Gender differences in plant use knowledge within a traditional fishing community in northeastern Brazil

David Y.P. Tng, Deborah M.G. Apgaua, Marisa D.S. Lisboa and Charbel N. El-Hani

Research

Abstract

Background: Understanding patterns in traditional plant use knowledge is crucial for assisting policy making with regard to nature conservation, human nutrition, human health, as well as educational and participatory processes in traditional communities. We aim to document and describe local ethnobotanical knowledge and test the hypothesis that gender structures the knowledge of plant use possessed by artisanal fishers in a fishing community in northeast Bahia, Brazil.

Methods: Through semi-structured interviews and guided walks with traditional experts, we recorded the local knowledge of plant use with regard to medicine, food, wood and fibre, and ritualistic/religious practices. The data were analyzed using quantitative indices of use value (UV) and informant consensus factor (ICF), and gender differences in plant use knowledge was analyzed using a non-metric multidimensional scaling (NMDS ordination).

Results: A total of 161 ethnospecies with local names were registered, including 122 species of plants from 52 botanical families based on scientific (academic) taxonomy, which were identified along with the plant parts used, habitats, and preparation methods. Female and male traditional experts possess a different set of plant use knowledge, with women generally citing more food and medicinal plants, and men citing more wood and fiber plants.

Conclusions: Gender differences in plant use knowledge can be explained by the different occupations of the male and female traditional experts. The results of this study provide a framework for extending our ethnobotanical investigations to other traditional fishing communities, and also to examine other social and demographic factors influencing traditional knowledge related to plant use.

Keywords: Artisanal fishers, Gender differences, Northeast Brazil, Plant uses, Traditional plant knowledge

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Resumo

Contexto: Compreender padrões presentes no conhecimento tradicional sobre o uso de plantas é crucial para auxiliar na tomada de decisões políticas em relação à conservação da natureza, nutrição humana, saúde humana, assim como em processos educacionais e participativos em comunidades tradicionais. Nosso objetivo é documentar e descrever o conhecimento etnobotânico local de uma comunidade de pescadores no nordeste da Bahia, Brasil, e testar a hipótese de que há diferenças de gênero no conhecimento do uso de plantas adquirido por pescadores artesanais.

Métodos: Através de entrevistas semiestruturadas e caminhadas guiadas com especialistas tradicionais, nós registramos o conhecimento relacionado ao uso de plantas, incluindo usos medicinais, alimentícios, como fontes de madeira e fibra, e ritualísticos/religiosos. Os dados foram analisados quantitativamente utilizando o Índice de Valor de Uso (UV) e Fator de Consenso dos Informantes (ICF), e a diferença de gênero no conhecimento do uso de plantas foi analisada utilizando o método de Escalonamento Multidimensional Não Métrico (ordenação NMDS).

Resultados: Foram registradas no total 161 etnoespécies com os nomes locais, incluindo 122 espécies de plantas pertencentes a 52 famílias botânicas com base na taxonomia científica (acadêmica), as quais foram identificadas juntamente com as partes das plantas utilizadas, seus habitats e métodos de preparação. Especialistas tradicionais dos gêneros feminino e masculino possuem conjuntos distintos de conhecimentos sobre o uso de plantas: mulheres citam com maior frequência plantas de uso alimentício e medicinal, e homens citam mais plantas que são fontes de madeira e fibra.

Conclusões: As diferenças de gênero no conhecimento podem ser explicada pelas diferentes ocupações de homens e mulheres que são especialistas tradicionais. Os resultados deste estudo proporcionam um quadro metodológico para estender nossas investigações etnobotânicas para outras comunidades tradicionais de pescadores, e também para examinar outros parâmetros sociais e demográficos que influenciam o conhecimento tradicional relacionado ao uso de plantas.

Background

Human communities that occupy areas close to natural vegetation coexist with great biological diversity and possess a cultural repertoire of practices related to the uses of plants in everyday life (de Oliveira *et al.* 2012, de Santana *et al.* 2016, Sujarwo *et al.* 2016). Concerningly, the erosion of traditional knowledge and the disappearance of traditional communities worldwide is occurring at an alarming and unprecedented rate due to urbanization, land use change, modernization (Gandolfo & Hanazaki 2014, Tang & Gavin 2016), and also by the development of activities in the places where the communities dwell, such as tourism, without due attention to the local communities and their knowledge and culture (Canavan 2016, Xue *et al.* 2017).

Understanding and conserving traditional knowledge, such as patterns in traditional plant use knowledge, which are the focus of this paper, is therefore crucial for assisting not only policy making with regard to nature conservation, human nutrition, human health (Gómez-Baggethun *et al.* 2014), but also educational and participatory processes in traditional communities (Kimmerer 2002, Tengö *et al.* 2017).

In Brazil, these communities include Indigenous peoples, quilombolas (descendants of Afro-Brazilian runaway slaves), and various traditional communities of fishers, river-dwellers, rubber sap gatherers, etc., who often live in well-delineated communities in rural areas away from major cities and surrounded by natural landscapes. Our focus in this paper is on fishing communities, which, whilst characterized by fisheries as their main economic activities, may yield important sources of information for ethnobotany research. Members of such communities have been documented, for instance, to harvest plants for everyday use and even invest varying levels of management in plant cultivation (Hanazaki *et al.* 2000, 2009, Peroni *et al.* 2008).

Among the various categories of traditional plant uses typically studied in ethnobotanical surveys, the use of plants for medicinal and curative purposes is by far the most well investigated. In Northeastern Brazil, various authors have focused on medicinal plant use in various traditional communities (Borges & Bautista 2010, Cartaxo *et al.* 2010, Cunha *et al.* 2012, da Silva *et al.* 2012, de Araújo *et al.* 2018, Gomes & Bandeira 2012). In spite of these surveys, the geographical coverage of these studies is still far from complete. For instance, there are still very little studies on plant uses in traditional communities occupying the northeast shore of Bahia, particularly in artisanal fishing communities, some of them still with relatively well-preserved culture. As a corollary to medicinal plant use, Indigenous communities often have systems of religious or ritual plant use for healing or for restoring well-being (Bussman & Sharon 2006). In these instances, there are members of the community who serve in the capacity

of shamans or spiritual healers who help cure ailments through ritual use of plants (Voek 2004). By comparison, such practices are less well known in other traditional rural communities (Rodrigues & Carlini 2006), such as in fishing communities in the region we work.

Additionally, other aspects of plant use deserving attention include the use of non-conventional plant foods and also plants for construction, tool making, and technology. For our purposes, we broadly define non-conventional plant foods as wild, wayside, or naturalized plants that can supplement the nutrition of rural communities (Barminas *et al.* 1998, Kebu & Fassil 2006). Despite an increased interest in non-conventional plant foods in Brazil in recent years (Bortolotto *et al.* 2015, do Nascimento *et al.* 2013, 2015, Kinupp & Lorenzi 2014), this aspect of traditional plant use remains poorly studied in most regions. Likewise, traditional knowledge on plants used for construction, tool making, and technology is poorly documented, but yet highly pertinent for traditional communities that rely on fishing as the main source of sustenance, as fishers often use plant resources to build boats and other structures and tools involved in their fishing technologies (Andrade *et al.* 2018, de Oliveira & Hanazaki 2011).

Finally, a social factor that underlies these traditional plant uses is gender. Gender has been widely studied as a potential driver of plant knowledge, particularly in traditional communities where gender roles or professions are well defined (Torres-Avilez *et al.* 2016), as one can see, for instance, in communities where males are predominantly the providers, while females are generally home-makers and child-carers (Wayland 2001). These gender role differences have been cited as the reasons why male and female traditional experts within a community possess varying levels of knowledge across plant use categories (Müller *et al.* 2015, Torres-Avilez *et al.* 2016). However, there are still gaps to fill in the study of gender differences in ethnobotanical knowledge. Most studies on this topic have focused squarely on medicinal plants (Albuquerque *et al.* 2011, Merétika *et al.* 2010, Voeks 2007) while paying less attention to other plant use categories. Also, the bulk of these gender comparisons have employed simple descriptive statistics to compare the average number of plant citations made by male and female traditional experts (Albuquerque *et al.* 2011, Müller *et al.* 2015, Luzuriaga-Quichimbo *et al.* 2019).

To our knowledge, these gender studies have not been expanded to investigate knowledge compositional differences between female and male traditional experts. Such an approach could use multivariate analyses to characterize gender-specific structures within the body of traditional knowledge, and further the field by allowing ethnoscientists to draw more robust conclusions on differences in knowledge composition across individuals (Baudalf & dos Santos 2019), for instance, by triangulating qualitative and quantitative analyses. Other auxiliary information on the plants cited by the experts that is straightforward to compile, such as plant origin (for instance, whether a plant is native or introduced) and lifeform, can also provide valuable insights in gender plant use comparisons (Torres-Avilez *et al.* 2016, Voeks 2007), but, again, these data are frequently left out of ethnobotanical studies.

In the present study, we aim, therefore, to (1) document and describe, using a holistic approach (e.g., Crepaldi & Peixoto 2010), the local knowledge of plant use with regard to medicine, food, wood and fibre, and ritualistic/religious practices in an artisanal fishing community in northeast Brazil, and (2) test the hypothesis that there are gender differences in plant use knowledge across plant use categories, plant origin and lifeform within the fishing community.

Materials and Methods

Study area and brief historical context

The study was conducted in Siribinha (11º48'49"S, 37º36'38"W; Figure 1), an artisanal fishing community with a population of ~500 inhabitants, located in the north coast of the State of Bahia, Brazil, near the mouth of the Itapicuru River. The community is part of the Municipality of Conde and has an economy driven primarily by fishing and tourism.

The village of Conde was part of the Portuguese occupation north of Salvador, which was the capital of Brazil until 1763, and is currently the capital of the state of Bahia. The occupation in Conde began in 1549 with the first cattle corrals around the site where the city is currently located. Between 1558 and 1572, Jesuit missionaries arrived to the area where Conde is today, interacting as part of the Portuguese colonization process with the indigenous Tupinambá people who occupied the region, one of the sources of local ethnobotanical knowledge. In 1621, Portuguese settlers raised livestock, sugarcane and tobacco crops with slave labor mostly from West Africa, resulting in an important afro-descendant influence in the area. Given this historical background, current ethnobiological knowledge in the fishing village of Siribinha can be said to result from a combination of Tupinambá, Portuguese, and African influence (more specifically, from different ethnic groups from West Africa).

