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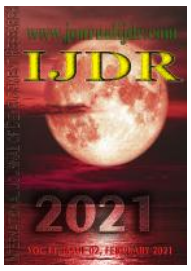

RESEARCH ARTICLE OPEN ACCESS

ENVIRONMENTAL PERCEPTION AND CHARACTERIZATION OF PHYTOPHYSIOGNOMIES WITH SPECIES OF MEDICINAL USE IN THE REGION OF THE MIDDLE SÃO FRANCISCO, BA

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ABSTRACT

The interest in plants as a medicine has grown in the Brazilian Cerrado, having as one of the main reasons the social and economic conformation of the country. Therefore, the valorization of the empirical knowledge of biome is the first step towards the success of the conservation and sustainable use of biodiversity.This study aimed to generate information about the environmental perception and the characterization of phytophysiognomies with species of medicinal use in the region of the Middle São Francisco.The study was developed in two maroons (quilombola) communities, in Barreiras and Ibotirama, located in the western Bahia state.The analyses were carried out through the collection of data obtained in the knowledge workshops and interviews.The two communities, regardless of the distance from the centers of their municipalities, have a conscious perception of the conservation and use of native medicinal plants, which may be linked to the maintenance of cultural and traditional habits and the community's dependence relationship with the remaining vegetation.

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INTRODUCTION

Interest in plants as a medicine has grown in Brazil.One of the main reasons for this growth is due to the many communities that do not have access to allopathic medicines, either for economic reasons or for local infrastructure (OMS, 2002). Due to this real shortage, the Ministry of Health, through the National Policy on Medicinal Plants and Herbal Medicines-PNPMF (Ministério da Saúde, 2006), implemented the use of medicinal plants in the Unified Health System (SUS) as a strategy to guarantee health security.The Cerrado biome has excellent potential for discoveries of plants with medicinal properties, due to its wide phytophysiognomic diversity and, consequently, greater chemical diversity (Alves, 2010; Gottlied and Borin, 1994). It is observed that there is a significant gap between what has been recorded in literature and what is known from the empirical point of view in terms of the use of biodiversity.Also, the anthropic impact on the Cerrado biome often leads to changes in vegetation that occur more quickly than natural transformations, as human-made disturbances generally occur in the form of continuous and generalized stress, for example, frequent fires, pastures and wood extraction.Thus, there is a need for studies to generate information on the medicinal flora of the Cerrado, as a strategy for valuing conservation, mainly because biodiversity is lost faster than it is discovered or protected (Ratter *et al.*, 1996). The threat of medicinal plant loss tends to increase because most of them are woody and become the target of multiple-use, such as construction, energy production, dye, and others (Ferraz et al., 2005; Lucena *et al.*, 2011). These categories of use can cause the extraction of essential species within a community to be considerably increased and cause significant deforestation on landscapes with large populations.As a result, research in the area is vital since the depletion of some resources could lead to the reorganization of the list of plants used local medical systems (Hanazaki *et al.*, 2007). Native species are often neglected, as they have attributes that are not so attractive when compared to exotic species.The latter, in turn, usually have a higher market value, since their organoleptic attributes are more pleasant (Medeiros *et al.*, 2015). This can lead to several problems, such as population decline of native

plants, reduction of local diversity, and partial or total modification of the landscape (Albuquerque, 2006b; Medeiros et al., 2012). Valuing empirical knowledge is the first step in achieving together with the community to protect its cultural and social heritage and thereby develop appropriate strategies for the conservation and sustainable use of local biodiversity (Amorrozo and Viertler, 2010). Thus, the present study sought to collaborate with the understanding of human behavior in the search for resources necessary for its stability, trying to evaluate and integrate the dynamics of traditional/ popular and scientific knowledge.Given the above, it was investigated whether traditional communities far from urban centers used more medicinal plants compared to closer ones; whether areas surrounding the houses have less floristic diversity compared to the more distant ones; the characterization criteria that the local population uses to classify landscapes; the conservation status of landscapes that have populations of native woody medicinal species; and whether the community commonly uses woody species.

MATERIAL AND METHODS

Characterization of the study area: The study was carried out in two marron communities (quilombola), Mucambo and Pedra Negra da Extrema, in Barreiras and Barra municipalities, respectively.Both municipalities are in Western Bahia and have agribusiness as the main economic activity.The vegetation in Barreiras is predominantly of open arboreal Cerrado with gallery forest in smaller portions. In Barra, it is characterized by an area of transition from the Caatinga, visually marked by xerophilic plants and elements of Cerrado vegetation**.** The Mucambomaroon community is located 12 km from the Barreiras downtown.It is bordered by the Rio Grande and has significant influence from the urban center, due to the proximity between the community and the city and the fact that it is in the pathway for other rural communities and private farms.The community's economic activity is based on fishing, small food crops, and handicraft production of cassava flour, which are used for own consumption and sale of surplus.However, some inhabitants work in the community's commercial establishments and downtown. Most of the inhabitants live with a family income of up to a monthly minimum salary; they are salary earners or derive income from these activities.The level of education varies from middle school to complete high school.The community has just over 50 families and an organization that is traditionally observed in small villages and inland towns, a central street, where a small square with a Catholic church is located. In the same street, there are a preschool, a basic health unit, a pharmacy, and some bars.In the adjacent streets are located a cemetery, an annex of the school where classes of elementary and middle school work, and in the last upper portion of the community, there is a rehab center for alcohol and drug addicts.Garbage collection is carried out once a week by the municipal government of Barreiras.

The maroon community of Pedra Negra da Extrema has a strong riverside characteristic. It is bordered by the São Francisco River and is located between the municipalities of Ibotirama, about 40 km away, and Barra, at an average distance of 80 km.This region of Barra, where the community is located, has been considered a transition area because it is under the influence of the Cerrado and Caatinga vegetation (Plano Territorial deDesenvolvimentoSustentável, 2010). The community has approximately 50 families and does not have the autonomy to develop all basic needs, such as health and secondary education.Despite belonging to the Barra municipality, the community has a greater relationship with Ibotirama, due to the proximity and ease of transition.The level of education varies from middle school to complete high school.Spatially, it is arranged around an open field that serves as a soccer field for children.It has a Catholic church, and school of primary education, and some bars that also work as a grocery store.Local commercial activity is based on fishing from the São Francisco river, the production of flour in traditional flour workshops, small crops, and handicrafts.Most inhabitants live with a family income of up to a monthly minimum salary, resulting from activities mentioned.

