insects, infected leaves, and weeds.

fruit tree species

154 The homegardens surveyed presented a considerable diversity of botanical species, with the fruitful
155 category in their predominance. However, it is noted that homegardens are spaces for growing fresh
156 food, providing the family of growers with greater food security, providing a better lifestyle, and a
157 family income alternative.

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