Figure 1. Map showing the location of the traditional fishing community of Siribinha, Municipality of Conde, Bahia, Brazil. Inset shows the state of Bahia.

The natural vegetation of the area consists of freshwater alluvial wetlands, mangroves, beach vegetation, and shrubby thicket-like forests (locally known as *restingas*) growing on sand dunes. Coconut plantations and cattle raising also make up part of the land use tenure nearby the fishing village.

The major part of the territory of Conde and all the Itapicuru estuary are located within the Environmental Protection Area of the North Coast of the State of Bahia (http://www.oads.org.br/leis/2724.pdf, accessed 26 May 2019), but this has not prevented socioenvironmental problems such as deforestation and disorderly appropriation of territory, which threaten the cultural heritage of the municipality and the ecological integrity of surrounding natural habitats. In particular, limited employment and income opportunities have led to an exodus of part of the younger generation to larger cities, thereby contributing to the erosion of traditional culture, even though a significant part of the young people from Siribinha eventually returns to their birthplace.

Interviews and guided walks with traditional experts

Between August 2018 and July 2019, we made door-to-door visits in order to identify local people with specialized knowledge on plant use (Davis & Wagner 2003), *i.e.*, traditional experts. Our sampling approach was intentionally non-random (Albuquerque *et al.* 2014a), under the assumption that local experts would provide more specific and higher quality information concerning plant use. During our first contacts with the community the inhabitants themselves identified the traditional experts, who we define as "individuals recognized by the community as having deep knowledge about the traditional uses of native and/or introduced plants". Using the snowball method (Bailey 1994), names of other experts were then obtained during the interviews. Eventually, we interviewed a total of 28 traditional experts in Siribinha (17 women and 11 men), with ages ranging from 43 to 82. All the interviewed traditional experts had lived in the community for at least 30 years and were frequently sought out by other community members for advice on plant use. The interviewed men are currently active or retired fishermen (locally known as "*pescadores*"), and the women are primarily homemakers who sometimes fish or specialize in collecting crabs, especially Aratu-vermelho (*Goniopsis cruentata*). Women who fish or catch

crabs are locally known as *pescadoras* or *marisqueiras*. One of the female traditional experts interviewed is also regarded in the community as a "*rezadeira*", that is, she is recognized as one who is able to provide benefits from praying or bestowing blessings.

We used semi-structured interviews (Albuquerque *et al.* 2014b), which best suited our research goals and were also readily accepted by the local community. Our interview protocols were designed to gather information about the medicinal, food, manufacture (particularly, of fishing artifacts) and ritual/religious uses of plants, plant names, plant parts used, and preparation methods where relevant. All interviews were conducted in Brazilian Portuguese, and experts were interviewed individually, as recommended by Phillips and Gentry (1993), to ensure that responses were independent. During the course of the interviews some traditional experts brought us on guided walks (Albuquerque *et al.* 2014b) through their gardens or through the natural vegetation in the vicinity of their houses to describe the plants they use. Each interview lasted approximately an hour.

We analyzed how community members use plants in four basic categories: (i) medicine, (ii) food, (iii) ritual/religious uses, and (iv) plants providing wood and fibre for manufacturing fishing artifacts and home construction. For descriptive and tabulation purposes, we further subdivided the plants used for making fishing implements (boats, canoes, fishing fences, etc.) and plants for home construction. We also further defined a subcategory of non-conventional plant foods under the food plants category, defined by Kinupp and Lorenzi (2014) as species collected from the surrounding environments or planted in gardens in order to supplement conventional food. This subcategory also includes native or naturalized fruits harvested from surrounding habitats (Lorenzi *et al.* 2015). As part of our analysis to see if there are gender differences in plant lifeform spectra, we categorized all cited plants into four basic lifeforms: tree, shrub, herb, and climber.

Plants were identified in the field, or where identification was not possible, a sample was brought back to the lab and identified at the herbarium at the Institute of Biology, Federal University of Bahia, using the literature (Lorenzi & Matos 2008) or through consultations with experts. In the case of plants used for construction of houses or boats, it was not possible to ascertain the botanical names of most of the species, because many of these plants are sourced from forests that no longer exist, from other localities, or are commercially sourced. However, we listed genus names for species that are well known commercially. Plants were classified in terms of their origins as native (to Brazil), or non-native and naturalized based on the online flora of Brazil (reflora.jbrj.gov.br/, accessed 26 May 2019), and the cultivated status of each species was also noted.

Data analysis

To summarize the overall pattern of plant use, we employed Venn diagram analyses to show how many plants fell within single or multiple categories of the four basic plant use categories: (i) medicine; (ii) food in general; (iii) wood and fibre sources for construction and fishing-related technology; and (iv) ritual/religious plant use. As part of our aim to document and describe traditional plant use in the community, the second step in our data analysis was to calculate two indices related to plant use, the Use Value (UV) for each species cited, and the Informant Consensus Factor (ICF) for each plant use, distribution and lifeform category. The UV shows the relative importance of each species known locally, which we calculated following the formula: UV = U/N, where U refers to the number of citations per species, and N refers to the number of traditional experts interviewed (Gürdal & Kültür 2013). The ICF denotes the degree to which traditional experts exchange information about plant use, which we calculated using the following formula: ICF = N_{ur} - N_t/N_{ur} - 1, where N_{ur} refers to the number of use citations in each category and N_t is the number of species indicated in each category (Cartaxo *et al.* 2010). Therefore, ICF values will be low (approaching 0) if plants are chosen randomly, or if traditional experts do not exchange information about their use, but high (approaching 1) if information is exchanged among them. For the ICF index, we divided all cited plants into 12 categories: medicine, food in general, non-conventional food plants, manufacturing and technology in general, fishing-related technology only, ritual/religious plant use, distribution type (native or non-native), lifeform categories (tree, shrub, herb, and climber).

We tested the overall difference in the number of plants cited by male and female traditional experts and also plants within the 12 categories using a student's *t*-test ($\alpha = 0.05$). A linear regression ($\alpha = 0.05$) was used to determine if the age of traditional experts determined the number of plant species cited. We also identified major gradients in plant use knowledge using non-metric multidimensional scaling (NMDS) ordination, using a Jaccard distance matrix, and plotted the first two NMDS ordination axis scores as a scatterplot to show the plant knowledge compositional patterns across all traditional experts interviewed. For better interpretability, male and female traditional experts were depicted with

separate markers in the scatterplot. For this analysis we included all cited plants and performed Spearman-rank correlations for each species with each NMDS axis in order to examine the main species driving patterns in the ordination. We presented along with the scatterplot the species correlations with ordination axes where the correlation coefficient was $r < -0.5$ or $r > 0.5$ ($p > 0.05$). We also tested if the knowledge composition of male and female traditional experts differed using a permutated multivariate analysis of variance (PERMANOVA) with a significance level of 0.05 and 999 permutations. Ordinations and PERMANOVA analyses were performed using the *vegan* package in R (R Core Team 2018).

Results

We recorded 161 ethnospecies of which 39 cited plant records could not be identified based on academic scientific taxonomy and, thus, only local names are presented here (Figure 2a; Table S1). Among the species we could identify based on the latter taxonomy, we recorded 122 species belonging to 104 genera and 52 families (Table S1). The top five botanical families with the highest number of species with cited uses were Fabaceae (12 spp.), Myrtaceae (8 spp.), Arecaceae and Lamiaceae (7 spp. each), and Anacardiaceae (6 spp.) (Table S1). Plants with the highest Use Values (UV) were *Lippia alba* (UV = 0.82), *Dysphania ambrosioides* (UV = 0.61), *Rhizophora mangle* and *Manilkara* spp. (both UV = 0.57), and *Myrciaria floribunda* (both UV = 0.54).

Medicine and food plants comprised the highest number of citations (81 and 68 spp., respectively), and, among the food category, 50 spp. may be considered non-conventional plant food. For wood and fibre plants, traditional experts cited 47 spp., among which 43 spp. were cited for fishing technology. Plants used in religious or ritual contexts numbered 11 spp. A number of species featured in multiple use categories (Figure 2a), with the highest number of plants shared between the food and medicine categories (26 spp.). A more detailed section on traditional plant use descriptions and culturally relevant notes are provided in the Supplementary Material.

In general, we found high information consensus values (ICF) within all categories of plant use, distribution type, and lifeform (all ICF ≥ 0.65), with the highest ICF values documented in plants used for religious or ritual purposes (Table 1). Female traditional experts cited on average more plants (23.7 spp.) than male traditional experts (20.5 spp.), although a *t*-test comparing these means was not significant. However, female traditional experts cited significantly more medicinal plants, food plants, non-native species and plants from the herb lifeform than males. In turn, male traditional experts cited significantly more plants used for fishing technology than females (Table 1). Our PERMANOVA analysis showed that male and female traditional experts possessed a significantly different set of plant knowledge ($F = 3.395$, $p > 0.001$), with female traditional experts citing a group of five species used variously for food or home-grown remedies which were not cited by males, while males cited species used for construction that were not cited by females (Figure 2b). Age of the traditional experts did not have a significant bearing on the number of plants each one of them cited (Linear regression, $R^2 = 0.02$, $p = 0.53$).

Discussion

Globally, cultural knowledge of rural communities is under threat from urbanization, land use change, impacts on productive practices, growth of other activities such as tourism, etc. Therefore, it is critical to understand patterns of this cultural knowledge, both for the sake of conserving cultural diversity and for maintaining the resilience of socioecological systems. Using a holistic approach, we documented a diverse cultural knowledge of plant use for medicinal purposes, feeding, wood and fibre extraction, and ritual/religious purposes in an artisanal fishing community in northeast Brazil, and uncovered a number of gender-related trends specific to this body of cultural knowledge.

The broader context of medicinal plant use

The medicinal plants used by the communities belong to a broader regional milieu of medicinal plant knowledge (di Stasi *et al.* 2002, Lorenzi & Matos 2008), as supported by the high informant consensus factor that we obtained for the medicinal plant category. The domestic cultivation of the most commonly cited species *Anacardium occidentale*, *Cymbopogon citratus*, *Dysphania ambrosioides*, and *Lippia alba* (Figure 3a) have been reported for other Indigenous (Albuquerque *et al.* 2009, Borges & Bautista 2010, Cunha *et al.* 2012), Afro-Brazilian (Quilombola) (Gomes & Bandeira 2012, Lisboa *et al.* 2017, Mota & Dias 2016), and rural communities in the region (Almeida *et al.* 2014, Bandeira *et al.* 2015). Many of the species cited are also available commercially in regional markets within the state of Bahia (de Araújo *et al.* 2018, authors' pers. obs.). Likewise, the use of various species of *Ocimum* as reported in this study has also been previously documented in the region (Holanda & Albuquerque 1998). Also, many plants listed by the community specialists are herbaceous or naturalized plants, a pattern that has been noted by Voeks (1996).