Participatory Workshops: The study was conducted according to the resolution of the National Health Council and approved by the Research Ethics Committee(process number 2.942.954). The project and the Free and Informed Consent Term were read, explained, and recorded in the minutes during an assembly with the residents' association in the Pedra Negra da Extrema community.In the Mucambo community, as it has no active association or cooperative, the term and the project were clarified house by house for the residents.The Terms of Free and Informed Consent were signed in two copies by the residents who agreed to participate in the research, where one copy remained with the researcher, and the other remained with the residents. The participatory workshops consisted of moments of meetings with the communities, intending to observe the relationship and the perception of the local population with the vegetation.In the workshops, residents were invited to make a community mapping (Sieber et al., 2014), in which they were encouraged, through questions, to highlight the landscapes in which they are inserted, indicating their conceptions of landscape and areas of medicinal resource collection of higher preference.This dynamic was carried out collectively, in which the spatialization of each mentioned area was designed.The objective of this stage was to carry out sorting of information on the historical aspects of the community and to ask the residents to assist in the interpretation of data, with the agreement of collective decision-making, selection of collection areas, delimitation of the area for maintaining natural resources, and the permission of a researcher to enter the community.

Interviews: The interviews were conducted with people living in the communities, aged 18 years or older.For each community, 50 residents were interviewed, one representative per household.The interviews were conducted at each resident's home and were conducted based on a semi-structured form.We sought to carry out the interview separately from other interactions, whether they were domestic activities or being in the company of a third person who could interfere in the responses.Residents were asked about (1) the names and characteristics of each of the vegetation units they were aware of;(2) the category of use for each plant mentioned, whether medicinal, wood, food, etc.;and(3) the five main plants of daily use in order of preference/highest use.

Vegetation Inventory: The study sought to access the native woody species present in the study area and observe their conservation status through the analysis of the population structure in each of the local vegetation types used and indicated by the residents interviewed.An inventory of woody vegetation was carried out where the point-centered quarter method was used (Brower and Zar, 1984). In each area indicated by the interviewees, five 100 m transects were drawn with a 30 m spacing between them.Points were marked every 10 m, and quadrants were traced from these points.The individuals closest to each quadrant, which had a Diameter at Ground Level (DGL) ≥ 3cm, were included in the sample.The sampled individuals had their DGL and height measured.Cut individuals were not excluded from the sample.The samples collected had their vernacular recorded with the help of a key informant. The botanical material was deposited and identified at the Herbarium of the Federal University of Western Bahia (BRBA).The identification occurred with the help of specialists and by comparisons with material available in the university's herbarium, INCT- Virtual Herbarium of Flora and Fungi and Reflora - Virtual Herbarium Plantas do Brasil.

Data analysis: The arithmetic mean was used to deduce which community had the highest average medical citation per person, whether the closest or furthest community.This was calculated based on the number of times the medicinal category appeared concerning the number of residents interviewed.The local predilection ranking for the species was also determined based on the arithmetic mean of the citation number of the species per person interviewed divided by the total number of residents interviewed.The Use Value (UV) was calculated using the equation $VU = (\Sigma U)/n$, where "U" is the number of uses cited by respondents, and "n" is the number of respondents (Rossato et al., 1999 apud Albuquerque et al., 2010a). For the calculation of UV, plants categorized by declared use were used that

had a number equal to or greater than 15 citations during the interviews to avoid overestimation, which could occur if a plant cited by a single informant was used for analysis, but which listed various uses for it. The indications of the community's collection units were observed through the interview and workshop processes to assess the conservation status of landscapes of native woody medicinal species populations.Subsequently, an inventory of vegetation was carried out to observe if the area determined to be the most used was the most affected.Thus, three indicators were considered: (a) the local perception of the most affected areas, according to data from the workshops and through inventory data;(b) the diametric distribution of the living individuals of the woody species present in each landscape unit;and (c) signs of extraction of bark and logs present in plant individuals.Thus, woody individuals that were cut or fallen were not excluded from the sample. Vegetation inventory data was used to calculate the Shannon index and reverse J-shaped distribution.The Shannon Index was performed with the total number of individuals who appeared in each area.The reverse J-shaped distribution, which consists of simple regression analysis, was performed with species that had more than 15 individuals in the unit in which it was inventoried, avoiding bias in the results of the regression analyses. Then, the species were classified as suitable and non-suitable to the reverse J-shaped distribution according to the categorization proposed byLykke (1998).

RESULTS AND DISCUSSION

Analysis of the workshops: The perception of changes in the landscape by residents of the Mucambo community ranged from 20 years to today in different recognized phytophysiognomies, such as Cerrado, Capoeira, Chapada, and Vereda (Figure 1).We note that local perception is predominant about the most significant landscape modification after a decade in the Cerrado and capoeira phyto physiognomies (Figures 1A and 1B). As for the Chapada and Vereda, it was not possible to verify a consensus (Figures 1C and 1D), taking account of the sum of the number of similar citations for the strata time ≥ 10 years and time ≤ 5 years.

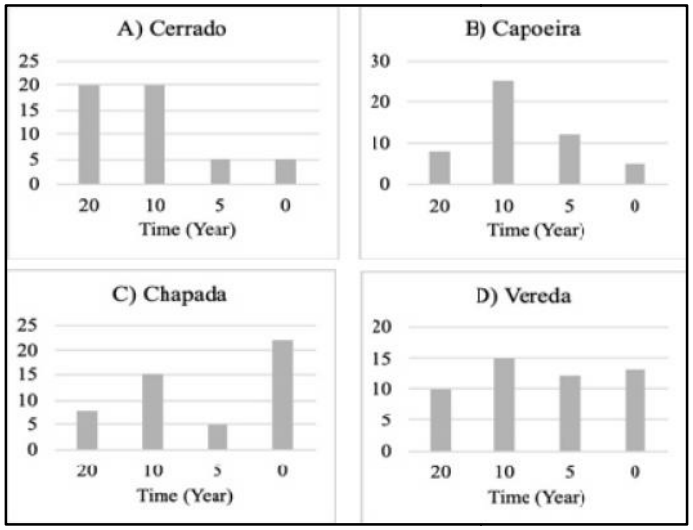

Figure 1. Historical graphs on the perception of changes in the Cerrado (A), Capoeira (B), Chapada (C), and Vereda (D) landscapes, by the residents of the Mucambo - BA community.

This expressiveness or consensus of landscape change in the Cerrado area is probably because among the four phytophysiognomies reported, Cerrado occurs like the one with the highest preference for collection, with the presence of 36 used medicinal trees, while the Chapada features 14.Other aspects that appear in the interviews is that this area has better fertility concerning the others, being more conducive to planting and the place for collection.However, it is reported that in the last 20 years, it has been raining less and less. That plant resources have not been renewed, mainly because during this period, the withdrawal of material for sale at fairs increased without due care, such as medicinal barks. The landscape changes for the Pedra Negra da Extrema community ranged from 10 years to today within two reported phytophysiognomies, Alagadiço, and Caatinga (Figure 2). There was a consensus on the perception of the period when significant changes in both landscapes began to occur; it was in the period ≥ 5 years.

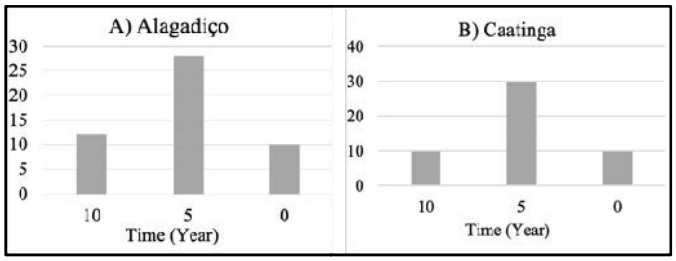

Figure 2. Historical graphs on the perception of changes in the Alagadiço (A) and Caatinga (B) landscapes, by residents of the Pedra Negra da Extrema - BA community

It is observed that the area of greatest predilection is the Caatinga with 90% of citations, due to the greater availability of plant resources when compared to the Alagadiço area, with the presence of 45 and 5 medicinal species used, respectively.It was also observed that the declared period in which significant changes in the landscape began to occur coincided with the period of severe droughts in the region; according to residents' reports, there were five years without significant rain.The drought explains how the Alagadiço area does not appear as a predilection area for collection, since rain is necessary to the São Francisco River flood or overflow and, with that, the temporary flooding of the area called Alagadiço would renew the landscape, a situation that hasn't happened.In this context, there is a focus on intensifying the use of plant and medicinal resources from the Caatinga for commercial and subsistence activities, which may lead to extrapolating the local resilience capacity, corroborating with a greater modification of the landscape. Even so, it is clear that both in the Mucambo and Pedra Negra communities, for the most part, the residents prefer to collect firewood in a non-destructive way, that is, they collect from plants that have fallen (Figure 3).Probably, this preference is because there is no high requirement for wood integrity for use as fuel since to be used, the wood only needs to be dry.This situation can explain the low value for the cut option in the Pedra Negra community when compared to the Mucambo community (Figure 3B).Unlike the Mucambo community, in which the highest number of citations for the cut option was found (Figure 3A), which may be associated with the commercial production of artisanal cookies, as part of the complementary income of this community.The better quality of the wood reflects in the higher energy yield so that on some occasions, “noble” woods are selected because they result in a better performance of the activities and consequently greater saving.

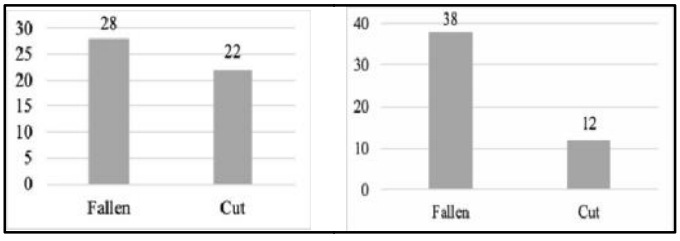

Figure 3.Preference state of plant material for the use of the firewood category in the Mucambo - BA (A) and Pedra Negra da Extrema - BA (B) communities

For the construction or technology category, we observed that the residents interviewed, in their majority, declared their preference for better quality wood, called “noble”, for the construction of boats, houses and shacks (Figure 4).In both communities, we verified unanimity for the demand and use of the best quality wood for the manufacture of boats (Figures 4A and 4C).Besides the predominance of the use of the same type of wood for civil construction, 76% for Mucambo (Figure 4B) and 88% for Pedra Negra da Extrema (Figure 4D).

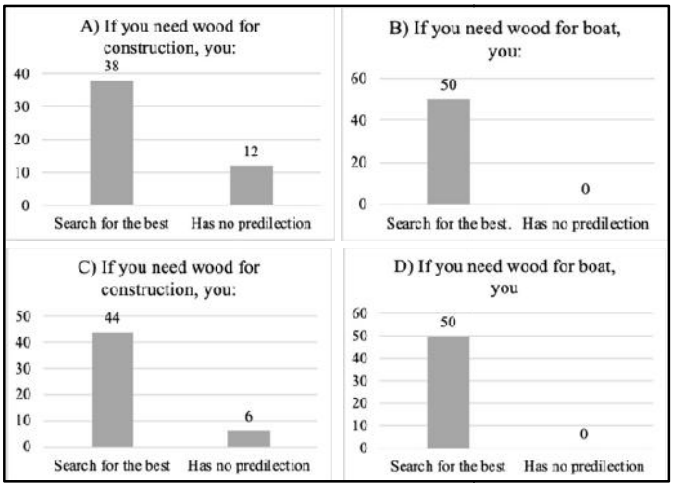

Figure 4. Predilection of wood quality for use in the construction (A and C) or technology (B and D) categories for the Mucambo - BA and Pedra Negra da Extrema - BA communities, respectively

The construction and technology categories are activities that involve the safety and physical integrity of the individual, and it is necessary to have a minimum guarantee in the construction of homes and boats, to try to minimize the risks of compromising the structure.About boats, specific woods are needed so that they do not rot or sink.The construction of houses and boats is relatively complicated compared to the construction of tools. It requires better quality wood, establishing a relationship between lower cost and greater benefit, adding economic value. It was considered the versatile plant is one that is included in more than one use category (medicinal and fuel), and the exclusive plant is assigned to only one use category (fuel only).The selection of versatile plants and plants exclusive to the most residents interviewed from the two communities does not depend on the location of the plant of interest.In this sense, 80% of the population from the Mucambo community (Figure 5A) and 92% from the Pedra Negra da Extrema community (Figure 5B) reported preferring to look for an exclusive plant rather than a medicinal plant, even if it means search in more distant areas.