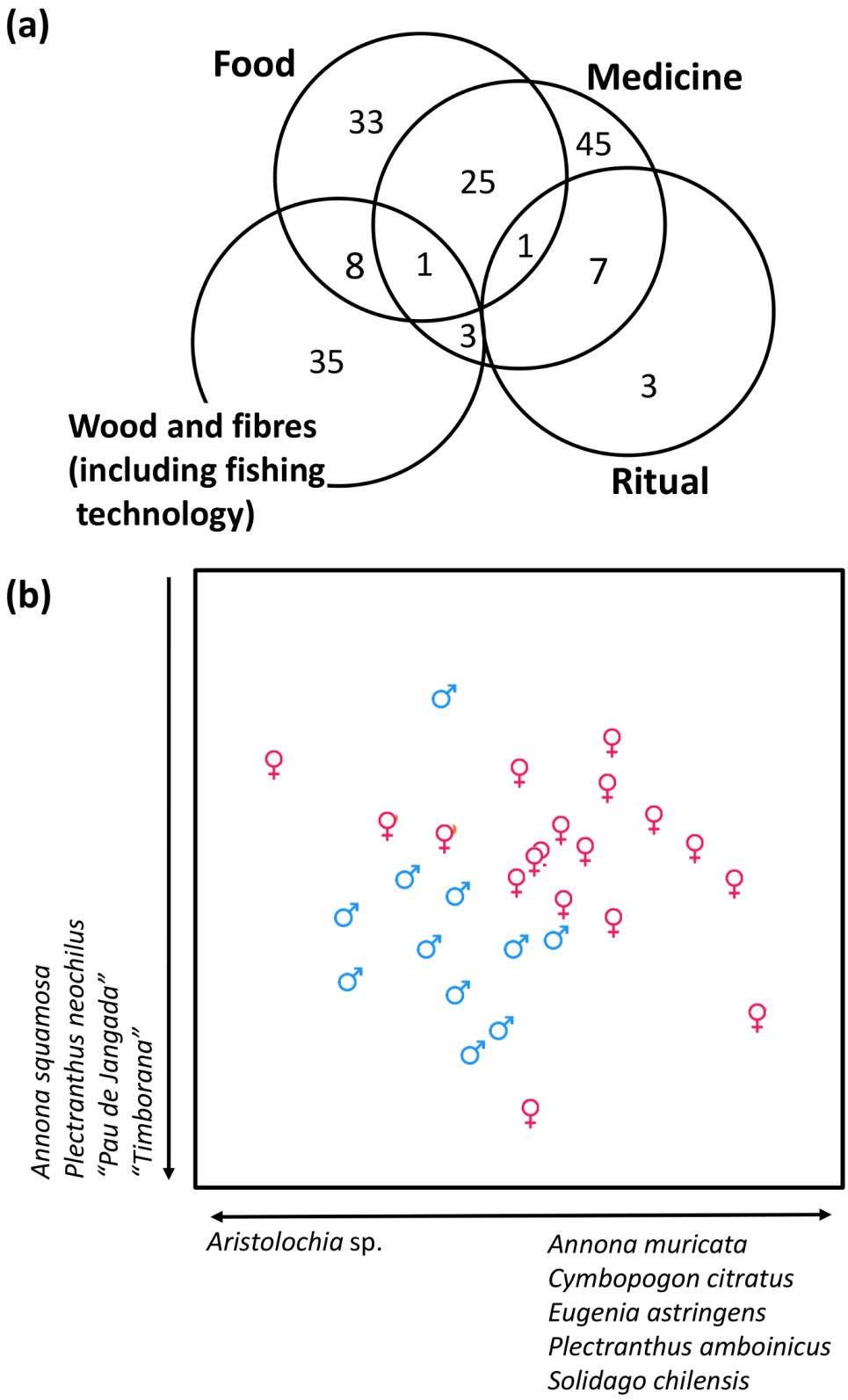

Figure 2. Venn diagram (a) showing the number of plants cited within each plant use category. The patterns of plant knowledge composition of the 28 traditional experts (depicted by the 11 male and 17 female symbol markers) are visualized in a Non-metric multidimensional scaling ordination (b). The plants listed along each axis represent the species which had a Spearman-rank correlation of $r > 0.5$ or < -0.5 ($P > 0.05$) with each ordination axis, signifying their influence on the ordination patterns. Both Venn diagram and ordination analyses used the full dataset of 161 cited plant species.

Table 1. Mean number of citations of plant uses within each category by male and female traditional experts in a traditional fishing community in northeast Brazil. #For the plant distribution category, the figures are based only on the 116 plant species which we could identify at least to genus level. Means and inferential statistics for climbers were not calculated due to low number of citations in this category. T-statistics of t-tests and p values comparing the number of citations of plants under each category by female and male fishers are presented. Significant *p* values are highlighted. The abbreviation ICF refers to the Informant Consensus Factor.

	All traditional experts	Women	Men	*T* (*p*)	ICF
All	20.5	23.7	20.5	2.034 (0.056)	N.A.
Medicinal	12.4	15.1	8.4	**3.365 (0.003)**	0.77
Food – All	11.8	13.5	9.0	**2.316 (0.032)**	0.80
Food – non-conventional plant foods only	8.2	8.9	7.0	1595 (0.127)	0.80
Construction & technology in general	5.2	3.9	7.18	0.885 (0.391)	0.79
Fishing technology only	6.3	4.1	9.6	**2.788 (0.011**)	0.76
Religious/Ritual	2.5	2.8	2.0	0.549 (0.590)	0.86
#*Plant distribution or lifeform*					
Native species	14.1	13.2	15.6	1.057 (0.304)	N.A.
Non-native species	8.2	10.3	5.0	**4.860 (> 0.001)**	N.A.
Tree	8.6	10	7.1	1.406 (0.176)	N.A.
Shrub	5.5	6.6	4.3	1.470 (0.157)	N.A.
Herb	3.9	6.0	1.4	**4.689 (> 0.001)**	N.A.
Climber	N.A.	N.A.	N.A.	N.A.	N.A.

However, some members of the community are also stewards of knowledge regarding medicinal plants in the natural vegetation in the area. For example, traditional experts cited the use of *Anacardium occidentale* and *Schinus terebinthifolia* for skin problems and female genitourinary disorders, in line with recent reports for other riverine fishing communities in the region (Paiva *et al.* 2017). Other notable examples include the harvesting of *Chrysobalanus icaco* (Figure 3b) and *Periandra mediterranea* from the surrounding vegetation for medical use.

The common names applied to medicinal plants deserve special mention. In particular, we came across a common name, *Acanfo*, applied to *Periandra mediterranea*, for which we could not find references in the literature. Previously, other workers had reported the use of this plant under the names *Acançu* (Almeida *et al.* 2010), *Arcançuz* (da Silva *et al.* 2012), *Alcaçuz* and *Alcançuz* (Gomes *et al.* 2012), from various other localities inland in the state. These site-specific differences in names may reflect phonetic changes in local names being applied to a single plant, as people from the communities move from place to place.

Food plants

As with medicinal plant use, the use of plants for consumption as food fits into the two categories of cultivated for domestic use and wild harvested (Figure 3c), and some of the species overlap with plants used for medicine. Various of the plants used have also been reported for other communities in the Bahia state (Agra *et al.* 2008, do Nascimento *et al.* 2015, Mota & Dias 2016, Neto *et al.* 2014, Rodrigues & Guedes 2006).

Religious and ritual use of plants

We describe for the first-time specific details and attitudes relating to religious and ritualistic practices involving the use of plants in blessing and prayers in fishing communities from Bahia. Notably, most of the plants listed under this purpose are naturalized or cultivated, with the exception of *Protium heptaphyllum* and *Schinus terebinthifolius*, and the species cited have also been documented to be used in other communities (Crepaldi & Peixoto 2010, de Oliveira *et al.* 2009, Varella 1973). Although community members of Siribinha are predominantly Christian (mostly Catholic, but with a growing number of followers from neo-Pentecostal churches), the influences of Afro-Brazilian religions are still conspicuous, particularly in the use of *Jatropha gossypiifolia* (Figure 3d; Pires *et al.* 2009, Varella 1973).