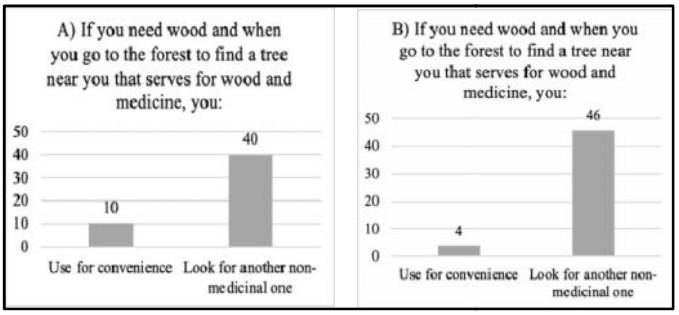

Figure 5. Selection of a versatile plant and an exclusive plant based on the distance criterion for use in the fuel category in the Mucambo - BA (A) and Pedra Negra da Extrema - BA (B) communities

The medicinal use of plants in communities is considered cultural heritage, and for generations, the traditional knowledge has been passed down from the oldest to the youngest.The phytotherapeutic potential of medicinal plants is recognized by relating them to the well-being and survival of communities.It was observed that medicinal plants are still used regardless of the distance from the urban center. The residents from both communities, Pedra Negra da Extrema (located at 80 km from the urban center) and Mucambo (located at 12 km from urban center), use the medicinal plants.Although, in many situations the individual chooses to collect trees closer to the community, for reasons of convenience or safety, even though it is inserted in categories that are linked to the well-being of the community (Albuquerque, 2006a), the residents give more importance in have herbal medicines available because they are often the only resource available. This recognition of collective dependence contributed to the development of a practice or policy for the preservation of predilection species.In the Mucambo community, two activities emerged, one of mitigating the removal of trees, with 35 citations; and the other to return the seeds, with 45 citations (Figures 6A and 6B).The return of seeds is configured as the action of using the pulp of the fruits and not discarding the seeds in common garbage, but returning them to the environment, in the same places where collections were made or in similar or close places.Similar places are those with similar floristic composition, have the same types of trees, and availability of resources in general.

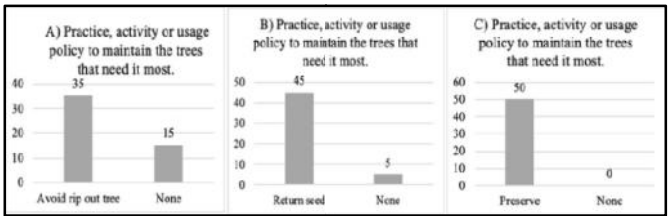

Figure 6. Development of practices, activities, or internal policies for the preservation of predilection species in the Mucambo - BA community: (A) avoid uprooting and (B) return seeds; in the Pedra Negra da Extrema - BA community: (C) preservation area.

In the Pedra Negra da Extrema community, the category/practice that emerged was “Preserve” with 100% of citations (Figure 6C).This practice was defined for Alagadiço phytophysiognomy as an area for preservation, determined from a consensus in the community. Although this area is not the most preferred for collection, it has some exclusive plants used by the community, in addition to being part of a riparian forest of the community's water supply river, in which fishing activities are developed as a source of income. Awareness regarding the use of plant resources corroborates the way of extracting the bark of medicinal species in the vertical direction.In the Mucambo community, 70% of respondents declared extracting the bark vertically, while in Pedra Negra da Extrema 100% replied that they remove it in the same way, “from the bottom up” (Figure 7).The extraction way of the bark adopted reduces the damage to the tree, making the plant resource available for a longer time, in contrast to the form of extraction in the horizontal direction, which would lead to the death of the plant due to the phloem removal.Also, the communities declared to extract the bark rotationally.They wait for the plant healing to occur before removing the bark again from the same individual, always looking for a tree that did not suffer disturbance close to the collection period.Therefore, the results obtained with the workshops demonstrate a greater awareness of the communities regarding care for the landscape.

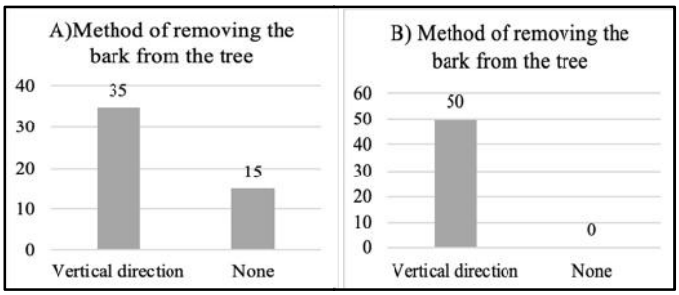

Figure 7. Bark removal method of woody medicinal species in the Mucambo- BA (A) and Pedra Negra da Extrema - BA (B) communities.

Analysis of the Interviews: In the understanding of the residents, the same landscape was defined in different ways, which we determined by categories (Tables 1 and 2).A category that had citations from all residents was not declared and, despite not having equity with the literature, essential characteristics of each identified physiognomy were mentioned.Perceptions that demonstrated the residents could understand and distinguish the areas and the dynamics of the landscape, such as the time of flowering, fruiting, and flooding, for example. The area characterized by residents as Alagadiço is described as an area close to the river, and that floods with the São Franscisco River flood.The diagnostic characteristics reported by

them are consistent with that observed *in loco*.This area has an expressive extension that is closer to the river than the caatinga area, distancing approximately 10 km.It has many gaps in vegetation; the soil has a clay/cracked clay appearance, suggesting the presence of water in specific periods of the year, which is related to the reports.

Table1. Phytophysiognomy characterization, according to local classification and number of citations by trait, Pedra Negra da Extrema - BA community

Areas	Categories	Number of citations
Alagadiço	Presence of water	20
	Near to the river	10
	Open vegetation	16
	Clayey soil	20
	Thick trees	2
	Tall trees	11
	Island	1
	Do not know	11
Caatinga	Open vegetation	8
	Closed vegetation	28
	Sandy soil	19
	Thin trees	5
	Old trees	8
	Dry vegetation	5
	Lumpy soil	3
	Do not know	12

The Caatinga was described by local knowledge as an area of the forest because, concerning the Alagadiço, it has a larger number of trees.They describe the area as a place of plants with many thorns and trees that loose leaf at a time of the year.This is the that characterizes the semiarid regions, such as the Caatinga (Rodaland Sampaio, 2000; Veloso et al., 1991), present in the studied transition area.

Table 2. Phytophysiognomy characterization, according to local classification and number of citations by trait, Mucambo - BA community

Areas	Categories	Number of citations
Capoeira	Plant species	17
	Non-productive	7
	Thin tree	5
	Dry vegetation	24
	Productive area	2
Cerrado	Plant species	41
	High area	4
	Thick tree	10
	Dry vegetation	14
	Latossolovermelho (Oxisol)	8
	Productive area	4
Chapada	Plant species	35
	Flat area	6
	Thick tree	9
	Dry vegetation	6
	Latossolovermelho (Oxisol)	2
Vereda	Plant species	19
	Presence of water	18

Unlike the perception of the landscape of the Pedra Negra da Extrema community, for the Mucambo community, it was possible to verify equity in the definition of the residents interviewed when compared to the literature, being that: capoeira is the dirty field; Cerrado is the cerradão; Chapada is the rocky Cerrado; and Vereda that is the Vereda itself.Ribeiro et al. (1984) Ribeiro and Walter (1998) briefly describe that: (1) Dirty fields have almost exclusively herbaceous vegetation, and the existing tree individuals are poorly developed; (2) Cerradão is marked by traces of drought resistance, has a configuration with species that occur in the Cerrado and Forest; (3) Rocky Cerrado is characterized by its tree-shrub vegetation, and rocky environments; (4) Vereda is the phytophysiognomy that stands out for the presence of water and species of palm trees such as Buriti (*Mauritia flexuosa*). The mentioned aspects correlate with the areas addressed (Table 2), such as physical-chemical characteristics of the soil that influence not only the coloration, but the composition of the present vegetation, when the residents interviewed mention Latossolo Vermelho (oxisol) and the presence of crooked trees; the influence of climate change (season) on the availability of resources, when they report on the dry season when the plants are leafless; and the degradation that is strongly present in the community since many areas are considered unsuitable for production due to agricultural exploitation; situations related to the action of fire were sporadically mentioned during the interviews.The community's stance concerning the presence of fire demonstrated that they attribute their presence to intentional and criminal actions, and not to a natural occurrence so that this was not mentioned as an attribute.These aspects mentioned are in line with the scenario of continuous and accelerated deforestation, which according toMapBiomas (http://alerta.mapbiomas.org),the Cerrado was the most affected biome in recent years, losing about 48 thousand hectares to deforestation only between October 2018 and March 2019.

Furthermore, it was noticed that visually expressive characteristics were often more addressed by communities (Tables 1 and 2). In the two communities, the highest number of citations concerns spatialization, type of vegetation, species, and soil information.The descriptions of the environments are similar to those found in the identification keys of phytophysiognomies (Ribeiro et al., 1984). So it is possible to verify that in addition to characterizing through elements, most residents recognize not only structural aspects but also the functional aspects of the landscape. Based on the concept of landscape, which is characterized by forms and elements that are beyond physical perspective (Santos, 1997; Metzger, 2001), which also considers the emotional aspects of the relationship of affectivity built-in generations (Silva, 2012), it was possible to observe an understanding on the part of the communities in this study that managed to define landscape sufficiently for their reality and their phytophysiognomies. In the ranking of predilection plants in the communities, we observed 29 and 26 plants mentioned, with an order ranging from 2.0 to 5.0 in the Mucambo community and 2.3 to 4.1 in the Pedra Negra de Extrema community, respectively (Table 3). The lowest number of plants in the ranking being those with the highest preference.

The preferred plants of the Mucambo community were hortelã miúdo (*Menthaspicata)*, lobeira (*Solanum lycocarpum*), barbatimão (*Stryphnodendron adstringens*), velame (*Croton heliotropiifolius*), baraúna (*Schinopsis brasiliensis*), jatobá (*Hymenaeacourbaril*) and vaqueta. The plant that is in the first position in the ranking is a herbaceous and exotic species,the hortelã miúdo. The higher preference for an exotic species may indicate that medicinal plants, especially exotic plants, may be associated with the use of food / recreational supplement, rather than by the therapeutic property itself. Mucambo is a community close to the urban center and has a small pharmacy, which manages to meet urgent needs.This ease of access to allopathic medicines can influence the entry of exotic crops since to grow plants in a seedbed is ease; it is always available, and it can supply needs for random and low complexity uses.Also, exotic species are less vulnerable to landscape changes compared to native species, which are often more susceptible to climatic variations and change according to the environment, needing particular situations for development and fruiting (Medeiros *et al.*, 2015). Ethnopharmacological studies demonstrate that the taste and/or smell of a plant can also influence the predilection for use(Medeiros *et al.*, 2015). Exotic plants often have higher palatability (milder flavor) than native plants, which tend to have an unpleasant taste, bitter and astringent, for example, related to the presence of certain compounds such as terpenoids, alkaloids, and tannins (Molares and Ladio, 2008; Ankli *et al.*, 1999).