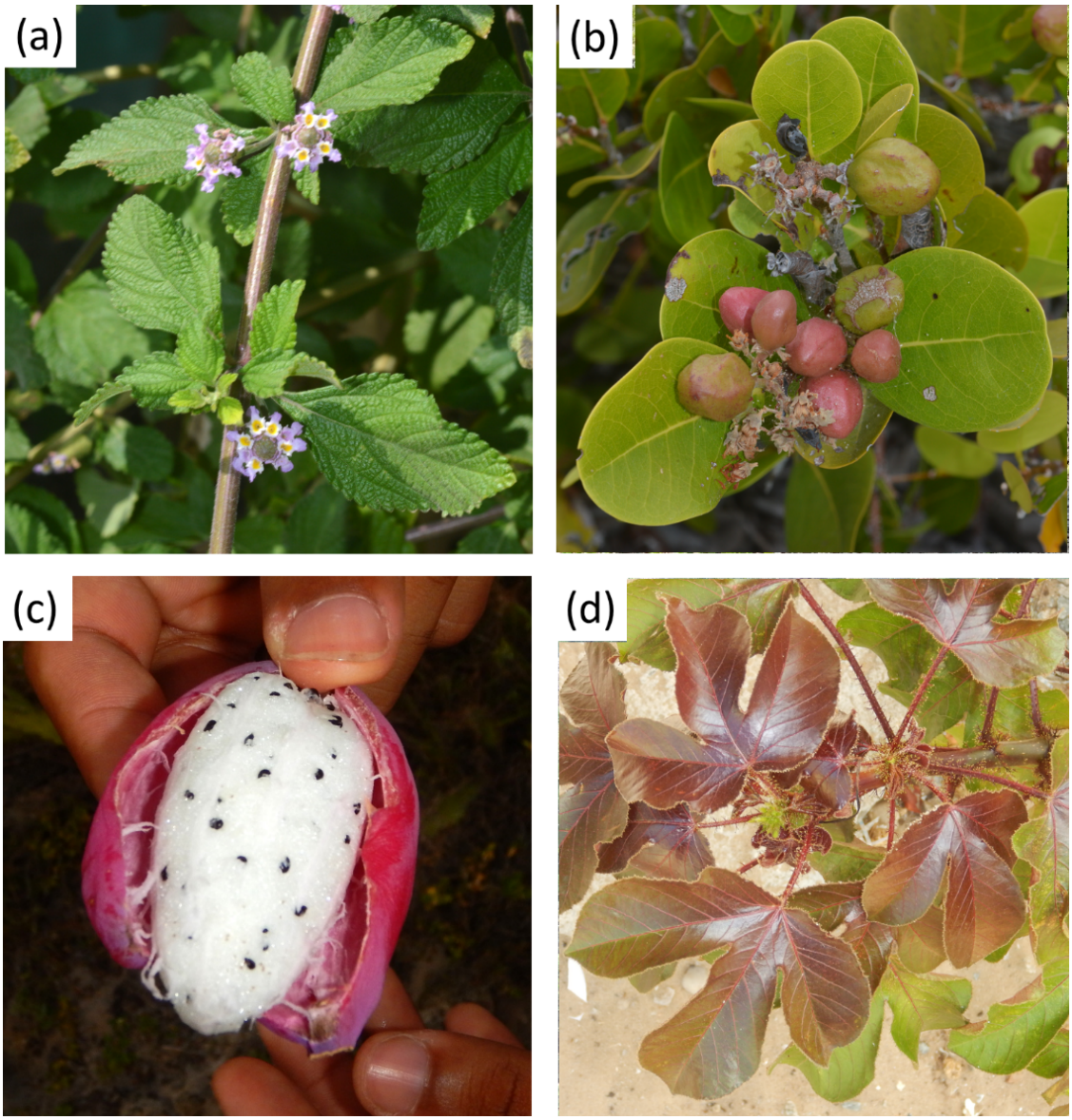

Figure 3. Medicinal plant use in a traditional fishing community in Siribinha, northeast Bahia, Brazil, includes cultivated plants broadly used in the region, such as (a) *Lippia alba* (Verbenaceae) and also (b) wild-harvested species, such as *Chrysobalanus icaco* (Chrysobalanaceae). Non-conventional plant foods such as (c) *Cereus fernambucensis* (Cactaceae) are also utilized by the community. The leaves of (d) *Jatropha gossypiifolia* (Euphorbiaceae) are used in blessing rituals.

Wood and fibre plants for construction and fishing technology

Plants used for construction and fishing technology (Figure 4) have been documented by various studies in the region. Leaves and fibres of palms such as *Attalaea funifera* (Figure 4b), *Bactris* spp. and *Syagrus* spp. feature prominently in traditional use in the region (Lorenzi *et al.* 2000). This is also the case of the use of mangrove wood to construct houses (Bezerra 2008). However, in the community investigated in the present study, wood material for the construction of houses is largely sourced from *Manilkara* spp. (Table S1).

Canoes were previously constructed using a single trunk, and the fishers also used *jangadas* made of several trunks, but boats made of several wood planks were introduced later, around 30 years ago. Among the species we documented for canoe making (Table S1), only *Artocarpus heterophyllus* was also cited in previous literature (Andrade *et al.* 2018).

It is interesting to note that in other ethnobotanical studies carried out in shore communities, the use of species for constructing fishing artifacts has not been mentioned (Lopes *et al.* 2013).

Figure 4. Wood resources and fibres used in construction, fishing artifacts, and daily-use implements in an artisanal fishing community in Siribinha, northeast Bahia, Brazil. (a) *Rhizophora mangle* (Rhizophoraceae) wood and coconut palm leaf thatch used to construct boat shelters; (b) slivers of the leaf rachis of *Attalaea funifera* (Arecaceae) palms bound together by cordage of *Davilla flexuosa* (Dilleniaceae) to make *covos*, local traps for capturing shrimp (small-sized version), Aratu-vermelho (*Goniopsis cruentata*) and small fishes (medium-sized version), and *siris* [another kind of crab] (larger-sized version); (c) a needle used to make and mend nets, carved from *Tocoyena bullata* (Rubiaceae); (d) broom heads made from the leaf fibres of *A. funifera*.

Gender-specific patterns in traditional knowledge

Women from the community generally possessed more knowledge of plant foods and medicines, while men had more knowledge about wood- and fibre-producing plants, in keeping with gender role differences within the community and data from previous studies (Torres-Avilez *et al.* 2016). The gender differences found in the study can be explained by the traditional experts' different occupations. The male traditional experts are active or retired fishermen and, thus, possess more knowledge of plants used to build boats, fishing artifacts, and also houses. In turn, the female traditional experts are mostly home-makers, often involved in cooking and healing, and thus exhibit more knowledge on plants used as food and medicines.

Women cited more non-native species and herb species than men, which is in part a function of their

superior knowledge on readily harvestable medicinal plants from waysides, but which likely also reflects the role they play in cultivating home gardens with useful herbaceous food and medicinal plants, as supported by our field observations. The role of home gardens as a reservoir of useful plant resources in the community is a potential avenue for follow-up research.

In terms of knowledge compositional differences, our multivariate analysis represents a novel approach for visualizing patterns in plant use knowledge between genders and across individuals (Baldauf & dos Santos 2019). Previous work on this issue has typically just compared average number of citations or use value differences between male and female traditional experts (Camou-Guerrero *et al.* 2007, Torres-Avilez *et al.* 2016), which does not account for differences in the body of knowledge across individuals. Moreover, our ordination also helped us to identify citations of species that are driving these differences (Figure 2b). While we sampled within a single community, we anticipate that multivariate analyses will serve as a useful framework for an expanded analysis will serve as a useful framework for carrying out analyses in different traditional communities.

The maintenance or erosion of traditional knowledge

There was a consensus among the traditional experts that their knowledge on plant use is undergoing a progressive dilution along the generations. However, this claim that succeeding generations have less knowledge on plant use requires further investigation. Such claims have been challenged on at least one count by Vandebroek and Balick (2012), who studied people who use plants to self-medicate in the Dominican Republic. While age of the traditional experts did not appear to be a factor in the number of plants our traditional experts cited, we interviewed mostly middle-aged to old-aged individuals and, therefore, the method used in the present study was not adequate for fully testing age as a driver of plant knowledge. It would therefore be a worthy follow-up study to conduct more formal interviews with people of all age groups in the community.

More critically, landscape change in the region has meant that certain forests where medicinal plants used to be collected have now been felled. Indeed, environmental degradation and large changes in modern social and economic systems are well known to be drivers leading to a reduction in traditional medicinal plant use (Anyinam 1995, Srithi *et al.* 2009). For instance, some of the traditional experts reported that some forests where they used to collect certain medicinal plants or harvest wood for home or watercraft construction are no longer extant.

As it has been reported for other communities in the state of Bahia, modernization and the increased access to formal education and availability of modern pharmaceuticals may lead to traditional domains of medical knowledge being increasingly perceived as an irrelevant province of past generations (Gandolfo & Hanazaki 2014, Voeks & Leony 2004). However, it is noteworthy that Siribinha has only a small health facility, where a doctor only attends once a week, and, therefore, the community still relies to a large extent on their ethnomedical knowledge and local healers. It is worth investigating whether some integration between Western scientifically based medicine and ethnomedical knowledge systems has been taking place in Siribinha, as it has been reported for other communities in Northeast Brazil (Medeiros *et al.* 2016).

The substitution of materials used in fishing artifacts (Figure 4) is probably one of the most prominent observations made during the study. Fishermen in the village no longer make nets using plant material due to the availability of more durable nylon thread, as is the case in most, if not all the fishing communities in the Brazilian Northeast shore. Accordingly, only the elderly generation holds the knowledge on how to process the plant fibres to make nets. To preserve this aspect of artisanal knowledge, videos are being recorded of how fishers used to make nets. In other cases, for instance, in the traps called *covos* (Figure 4b), we still observe in the community the use of traditional plant materials. Fishermen in the community still catch prawns, small fishes, Aratu-vermelho and siri crabs using *covos*. These practices may have implications for fisheries conservation, as there are indications that traditional traps are less predatory than traps made of other materials, such as metal, which replaced the traditional traps in many fishing communities (Bavinck & Karunaharan, 2006, Blythe *et al.* 2013) due to perceptions of higher catch efficiency, lower relative cost, and ease of use (Coastal Resource Center 2013).

The registration of a rich tradition of plant use by a fishing community is surprising and underpins an urgent need to conserve traditional knowledge in the region. Educational programs for elementary school students in the community involving the dissemination of this body of knowledge on traditional plant use are in the works, including the creation of an ethnobotanical garden, with hopes that the next generation will become custodians of their cultural knowledge. Further studies are needed to

document plant use by other traditional communities in the Itapicuru River estuary.

Declarations

List of abbreviations: ICF: Informant Consensus Factor, NMDS: non-metric multidimensional scaling, and UV: Use Value.

Ethics approval and consent to participate: All the interviews with traditional experts were conducted with informed consent and in accordance with the Brazilian laws regulating ethics in research. The project where the current study is located was approved by the Committee of Ethics in Research of the Nursing School of the Federal University of Bahia (nº 2.937.348).

Consent for publication: Not applicable.

Availability of data and materials: Voucher specimens of all collected samples were deposited at the History, Philosophy, and Biology Teaching Laboratory, at the same university. Data will be available from corresponding author by request.

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Authors' contribution: DYPT, DMGA, and CNE conceptualized the work. DYPT, DMGA, CNE and MDSL did the preliminary work, semi-structured interviews, plant collection, and data generation. DYPT, and DMGA did the data analysis, verification, and authorization. DYPT, DMGA, CNE and MDSL wrote, revised, and edited the manuscript.