In general, a single exotic plant with significant value in the predilection list is not enough to indicate any concrete situation of acculturation or loss of interest in native species.Exotic species do not always acquire space in local medical systems, as there are historical, cultural, and land aspects that can interfere with their entry (Molares and Ladio, 2008; Ankli *et al.*, 1999). In the ranking of plant predilection in the Pedra Negra da Extrema community, only native plants appear, baraúna (*Schinopsisbrasiliensis*), umburana (*Amburana cearensis*), aroeira (*Myracrodruonurundeuva*), coroá, catinga de porco (*Cenostigma pyramidale*) and umbu (*Spondias tuberosa*) are preferred (Table3). It is common to see in communities far from urban centers a reserve of plants for different uses at home, for safety

Table 3. Ranking of predilection plants in the Mucambo - BA and Pedra Negra da Extrema - BA communities

Mucambo - BA			Pedra Negra de Extrema - BA		
Plant cited			**Plant cited**		
Scientific name	**Popular name**	**Order**	**Scientific name**	**Popular name**	**Order**
Menthaspicata	Hortelã miúdo	2.0	*Schinopsis brasiliensis*	Baraúna	2.3
Solanumlycocarpum	Lobeira	2.0	*Amburana cearensis*	Umburana	2.4
Stryphnodendronadstringens	Barbatimão	2.1	*Myracrodruonurundeuva*	Aroeira	2.4
Crotonheliotropiifolius	Velame	2.2	Notidentified	Coroá	2.5
Schinopsis brasiliensis	Baraúna	2.2	*Cenostigma pyramidale*	Catinga de porco	2.5
Hymenaeacourbaril	Jatobá	2.5	*Spondias tuberosa*	Umbu	2.6
Notidentified	Vaqueta	2.5	*Anadenanthera colubrina*	Angico	2.7
Anadenanthera colubrina	Angico	2.6	Notidentified	Arnica	2.7
Notidentified	Ipê amarelo	2.7	Notidentified	Guanambira	2.7
Qualeagrandiflora	Pau terra	2.7	*Passiflora cincinnata*	Maracujá do mato	2.8
Myracrodruonurundeuva	Aroeira	2.7	Notidentified	Marí	2.8
Mauritia flexuosa	Buriti	2.7	*Genipa americana*	Jenipapo	2.8
Eugenia dysenterica	Cagaita	2.9	*Crotonheliotropiifolius*	Velame	2.9
Genipa americana	Jenipapo	3.0	Notidentified	Favela	3.0
Anacardiumhumile	Cajuí	3.0	*Hymenaeacourbaril*	Jatobá	3.0
Lafoensia pacari	Pacari	3.1	*Handroanthusserratifolius*	Pau darco	3.1
Pterodonemarginatus	Sucupira	3.1	Notidentified	Acisci	3.2
Notidentified	Timbó	3.2	Notidentified	Cruilí	3.3
Amburana cearensis	Umburana	3.2	*Caraipadensifolia*	Camaçari	3.4
Notidentified	Bureré	3.2	*Libidibiaferrea*	Pau ferro	3.5
Notidentified	Jacarandá	3.3	*Triplarisgardneriana*	Pau jaú	3.5
Caryocar brasiliense	Pequi	3.7	**Aspidospermapyrifolium**	Pereiro	3.5
Caraipadensifolia	Camaçari	3.7	*Annonacrassiflora*	Articum	3.7
Cymbopogoncitratus	Capim santo	4.0	*Stryphnodendronadstringens*	Barbatimão	3.8
Lippia alba	Erva cidreira	4.0	Notidentified	Muquém	4.0
Handroanthusimpetiginosus	Ipê roxo	4.0	*Mimosa tenuiflora*	Jurema preta	4.1
Mimosa tenuiflora	Jurema preta	4.2			
Notidentified	Mutamba	4.4			
Plectranthusamboinicus	Hortelã grosso	5.0			

Table 4. Use value (UV) of the plants of the Mucambo - BA and Pedra Negra de Extrema - BA communities

Mucambo - BA			Pedra Negra de Extrema - BA		
Scientificname	Popular name	UV	Scientificname	Popular name	UV
Eugenia dysenterica	Cagaita	0.64	*Stryphnodendronadstringens*	Barbatimão	0.38
Myracrodruonurundeuva	Aroeira	0.66	*Annonacrassiflora*	Articum	0.40
Mauritia flexuosa	Buriti	0.76	Notidentified	Cruilí	0.40
Stryphnodendronadstringens	Barbatimão	0.90	Notidentified	Jacarandá	0.42
Senegaliatenuifolia	Angico	0.96	Notidentified	Marmeleiro	0.50
	Sucupira	1.02	Notidentified	Marí	0.62
Anacardiumoccidentale	Caju	1.16	*Genipa americana*	Jenipapo	0.64
Caryocar brasiliense	Pequi	1.16	*Senegaliatenuifolia*	Angico	0.68
			Triplarisgardneriana	Pau jaú	0.74
			Schinopsis brasiliensis	Baraúna	0.76
			Mimosa tenuiflora	Jurema preta	0.80
			Libidibiaferrea	Pau ferro	0.80
			Anacardiumoccidentale	Caju	0.82
			Cenostigma pyramidale	Catinga de porco	0.84
			Notidentified	Favela	0.96
			Hymenaeacourbaril	Jatobá	1.04
			Myracrodruonurundeuva	Aroeira	1.32
			Amburana cearensis	Umburana de cheiro	1.60

Table 5. Regression or angular coefficient (b) (diameter at breast height vs.the number of individuals) and an indication of the adequacy to the diametric distribution to the inverted "J" model by species, landscape, community.

Community	Landscape	Species	b	Group
Mucambu - BA	Cerrado	*Eugenia dysenterica*	-0.18	1
		Mimosa tenuiflora	-0.50	2
	Chapada	*Senegaliatenuifolia*	-0.53	2
		Mimosa tenuiflora	-0.34	2
		Bauhinia sp.	-0.52	2
Pedra Negra da Extrema - BA	Caatinga	*Triplarisgardneriana*	-0.44	2
		Amburana cearensis	-0.55	2
	Alagadiço	*Mimosa tenuiflora*	-0.35	2
		Triplarisgardneriana	-0.10	1