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Supplementary Material

Traditional plant use descriptions

Medicinal plant use

The most widely reported plants used for medicine were Capim-santo (*Cymbopogon citratus*), Mastruz (*Dysphania ambrosioides)*, Erva-cidreira (*Lippia alba)* (Figure 3a in main text), Erva doce (*Foeniculum vulgare)* and Boldo (*Plectranthus neochilus*). Of the 81 species of plants used for medicinal purposes, 44 species (54.3%) are commonly cultivated in home gardens for use; 15 species (18.5%) are harvested from surrounding natural environments; 10 species (12.3%) are harvested from wayside environments; and 8 species (10%) are bought from markets. However, a number of plants native to the surrounding *restinga* shrublands and sand dune vegetation are also collected for medicinal purposes, namely Milome (*Aristolochia* spp.), Gajiru (*Chrysobalanus icaco*) (Figure 3b in main text), Acanfo (*Periandra mediterranea*), Aroeira (*Schinus terebinthifolia*), and Rabujo de Cachorro (*Stemodia foliosa*).

The most common method of medicinal plant use is through preparing teas from leaves, stems or roots (Table S1). A number of plants are also made into juices or into syrups in conjunction with other ingredients. An interesting mode of using a medicinal plant, Mangaba (*Hancornia speciosa*), involves stirring the leaf sap into water and drinking the concoction. Some plants are also processed into a paste and applied topically to wounds (e.g., Mastruz, *D. ambrosioides*), or their shoots are boiled in water and used for bathing (e.g, Cajueiro, *Anacardium occidentale* and Aroeira, *S. terebinthifolius*) or for washing wounds.

Uses of non-conventional edible plants and other non-conventional plant foods

Seasonal bush fruits from the surrounding forests and *restinga* shrublands continue to be widely utilized, and traditional experts report the harvesting of the fruits and nuts of the native palms (primarily, Caxandó, *Allagoptera brevicalyx*, Tucum, *Bactris* spp. and Licurioba, *Syagrus* spp.), cashew nut tree (*Anacardium occidentale*), and also the fruits of various members of the Annonaceae, Cactaceae (Figure 3c in main text), Clusiaceae, Myrtaceae, Polygnaceae, and Sapotaceae (Table 1).

However, certain specific uses of some species are no longer practiced, such as the extraction of milk from the inner flesh of Licurioba (*Syagrus* spp). and Caxandó (*Allagoptera brevicalyx*) fruits.

Plants used for wood and fibre, fishing technology and daily-use implements

Mangue vermelho (*Rhizophora mangle*) was the primary species whose wood was used for house making in the past (Table S1), although most homes in the community are now made of bricks and mortar or concrete. Other

species of trees were also used in construction or to fortify the structure of houses (e.g., Mangue manso, *Laguncularia racemosa,* etc.) (Table S1).

A number of tree species were cited as being used for fishing technology, especially for manufacturing fishing artifacts. In the past, fishing canoes were made using wood of tree species such as Jaqueira (*Artocarpus heterophyllus*), Jacarandá (*Dalbergia nigra)*, Mulungu (*Erythrina velutina*), etc. However, *A. heterophyllus* is particularly held in high esteem for this purpose. Rafts were made using wood from the "*Pau de jangada*" tree, which, while we do not assign to western scientific species name, has been attributed to *Apeiba tibourbou* Aubl. in studies conducted in other parts of Bahia (Andrade et al. 2018). In contemporary times, the use of rafts and canoes have been superseded by boats, which are made from wood planks of the same aforementioned trees, and others from trees imported from other regions. Planks are now also bought rather than harvested from the forest.

The leaf stalks of the palms Piaçava (*Attalea funifera*), Coco (*Cocos nucifera*) and Dendê (*Elaeis guineensis*) were also sought-after for making hatch for houses and also boat shelters (Fig. 4a in main text). Additionally, *A. funifera* and *E. guineensis* are used to make artisanal fishing fences (*camboas*) and traps (*covos*) used to capture crabs, shrimps and small fishes (Figure 4b in main text). These leaf stalks – generally called *quitandas* – are processed into strips, shaped and bound by cordage obtained from plants such as Cipó-de-fogo (*Davilla flexuosa*) and Timborana (whose scientific species we could not identify). Another notable example of fishing technology used by the crab gatherers consists of attracting the Aratu-vermelho (*Goniopsis cruentata*) into the traps by beating mangrove tree branches against the crab traps to make a noise, as has been described by other authors (Maciel & Alves, 2009; Magalhães et al 2011). However, in Siribinha, the most used technique for extracting these crabs involves attracting them by making noise and/or singing and/or beating tree branches against each other, and then employing a fishing rod and small pieces of fish as bait in order to capture them. A novel finding in the current study is that traditional experts also consider that the leaves of *R. mangle* that are crushed when they beat the branches exudes a scent that attracts the crabs.

Before nylon nets were widely available, the community relied on plant fibres to weave nets. Many traditional experts reported using the leaf stalks of Tucum (*Bactris setosa*,Arecaceae) for this purpose. The women collected or purchased the leaves at local markets, did the initial processing (beating the leaf stalks to obtain the fibres), and stored the fibers in a spool. The men produced the thread and hand-wove nets with a traditional technique using this spool. The process of net-making with plants was labour-intensive and has been discontinued in favor of widely-available pre-made nylon nets, or nylon wire with which they themselves make one specific net they do not buy pre-made (a throw net called *tarrafa*). Additional fishing implements constructed from locally-sourced plant material include needles for net making and mending (Figure 4c in main text), for which the wood of Jenipapinho (*Tocoyena bullata*) is used.

Palm leaves were also historically used to transport fish out of the community to regional markets, whereby fishermen wove the leaflets of the *Syagrus* spp. or *Cocos nucifera* palm fronds through the flesh of the fish to secure them onto carrying poles. Other uses of palm fibre included the use of *A. funifera* leaf stalk fibres to make broom heads (Fig. 4d in main text).

Plants used for ritual/religious purposes and the role of faith

There are still in the community two persons recognized as "blessers" or *rezadeiras*, *i.e.*, persons who blesses or prays for the villagers upon request. *Rezadeiros* and *rezadeiras* used to play a prominent role in Brazilian rural communities, but this is a disappearing practice, now restricted to the older generation.

A number of plants were listed as being used specifically in praying or bestowing blessings, namely Comig o-ninguém-pode (*Dieffenbachia* spp.), Pinhão-roxo (*Jatropha gossypiifolia*; Fig. 3d in main text), Vassourinha (*Scoparia dulcis*), and Fedegoso (*Senna occidentalis*). Importance was also attributed to the number of branches used in blessing. For bestowing blessings or prayers, three branches of the target plant are collected and waved over the recipient as a prayer is recited six times, after which an additional prayer is recited and the branches discarded. In such prayers, the negative energies that cause sickness in a person are believed to be transferred to the discarded leaves or branches. One traditional expert described the praying process as follows:[1]

[1]Free translation from the Portuguese transcripts was made by the last author. In the quotes from traditional experts' interviews, we indicate the pauses by slash (/), using period (.) only to signal the end of a speech turn. The number of slashes used reflect the extent of the pause. For each transcript, we provide the Portuguese original excerpts in footnotes.

> One just takes three small branches (…)/ and it even shrivels when we pray (…)// (We make the pray) six times/ and the Lord's Prayer we pray three times/ three times the Hail Mary/ there we go to the side/ of the sunset/ and of the drying tide/ evil eye/ and we throw the plant away.[2] (TE_W5_77).[3]

Some community elders emphasized also the importance of faith in healing, attributing huge importance to the recipients having faith in the process. However, one elderly male traditional expert elaborated on certain ritual practices in his use of medicinal plants whereby branches picked for making tea are collected in odd numbers, mostly three or five branches, but never in even numbers:

> Sometimes we would break that branch (from Erva-cidreira)/ put the water to boil and would break those small branches/ one/ two/ three// Three because one has to put them anoni (odd number)/ because one cannot put even number/ four/ six/ one cannot (…)/ the medicine does not work. (TE_M2_81).

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[2] Original: É só pegar três galhinhos (…)/ e chega a murchar quando a gente reza (...)// (Faz a oração) seis vezes/ e o pai nosso reza três vezes/três Ave-Maria/Ali vai para o lado/do sol se põe/e a maré vaza/olho ruim/e joga a planta fora.

[3] Traditional experts are identified by codes for confidentiality purposes. The code indicates the gender and age of the traditional expert. For instance, TE_W5_77 indicates that the traditional expert (TE) is a woman (W) who is 77 years old.

Table S1: Traditional plant use in the artisanal fishing community of Siribinha, in northeast Bahia, Brazil. Plant uses are divided into four general categories: (i) medicine, (ii) food, (iii) ritual/religious, and (iv) wood/fibre. Some additional uses reported by the traditional experts that did not fit into these categories are listed under an "other" category. Non-conventional plant foods are indicated by the abbreviation NCPF in parenthesis

Scientific name	Family	Nome local	Use category and mode of use	Status and manner of procurement	Lifeform	Use value
Abarema filamentosa (Benth.) Pittier	Fabaceae	Barbatimão, Babatenã	Medicine - Bark collected from wild growing trees and boiled to make a tea to drink for toothache. The bark tea is also used as a bath to wash wounds, to treat inflammation in women, and also to help with healing after childbirth.	Native in surrounding forests. Wild harvested.	Tree	0.07
Alibertia edulis (Rich.) A. Rich. Moraes	Rubiaceae	Marmelo	Food (NCPF) - Fruits eaten raw.	Native in surrounding shrublands and forests. Wild harvested.	Tree	0.21
Allagoptera brevicalyx M. Moraes	Arecaceae	Caxandó	Food (NCPF) - Fruits eaten raw. "Milk" extracted from the flesh and used for cooking.	Native in surrounding shrublands. Wild harvested.	Shrub	0.29
Allium sativum L.	Alliaceae	Alho	Medicine – Bulbs made into a tea and drunk for high blood pressure, and also used by women as a bath for treating genitourinary infections	Non-native from Europe.	Herb	0.04
Aloe vera (L.) Burm.f.	Xanthorrhoeaceae	Babosa	Medicine - The gel extracted from the leaves applied topically on scalp or on wounds, or made into juices and drunk as a tonic or stomach complaints. Considered a panacea.	Non-native from the Arabian Peninsula. Cultivated in home gardens for use.	Herb	0.11
Alpinia zerumbet (Pers.) B.L. Burtt & R.M. Sm.	Zingiberaceae	Pomada	Medicine - Leaves used to make a tea drunk for flu. Tea also used in a bath for the same purpose.	Non-native from Asia	Herb	0.04
Alternanthera brasiliana (L.) Kuntze	Amaranthaceae	Bachitrim, Infectrim	Medicine - Leaves boiled to make tea and drunk for combating inflammation, or used as a gargle for	Native. Cultivated in home gardens for use.	Shrub	0.18