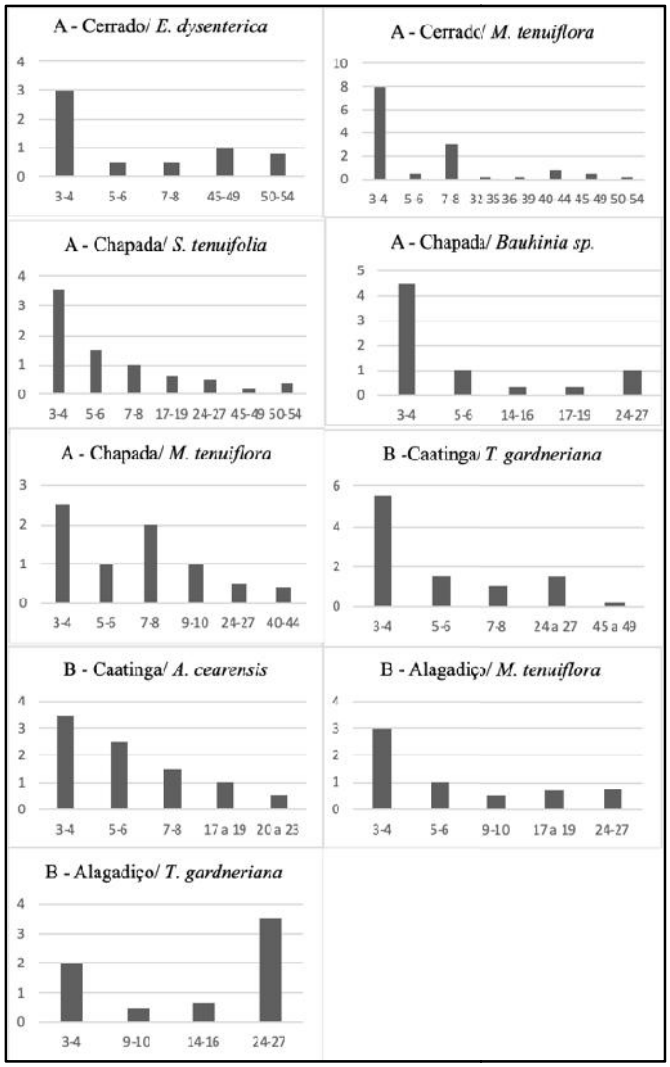

Figure 8. Diametric class distribution of medicinal plant species in the Mucambu - BA (A) and Pedra Negra Extrema - BA (B) communities. The 'x' axis shows the diametric class, and the 'y' axis indicates the number of individuals

reasons, even if they are available in the forest. For the residents of the mentioned community, having a medicinal plant, and knowing how to use it is of great importance. Another factor is the existence of considerable areas of forest, relatively close to the two communities, so that coexistence and ease of access to botanical resources can be influential in the use of native plants.This proximity to the landscape that still exists in the communities can help to clarify why these species are still a fundamental part of the local medical system.Compared with the literature, this profile is distinct from that found in many areas of the Atlantic forest, where residents need to travel greater distances to have access to native plants in the region, since in the communities there are few or no forest remnants, besides having to live with restrictions on the use of these fragments (Medeiros, 2012). Thus, opting for the cultivation of exotic medicinal plants. Both communities have cited native woody medicinal plants as the main species of preference, demonstrating that they still have importance within the local medical system, cultural habit, and widespread use in communities, with average citation values of 14.02 and 15.02 in the medicinal category per person in the Mucambo and Pedra Negra da Extrema communities, respectively.These citation values indicate representativeness or familiarity with the community's domain items.Often people who know or make more use of a specific category tend to quote more on the subject than people who know less (Quinlan, 2005). Thus, a high average of citations by people for the medicinal category may indicate that the community knows and/or makes more use of these. The Use Value ranged from 0.64 for cagaita (*Eugenia dysenterica*) to 1.16 for caju (*Anacardium occidentale*) andpequi (*Caryocarbrasiliense*) in the Mucambo community; in the Pedra Negra da Extrema community, it ranged from 0.38 for Barbatimão (*Stryphnodendron adstringens*)to 1.60 for Smelling Umburana (*Amburana cearensis*) (Table4). The plants with the highest UV for Mucambo are sought for medicinal and food use, while for Pedra Negra da Extrema they are sought for medicinal, technology, and wood use.Additionally, the plants that have the highest UVs are versatile.This type of plant belongs to more than one use category, being more locally known or popular, and mentioned by several people (Albuquerque *et al.*, 2010b). It was also observed that plants suitable for VU analysis are native plants, suggesting that communities have an essential relationship with forest areas. Therefore, based on the premise shared by Albuquerque *et al.* (2006a), that the best known may also be the most used, it is estimated

Table 6. Medicinal woody plants and their associated uses cited in interviews in the communities of Mucambo - BA and Pedra Negra da Extrema – BA

Scientific name	Popular name	Part used	Preparation	Associated use
Anadenanthera colubrina	Angico	Barkandbast	Lick, bath, local application	Flu, inflammation
Myracrodruonurundeuva	Aroeira	Barkandbast	Decoction,bath, local application	Inflammation, healing
Schinopsis brasiliensis	Baraúna	Bark	Decoction, bath, local application	Inflammation, healing
Stryphnodendron **adstringens**	Barbatimão	Bark	Tea, infusion, bath, local application	Inflammation, healing
Mauritia flexuosa	Buriti	Fruit	Oil	Healing
Eugenia dysenterica	Cagaita	Fruitandleaf	Fresh, tea	Laxative
Anacardiumhumile	Cajuí	Fruit, bark, andsap	Fresh, tea	Healing
Caraipadensifolia	Camaçari	Bark	Decoction, soak	Inflammation, healing
Cenostigmapyramidalis	Catinga de porco	Bark, bast, andleaf	Tea	Inflammation in thestomach
Hymenaeacourbaril	Jatobá	Bark, bast, leaf, and sap	Fresh, tea, soak	Inflammation, healing, anemia
Genipa americana	Jenipapo	Fruit	Juice, fresh	Anemia
Mimosa tenuiflora	Jurema preta	Bast	Bath, infusion	Healing, toothache
Passiflora cincinnata	Maracujá do mato	Fruit,fruit peel, andleaf	Juice, tea, fresh	Insomnia
Guazumaulmifolia	Mutamba	Fruit, leaf	Fresh, tea	Inflammation
Lafoensia pacari	Pacari	Bark	Soak	Inflammation in theprostate
Triplarisgardneriana	Pau jaú	Bark	Tea	Inflammation in theuterus
Caryocar brasiliense	Pequi	Fruit	Oil	Expectorant
Pterodonemarginatus	Sucupira	Fruit	Tea	Anemia andinflammation
Amburana cearensis	Umburana	Seed, bark,andbast	Tea, syrup, bath	Indigestion, flu,inflammation
Crotonhelio tropiifolius	Velame	Root, leaf,andlatex	Bath, lick, fresh	Itch, wart, infections

that they may be or will undergo intense selective pressure, which requires greater attention to these species for*in situ* maintenance. However, to be able to really understand if these species suffer higher pressure from use within these communities, complementary and more in-depth studies would be necessary since there are no studies that prove the direct relationship between use-value and resource use pressure.