			sore throats. The tea is also applied topically on minor wounds.			
Anacardium occidentale L.	Anacardiaceae	Caju, Cajueiro	Food (NCPF) - Fruit fleshy parts are eaten raw, and made into juices or sweet preserves. The nuts are roasted, dekernelled, and eaten. Medicine - Bark extracted, beaten and used to make a bath for skin problems.	Native in surrounding shrublands and forests. Wild harvested, and also occassionally cultivated for domestic use. Fruits and nuts also bought from markets.	Tree	0.50
Annona muricata L.	Annonaceae	Graviola	Food - Fruits eaten raw. Medicine - Leaves boiled to make tea and drunk to lower cholesterol, lose weight, and for post-operation recovery.	Naturalized. Cultivated in home gardens for use.	Tree	0.18
Annona salzmannii A. DC.	Annonaceae	Araticum, araticum-da-mata	Food (NCPF) - fruits eaten raw.	Native. Collected from surrounding forests.	Tree	0.18
Annona squamosa L.	Annonaceae	Pinha	Food - fruits eaten raw.	Naturalized. Cultivated in home gardens for use	Tree	0.18
Aristolochia sp.	Aristolochiaceae	Milome	Medicine - Stems used to make a tea and drunk for pain and coughs. Also infused in alcohol and taken for stomach bloating.	Native. Collected from surrounding forests.	Vine	0.29
Artocarpus heterophyllus Lam.	Moraceae	Jaqueira	Food - the inner flesh of fruits are eaten. Wood/fibre - Wood used for canoe and boat making, making oars, and house roofs.	Non-native from Southeast Asia. Naturalized and cultivated in home gardens	Tree	0.29
Attalea funifera Mart.	Arecaceae	Piaçava	Food (NCPF) - The inner flesh of fruits is eaten. The inner flesh is also made into an oil for cooking. Wood/fibre - entire leaves used as thatch for house building. The leaf stalks used to make animal	Native. Also cultivated in plantations in the region. Harvested from restinga or forest habitats or from plantations.	Tree	0.32

			enclosures. Fishing implements - leaf stalks used to make crap traps. The fibres are also used to make the crab traps. Fibres - Leaf stalks cut into strips and used to make brooms and hats.			
Avicennia schaueriana Stapf & Leechm. ex Moldenke	Avicenniaceae	Siribeira	Wood/fibre - Wood used for house construction.	Native. Harvested from surrounding mangroves	Tree	0.04
Bactris setosa Mart.	Arecaceae	Ticum, Tucum	Food (NCPF) - Fruits eaten. Wood/fibre - Fibres extracted from leaf stalk to make fishing nets.	Native. Harvested from surrounding forests	Tree	0.29
Bambusa sp.	Poaceae	Bambú	Wood/fibre – Used as part of house construction or for tying objects in the house or on boats Also used to make fishing rods.	Non-native and naturalized in the region.	Tree	0.14
Bowdichia virgilioides Kunth	Fabaceae	Sucupiruçu, sucupira	Wood/fibre - Wood used to construct boats, canoes, and homes. Cordage.	Native. Harvested from waysides and surrounding forests.	Tree	0.18
Brodriguesia santosii R.S. Cowan	Fabaceae	Favera	Wood/fibre - boat making, particularly to make the bows, miscellaneous wood implements.	Native. Harvested from surrounding forest.	Tree	0.07
Byrsonima sericea DC.	Malpighiaceae	Murici	Food (NCPF) - Fruits eaten raw. Medicine - Leaves used to make a tea and drunk for lowering cholestrol and also for slimming. Wood/fibre - Wood used in the construction of houses.	Native. Harvested from surrounding forest and resting.	Shrub	0.11
Caesalpinia pulcherrima (L.) Sw.	Fabaceae	Maravilha	Medicine - Leaves used to make a tea for washing wounds.	Non-native. Cultivated in home gardens.	Shrub	0.04
Capsicum annuum L.	Solanaceae	Pimenta	Food - Fruits eaten. Medicine - Leaves used to treat boils.	Non-native. Cultivated in home gardens	Shrub	0.04

			Ritual - In a ritualistic use, two leaves wrapped around a cut on a finger in the formation of a cross is believed to help healing.			
Caryocar brasiliense Cambess.	Caryocaraceae	Pequi	Wood/fibre – Wood used to make boats and canoes.	Native,	Tree	0.04
Catharanthus roseus (L.) Don	Apocynaceae	Boa noite	Medicine – Tea made from leaves and drunk to induce abortion.	Non-native. Cultivated in home gardens.	Herb	0.07
Cenchrus echinatus L.	Poaceae	Carrapicho	Medicine - The leaves and fruits made into a tea for urinary infections.	Native. Harvested from surrounding beach dunes.	Herb	0.04
Cereus fernambucensis Lem.	Cactaceae	Mandacaru, Calda	Food (NCPF) - The fruits are eaten raw, or candied. Medicine - The fruit pulp is taken to ease constipation and to improve metabolism.	Native. Harvested from surrounding beach dune and shrubland vegetation.	Shrub	0.25
Chrysobalanus icaco L.	Chrysobalanaceae	Gajiru	Food (NCPF) - The fruits are eaten raw. Medicine - A tea is brewed from the debarked stems and drunk to treat diabetes and vaginal discharge. The tea is also used to wash cuts and wounds.	Native. Wild harvested from surrounding beach dune vegetation.	Shrub	0.36
Cinnamomum verum J. Presl	Lauraceae	Canela	Food - Used as a spice in food and sweets and to flavour coffee. Medicine - Boiled to make a tea that is drunk to as a calming agent and for stomach complaints.	Non-native. Obtained from markets.	Tree	0.04
Citrus limon (L.) Burm. f.	Rutaceae	Limão	Food - Fruit juice drunk. Medicine - Fruit used to make tea to counter flu, or used as part of a syrup.	Non-native. Cultivated in home gardens or brought from markets	Shrub	0.14
Cnidosculus urens (L.)	Urticaceae	Cansação	Medicine - The stem pith is extracted to make an eyedrop for eye infections.	Native. Wild harvested from surrounding restinga vegetation.	Shrub	0.07

Coccoloba laevis Casar.	Polygonaceae	Pipoquinha	Food (NCPF) - Fruits eaten raw. Wood/fibre - cordage is obtained from the tree and used to make baskets for catching crabs	Native. Wild harvested from surrounding restinga vegetation	Shrub	0.29
Cocos nucifera L.	Arecaceae	Coco	Food - Fruit juice drunk, and flesh used to make "milk" for cooking. Medicine - The meat is cooked and eaten to heal pain. Wood/fibres - The entire leaves used for thatch in home making or for semi-permanent structures. Fibres made into cord used to secure fish for sale at markets. Others - Fibres are burnt to create smoke to repel insects.	Naturalized. Cultivated in beaches and surrounding sandy habitats, and also as a street tree and in homes.	Tree	0.50
Conocarpus erectus L.	Combretaceae	Mangue-de-botão	Wood/fibres - Wood used for roof rafters.	Native. Harvested from surronding mangrove.	Shrub	0.07
Costus spicatus Jacq.	Costaceae	Cana de macaco	Medicine - Leaves used to make a tea for slimming.	Native. Cultivated in home gardens.	Herb	0.07
Coutoubea spicata Aubl.	Gentianaceae	Papai Nicolau	Medicine - Entire plant boiled to make a tea and drunk for gastritis. One traditional expert added that drinking too much can affect the vision.	Native. Harvested from surrounding vegetation.	Herb	0.11
Cymbopogon citratus (DC.) Stapf	Poaceae	capim-santo	Medicine - Leaves boiled to make a tea and drunk as a relaxant, for high blood pressure, colic, and stomach complaints.	Non-native from South Asia. Cultivated for domestic use.	Herb	0.43
Cymbopogon nardus (L.) Rendle	Poaceae	capim-citronela	Medicine - Leaves used to make insect repellent.	Non-native from South Asia. Cultivated for domestic use.	Herb	0.04
Dalbergia nigra (Vell.) Benth.	Fabaceae	Jacarandá	Wood/fibre - Wood used to make boats and canoes.	Native. Harvested from surrounding vegetation.	Tree	0.07
Davilla flexuosa A. St.-Hill.	Dilleniaceae	Cipó-de-fogo	Wood/fibres - stems collected from surrounding forest to make cordage for securing fishing implements such as crab collecting baskets (covo) and	Native, harvested from surrounding forest.	Vine	0.07

			fishing fences (camboa) or other construction purposes.			
Dieffenbachia seguine (Jacq.) *Schott.*	Araceae	Comingo-ningeum-pode	Ritual - Leaves used in prayer and blessings.	Non-native.	Herb	0.04
Dysphania ambrosioides (L.) Mosyakin & Clemants	Amaranthaceae	Matruz, Mastruz	Medicine - Shoots used to make a tea or blended into juice and drunk to heal pain; clearing chest congestions, for inflammation, and to expel worms. Shoots mashed into a paste and applied topically to scrape wounds or cuts.	Naturalized. Cultivated for domestic use.	Herb	0.61
Elaeis guineenses Jacq.	Arecaceae	Dende	Ritual - Used for blessings or prayers. Food (NCPF) - fruits eaten. Wood/fibre - Construction of fishing fences and also crab traps.	Naturalized. Cultivated for domestic use.	Tree	0.07
Equisetum spp.	Equisetaceae	Cavalinha	Medicine - Plant boiled to make a tea that is drunk as a diuretic and to treat water retention.	Non-native from the northern hemisphere	Herb	0.04
Eremanthus spp.	Asteraceae	Candeia	Wood/fibre - Wood used to make fishing rods.	Native. Harvested from forests.	Tree	0.04
Erythrina velutina Willd.	Fabaceae	Mulungu	Wood/fibre – Wood used to make canoes and boats.	Native. Harvested from forests.	Tree	0.14
Eugenia astringens Cambess.	Myrtaceae	Murta	Food (NCPF) - Fruits eaten raw, or made into candies.	Native. Harvested from restinga and sand dune vegetation.	Shrub	0.36
Eugenia leitonii D. Legrand	Myrtaceae	Goiabão	Wood processed into planks to make boats.	Native. Harvested from forests	Tree	0.04
Eugenia uniflora L.	Myrtaceae	Pitanga	Food (NCPF) - Fruits eaten raw. Medicine - Leaves boiled to make a tea and drunk for fever, flu or high blood pressure. In conjunction, the cooled tea is also used as a headwash at night.	Native. Cultivated in home gardens.	Tree	0.29