Phytosociological Analysis: Seeking to understand the change in the landscape concerning the proximity or distance from houses, about the decrease and presence of native and exotic species comparatively, were included in analyzes, areas close, and with frequent use of the community.The indexes of collection of bark (IC bark) and trunks (IC trunk), for the areas of the two communities was zero since individuals with bark and trunk extraction were not identified in the field, showing that these are not factors that affect the conservation status of the landscape units.The lack of observation of extraction may have occurred because the collection sites did not coincide with the presence of injured individuals since the quadrant point does not analyze all trees in the selected area, or even because of the possibility that residents collect in areas more specific than what was indicated. For the Mucambo community, we found that the area closest to the houses showed less diversity (Cerrado: H` = 2.50) when compared to the more distant area (Chapada: H` = 3.09).The opposite was observed in the Pedra Negra da Extrema community, the area closest to houses (Caatinga) had the highest value of H` = 3.11 when compared to the most distant area (Alagadiço: H` = 2.48).

In the Mucambo community, the lowest diversity in the closest areas may have been influenced by several activities of the communities, such as: intentionally planting species of greatest interest; disposal of household waste with substances that can compromise the growth of vegetation; burning to clean areas, a common practice in communities where there is no frequent garbage collection; removal of plants to make room for small animal creations, or even when there is no intention to remove the plants, but the presence of creations causes the decrease of plants through consumption. In the Pedra Negra de Extrema community, unlike Mucambo, we found greater diversity in the nearest areas.This result was expected, considering that the most distant area, Alagadiço, was the landscape that most had spaces without vegetation due to the long drought period, which demonstrate its dependence on water from the river flooding, so that this situation can negatively influence the dynamics of the landscape and, consequently, the number of species and individuals in the area, reducing the H` value (Peroni *et al.*, 2000). The values of the slope (b) of the size distribution of the diametric class of the species considered to have a plant number ≥15, were all negative. They range from -0.18 to -0.53 in the Mucambo community and from -0.10 to -0.55 in the Pedra Negra da Extrema community (Table 5).Slope values (b) closer to zero indicate a flat distribution of diametric classes, demonstrating a structural dysfunction, declining and with multiple uses as indicated by the population, as can be seen for*E. Dysenterica* species in the Mucambu community and *T. gardnerina*species in the Pedra Negra da Extrema community (Table 5, Figure 8). Angular coefficient values (b) of the diametric class size distribution that is expressively negative (Table 5) best match the distribution of the reverse “J” model (Figure 8), that is, the species has a balanced distribution arrangement with good regenerative capacity (Souza et al., 2006).Although the distribution of the analyzed species still does not adapt to the reverse “J” model, the tangency to this model is probably related to the good environmental perception of both communities.

We found that landscapes remained with few alterations even when close to homes since most of the species that appeared were native, this can demonstrate a good relationship between the community and the landscape.Analyzing from a social perspective and observing the use of the landscape through human necessity, it is possible to perceive that the exotic elements that appear in the composition of the forest are inserted in the food category, which may suggest that the implantation of new species occurs with a subsistence interest. This issue has an economic impact since when planting and harvesting it is not necessary to purchase the product frequently, a practice that is consistent with the reality of traditional communities, where residents generally do not have a fixed monthly income or when they do, they are unable to meet their needs, which is the reality of the two communities studied.In this way, it is possible to perceive that both for the analysis of landscape population structure and the analysis of plant species, the two communities do not have any classification in group 3, which corresponds to the best adjust (very suitable) to the reverse “J” model.This data alerts to a different behavior from the studied landscapes, where a balanced growth dynamics is not found (Souza *et al.*, 2012), suggesting that plant species and phytophysiognomies can be indicated as priorities for conservation since they obtained critical results.However, there is the need to pay greater attention to the Alagadiço landscape of the Pedra Negra da Extrema community, which among all, was the one that showed the greatest inadequacy to the model and, therefore, the greatest structural problems. Phytosociology data, when compared to workshop data, suggest inconsistency of information, since even for the community with the most affected landscape unit, there are well-defined practices for conserving the local landscape.This demonstrates that there may have been noise at the time of transmission of information from the community's residents to the researcher, such as the inaccuracy of collection areas or even that these low rates were due to local climatic conditions, which may be affecting the landscape dynamics.Based on the cultural information transmitted, an informative and useful table (Table 6) was prepared, where native woody medicinal plants were selected to exemplify characteristics such as part used and associated use within communities.

Conclusion

The two communities, regardless of the distance from the centers of their municipalities, have the same level of knowledge and use of native medicines, which may be linked to the maintenance of traditional cultural habits and the close relationship of dependence of the community with the remaining forest.This relationship of life improved the environmental perception of the local population, which manages to identify and distinguish phytophysiognomies from landscapes consistent with the literature, allowing the use of natural resources satisfactorily and sufficiently for survival. When assessing whether the areas surrounding the community have less floristic diversity compared to the more distant ones, we believe it is necessary to evaluate further the role of the variables of popularity and versatility of native woody medicinal plants, related to landscape modification since models of population structure with significant structural problems and a tendency to have less floristic diversity in the area surrounding the community were observed; except for the Pedra Negra da Extrema community, as it presents particular characteristics in one of the landscape areas.

Regarding the conservation status of landscapes that have populations of native woody medicinal species, the data demonstrated that the two communities, when compared, are similar concerning species conservation since most of the species that were analyzed were found to be inadequate to the reverse "J" model.However, despite all areas having structural problems, the landscape with the most critical data is Alagadiço, suggesting greater attention and pointing out as a possible priority area for conservation. Regarding the use of woody species in the communities, although exotic and cultivated medicinal plants appear in their use lists, we observe that native woody plants have significant influence since they are highlighted in more than one category of use.We observed that medicinal woody plants that were classified into other categories are predominantly treated with greater care by the communities in question.Thus, the study showed that native species have, in specific contexts, advantages that keep them vital in local medical systems.

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