Euphorbia hirta L.	Euphorbiaceae	Erva Santa Luzia	Medicine: The sap is used as an eyewash and applied to wound to promote healing and to combat infections.	Native. Grows on waysides.	Herb	0.04
Foeniculum vulgare Mill.	Apiaceae	Erva doce, Erva doce verdadeira	Food - The seeds are used to flavour cachaça (an alcoholic beverage). Medicine - Seeds used to make a tea and administered to children for colic. The tea is also taken for stomach complaints and as a calming agent and to induce sleep.	Non-native. Cultivated in home gardens.	Herb	0.21
Garcinia gardneriana (Planch. & Triana) Zappi	Clusiaceae	Bacupari	Food (NCPF) - Fruits eaten raw.	Native. Harvested from the surrounding restinga vegetation.	Tree	0.14
Genipa americana L.	Rubiaceae	Genipapo	Food (NCPF) - Fruits eaten raw. Medicine - Fruit made into juices and drunk as a tonic and for anaemia.	Native. Cultivated in home gardens.	Tree	0.14
Gossypium spp.	Malvaceae	Algodão	Medicine - Leaves boiled to make tea and drunk for flu, inflammation and for other women complaints.	Non-native. Cultivated in home gardens.	Shrub	0.25
Gymnanthemum amygdalinum (Delile) Sch. Bip. ex Walp.	Asteraceae	Alumã	Medicine - Leaves boiled to make tea and drunk for stomach complaints.	Non-native. Cultivated in home gardens.	Shrub	0.07
Hancornia speciosa Gomes	Apocynaceae	Mangaba	Food (NCPF) - the fruits are collected from the surrounding forests and eaten raw. The pulp is made into candy or popsicles. Medicine - The sap is collected and mixed with water and drunk for gastritis..	Native. Wild harvested from surrounding forests and shrublands.	Tree	0.36
Inga spp.	Fabaceae	Inga	Food (NCPF) - the fruits are collected from the surrounding forests and eaten raw.	Native. Wild harvested from surrounding forests.	Tree	0.18

			Wood/fibre - Wood used for house construction.			
Ixora coccinea L.	Rubiaceae	Ixora	Food (NCPF) - the fruits are eaten opportunistically by children.	Non-native from South India. Cultivated as an ornamental.	Shrub	0.04
Jatropha gossypiifolia L.	Euphorbiaceae	Pinhão, Pinhão roxa	Ritual - Leaves used in prayer and blessings.	Native. Cultivated in home gardens.	Shrub	0.36
Jatropha curcas L.	Euphorbiaceae	Pinhão branco	Medicine - Leaves used to make a tea for asthma. Ritual - Leaves used in prayer and blessings.	Non-native. Cultivated in home gardens.	Tree	0.07
Kalanchoe crenata (Andrews) Haw.	Crassulaceae	Folha da Costa	Medicine - Leaves made into a syrup and drunk for colds. Leaves also or made into a paste applied topically on minor wounds. Leaves also heated in a fire and used to make a compress to treat foot fungal infections.	Non-native. Cultivated in home gardens.	Herb	0.21
Laguncularia racemosa (L.) C.F. Gaertn.	Combretaceae	Mange manso	Wood/fibre - Wood collected from surrounding mangroves to make homes. Fine branches used for making cordage. Wood used to make fishing fences and crab traps. Wood also used for making fishing rods, canoes and boats. Leaves beaten on the crab traps believed to release a scent that is attractive to the crabs.	Native. Harvested from surrounding mangroves.	Tree	0.39
Lantana câmara L.	Verbenaceae	Camara	Food - Leaves used to make a tea as a coffee substitute.	Native. Harvested from surrounding forests.	Shrub	0.04
Laurus nobilis L.	Lauraceae	Louro	Medicine - Leaves and shoots boiled to make tea and drunk for menstrual colic.	Non-native. Obtained from markets.	Tree	0.07
Lippia alba (Mill.) N.E. Br. ex Britton & P. Wilson	Verbenaceae	Cidrera, Erva-cidreira	Medicine - Leaves and shoots boiled to make tea and drunk for colic, food poisoning, stomach complaints, to lower blood pressure, as a general	Non-native, but naturalized and cultivated in home gardens.	Shrub	0.82

			relaxant, and to aid with sleeping. Ritual - Used for prayers or blessings.			
Malpighia glabra L.	Malpighiaceae	Acerola	Food (NCPF) - Fruits eaten raw. Medicine - Leaves used to make a tea for washing head when having a flu.	Non-native. Cultivated in home gardens.	Shrub	0.18
Mangifera indica L.	Anacardiaceae	Mangeira	Food - Fruits eaten raw. Medicine - Leaves used to make a tea to treat fever.	Non-native from Asia. Cultivated as a wayside tree and in home gardens.	Tree	0.18
Manilkara spp.	Sapotaceae	Maçaranduba	Food (NCPF) - Fruits eaten raw. Fishing implements - Wood used to make rods for fishing. Wood/fibre - Wood used to make canoes, boats and house roofs.	Native tree from surrounding forests.	Tree	0.57
Matricaria chamomilla L.	Asteraceae	Camomila	Medicine - Dried flowers boiled to make a tea drunk as a calming agent and to treat stomach pains.	Non-native. Obtained from markets.	Herb	0.04
Mentha x *villosum* Huds.	Lamiaceae	Hortelã miúdo	Food - Fresh or dried leaves used as a seasoning to cook beans, meat or fish. Medicine - A juice is made from the fresh leaves and stems with a blender and drunk for treating worms and inflammation.	Non-native. Naturalized and cultivated in home gardens.	Herb	0.21
Mesophaerum pectinatum (L.) Kuntze	Lamiaceae	Canudinho	Medicine - Stems and leaves boiled to make a tea and drunk for slimming, constipation and inflammation.	Native. Grows by waysides.	Shrub	0.07
Morinda citrifolia L.	Rubiaceae	Noni	Medicine - Fruits blended with grapes juice to make a tonic for lowering blood pressure and for muscular pains.	Non-native tree from Asia. Cultivated in home gardens.	Tree	0.07
Momordica charantia L.	Cucurbitaceae	Melão-de-são-caetano	Food (NCPF) - Fruits eaten.	Non-native. Naturalized.	Vine	0.04

Morus spp.	Moraceae	Amora	Medicine - Leaves used to make a tea for lowering blood cholesterol, losing weight, and for pains in general.	Non-native. Cultivated in home gardens.	Tree	0.14
Musa x *paradisiaca* L.	Musaceae	Bananeira	Medicine - Leaves used to make a tea for slimming.	Non-native. Cultivated in home gardens.	Tree	0.04
Myrciaria floribunda (H. West ex Willd.) O. Berg	Myrtaceae	Cambuí	Food (NCPF) - Fruits collected from surround forest and eaten raw, made into juices, and used to flavour alcoholic beverages (cachaça).	Native. Harvested from surrounding forest.	Shrub	0.54
Nerium oleander L.	Apocynaceae	Espiradeira	Medicine - Leaves used to make a tea for abortion. Ritual - Used in blessing and prayers.	Non-native. Cultivated in home gardens.	Shrub	0.07
Ocimum basilicum L.	Lamiaceae	Manjericão	Food - Leaves used as a spice for cooking and to flavour juices. Medicine - Leaves boiled to make a tea and drunk to treat high blood pressure and high cholesterol, to counter flu, and also to promote slimming.	Non-native. Cultivated in home gardens.	Herb	0.18
Ocimum gratissimum L.	Lamiaceae	Quioiô	Medicine - Leaves boiled to make a tea and drunk for flu.	Non-native. Cultivated in home gardens.	Herb	0.04
Ocotea sp.	Lauraceae	Louro-branco	Wood/fibre - Wood used to construction house roofs and also boat oars.	Native. Harvested from the surrounding forest vegetation.	Tree	0.07
Passiflora spp.	Passifloraceae	Maracujá, Maracujá-do-mato	Food (NCPF) - Fruits eaten raw.	Native. Harvested from the surrounding forest vegetation. Also cultivated.	Vine	0.18
Passiflora foetida L.	Passifloraceae	Ruge	Food (NCPF) - Fruits eaten raw.	Native. Harvested from the surrounding beach dune vegetation.	Vine	0.11
Pereskia aculeata Mill.	Cactaceae	Ora-pro-nóbis	Food (NCPF) - Leaves used for cooking or eaten raw in salads.	Native, but cultivated for domestic use.	Shrub	0.04

Periandra mediterranea (Vell.) Taub.	Fabaceae	Acampho, Campho	Medicine - Roots boiled to make tea and drunk for coughs.	Native. Harvested in the surrounding restinga vegetation.	Shrub	0.04
Persea americana Mill.	Lauraceae	Abacateiro	Food - Fruits eaten. Medicine - Leaves boiled to make a tea and drunk for kidney problems and toothache. Bark boiled to make tea for slimming.	Non-native from south Mexico. Naturalized and cultivated in home gardens.	Tree	0.18
Petiveria alliacea L.	Phytolaccaceae	Guiné	Medicine - Roots boiled to make tea to promote wound healing.	Native.	Herb	0.04
Peumus boldus Molina	Monimiaceae	Boldo do Chile	Medicine - Leaves boilded to make a tea and drunk for stomach complaints.	Non-native from Chile. Obtained from markets.	Shrub	0.04
Pfaffia glomerata (Spreng.) Pedersen	Amaranthaceae	Anador	Medicine - Leaves boiled to make a tea and drunk for headaches, fever and stomach complaints.	Native, but cultivated for domestic use.	Shrub	0.11
Phyllanthus niruri L.	Phyllanthaceae	Quebra-pedra	Medicine - Shoots used to make a tea and drunk for kidney stones.	Native. Grows by waysides.	Herb	0.18
Physalis angulata L.	Solanaceae	Saco de bode	Food - Fruits eaten.	Naturalized, and also cultivated for domestic use.	Herb	0.04
Pilea microphylla (L.) Liebm.	Urticaceae	Brilhantina	Food (NCPF) - Shoots and leaves used in salads and blended in juices. Medicine - Shoots and leaves used to make a tea and drunk for stomach pains and diarrhea.	Non-native from South and Central America. Naturalized and cultivated in home gardens.	Herb	0.14
Plectranthus amboinicus (Lour.) Spreng.	Lamiaceae	Hotelã, Hortelã grossa	Food - Leaves used for cooking with meat. Medicine - Leaves used for making a syrup for congested chest.	Non-native from India. Cultivated in home gardens.	Shrub	0.32
Plectranthus barbatus Andrews	Lamiaceae	Oxalá, Sete Dor	Medicine - Leaves used to make a tea for stomach complains, colic and general pain.	Non-native from India. Cultivated in home gardens.	Shrub	0.25
Plectranthus neochilus Schltr.	Lamiaceae	Boldo	Medicine - Leaves used to make a tea for stomach complains, poor	Non-native from India. Cultivated in home gardens.	Herb	0.43

			digestion, intestinal pains, flatulence, and for expelling worms.			
Portulaca oleracea L.	Portulacaceae	Beldroega	Food (NCPF) - Leaves used for cooking or eaten raw in salads.	Native. Grows by waysides, and also cultivated in home gardens.	Herb	0.04
Protium heptaphyllum (Aubl.) Marchand	Burseraceae	Amescla	Medicine: Leaves used to make a tea for flu. Resin taken internally. Ritual - The bark is burnt to produce smoke to cleanse negative energies.	Native. Harvested from surround forests.	Tree	0.07
Psidium guajava L.	Myrtaceae	Goiaba	Food - Fruits eaten raw. Medicine - Leaves boiled to make a tea for treating diarrhea, and also to ease toothache.	Native. Cultivated in home gardens.	Tree	0.21
Psidium guineense Sw.	Myrtaceae	Araçá-mirim	Food (NCPF) - Fruits eaten raw.	Native. Harvested from surround forests.	Tree	0.14
Psidium rufum Mart. ex DC.	Myrtaceae	Araçá-cagão	Food (NCPF) - Fruits eaten raw or candied.	Native. Harvested from surround forests.	Tree	0.32
Punica granatum L.	Lythraceae	Romã	Food - Fruits eaten raw. Medicine - The fruit husks made into a tea and gargled for sore throats. The leaves, fruit husks and seeds boiled to make a tea and drunk for throat inflammation.	Non-native from Iran and North India. Cultivated in home gardens for use.	Shrub	0.14
Rhizophora mangle L.	Rhizophoraceae	Mange vermelho	Wood/fibre - Trunk poles harvested for house-making and other semi-permanent structures. Fishing implements - The branches are beaten against the crab traps to release a scent that is believed to attract Goniopsis cruentata (aratu-vermelho) crabs. The fallen leaves are also believed to attracted the crabs. The branches are also used to make the crab traps. A red dye is extractable from the wood.	Native. Harvested from surrounding mangroves.	Tree	0.57

Ruta graveolens L.	Rutaceae	Arruda	Medicine - Leaves infused in alcohol and used topically for headaches. Ritual - Leaves used in prayer and blessings.	Non-native from Europe.	Herb	0.07
Saccharum officinarum L.	Poaceae	Cana	Medicine - Juice expressed from the stems used to treat low blood pressure.	Non-native from Southeast Asia. Cultivated in home gardens or bought from markets.	Herb	0.04
Schinus terebinthifolia Raddi	Anacardiaceae	Aroeira	Food (NCPF) - The fruits are eaten raw. Medicine - Leaves boiled to make a tea for gargling for healing after tooth removal. Tea is also drunk for inflammation. Tea made from boiled leaves or bark is used in a bath to treat inflammation in women, and also children having skin afflictions. The leaves are used to wrap minor cuts on the hand. Considered a panacea. Others - The fruits and seeds are used to make soap.	Native. Harvested in the surrounding restinga vegetation.	Tree	0.39
Scoparia dulcis L.	Plantaginaceae	Vassourinha	Medicine - Entire plant boiled and water is used to wash wounds. Ritual - Shoots used for prayer and for blessing.	Native. Occurs on waysides.	Herb	0.18
Senna obtusifolia (L.) H.S. Irwin & Barneby	Fabaceae	Senna	Medicine: Leaves used to make a tea and drunk for inflammation.	Native. Occurs on waysides.	Shrub	0.04
Senna occidentalis (L.) Link	Fabaceae	Fedegoso	Medicine - Leaves and shoots boiled to make a tea and drunk for flu and stomachache. The tea also used as a bath for children suffering from the flu. Ritual - Shoots used for prayer and for blessing.	Native. Occurs on waysides, but also cultivated for domestic use.	Shrub	0.18

Solanum agrarium Sendtn.	Solanaceae	Bombão, Bambauzinho	Food (NCPF) - Fruits eaten raw.	Native. Occurs in beach vegetation	Shrub	0.11
Solanum paniculatum L.	Solanaceae	Jurubeba	Medicine: Leaves used to make a tea and drunk for flu.	Native. Obtained from markets.	Shrub	0.07
Solidago chilensis Meyen	Asteraceae	Arnica	Medicine - Leaves crushed and applied on wounds.	Native. Occurs on waysides, but also cultivated for domestic use.	Herb	0.11
Spondias mombin L.	Anacardiaceae	Cajarana	Food (NCPF) - Fruit eaten. Household implements - Fibres used to make brooms. Cordage - Fibres made into cordage for securing fish for transport and sale at markets. Leaf fibres used for tying fishing fences.	Native. Planted in home gardens.	Tree	0.04
Spondias tuberosa Arruda	Anacardiaceae	Umbu	Food (NCPF) - Fruit eaten.	Native. Planted in home gardens.	Tree	0.07
Stemodia foliosa Benth.	Plantaginaceae	Rabujo de Cachorro	Medicine - Shoots and leaves used to make a tea and drunk for stomach pains, especially for children.	Native. Collected wild.	Herb	0.04
Syagrus coronata (Mart.) Becc.	Arecaceae	Alicuri, Licuri	Food (NCPF) - Fruit eaten. Wood/fibre - Fibres used to make brooms. Cordage - Fibres made into cordage for securing fish for transport and sale at markets. Leaf fibres used for tying fishing fences.	Native. Collected wild.	Tree	0.21
Syagrus schizophylla (Mart.) Glassman	Arecaceae	Alicuri-oba, Licurioba	Food (NCPF) - Fruit eaten. Wood/fibre - Fibres made into cordage for securing fish for transport and sale at markets. Leaf fibres used for tying fishing fences.	Native. Collected wild.	Tree	0.11
Syzygium cumini (L.) Skeels	Myrtaceae	Jamboláo	Food (NCPF) - Fruits eaten. Medicine - Leaves boiled to make a tea and drunk to lower cholestrol.	Non-native from Asia. Cultivated as a street tree.	Tree	0.11
Tabebuia spp.	Bignoniaceae	Taipoca	Wood/fibre - Branches historically used for making fishing rods.	Native. Harvested from surrounding forest.	Tree	0.07

			Household use - Wood historically used to make beds.			
Talinum paniculatum (Jacq.) Gaertn.	Talinaceae	Bredo, Maria gorda	Food (NCPF) - Shoots and leaves eaten as a salad or cooked.	Native. Cultivated in home gardens.	Herb	0.04
Tamarindus indica L.	Fabaceae	Tamarindo	Food (NCPF) - Fruits eaten raw. Medicine - Leaves used to make a tea which is gargled to ease gum inflammation after tooth extraction.	Non-native from India. Cultivated in home gardens.	Tree	0.07
Tapirira guianensis Aubl.	Anacardiaceae	Pau-pombo	Food (NCPF) - Fruits eaten raw. Wood/fibre - Wood used for making rafts.	Native. Harvested from surrounding forest.	Tree	0.07
Terminalia catappa L.	Combretaceae	Amendoa-da-praia, Amêndoa	Food (NCPF) - The fruits are collected, dekernelled, and the nuts eaten raw. Medicine - Leaves boiled to make a tea drunk for spinal issues or to lower cholestrol.	Non-native from Asia. Cultivated as a wayside tree	Tree	0.11
Tocoyena bullata (Vell.) Mart.	Rubiaceae	Genipapinho	Wood/fibre - The wood is used to make the needles used to mend fishing nets.	Native. Harvested from surrounding restinga.	Shrub	0.07
Zornia latifólia Sm.	Fabaceae	Arrozinha	Medicine - Leaves boiled to make a tea drunk for inflammation.	Native. Grows by waysides.	Herb	0.04
		Juá	Medicine - Leaves used to whiten teeth.	Native from surrounding forests	Shrub	0.04
		Araça	Food (NCPF) - Fruits eaten raw. Fishing implements - Stems used to make baskets for catching crabs.	Native from surrounding forests	Tree	0.11
		Cuaça	Medicine - The stems are boiled to make a tea to treat stomach pains and food poisoning. Also for pains in general.	Native from surrounding forests	Vine	0.18
		Limaozinho	Food (NCPF) - Fruits eaten raw. Medicine - Leaves boiled in water to make a bath used for flu. Leaves also	Native. Harvested from surrounding restinga.	Tree	0.14

		used to make a syrup with sugar for internal use.			
	Tripa de ovelha	Food (NCPF) - Fruits eaten raw.	Native from surrounding forests	Tree	0.07
	Biriba	Food (NCPF) - Fruits eaten raw.	Native from surrounding forests.	Tree	0.11
		Wood/fibre - cordage used for house construction. Fishing implements - cordage is obtained from the tree the use in making fishing implements.			
	Capim da Praia	Wood/fibre - Used for stuffing pillows.	Native from surrounding beaches	Herb	0.04
	Cipó de Alho	Medicine – Leaves made into a tea for combating fever	Native from surrounding forests	Vine	0.07
	Fruta de Paka	Food (NCPF) - Fruits eaten raw.	Native from surrounding forests	Tree	0.04
	Joaninha	Food (NCPF) - Fruits eaten raw.	Native from surrounding forests	Shrub	0.04
	Acalypi	Food (NCPF) - Fruits eaten raw.	Native from surrounding forests	Shrub	0.04
	pindaíba	Food (NCPF) - Fruits eaten raw.	Native from surrounding forests	Shrub	0.11
	embira-branca	Wood/fibre - Wood used for construction of canoes.	Native from surrounding forests	Tree	0.07
	embira-vermelha	Wood/fibre - Wood used for construction.	Native from surrounding forests	Tree	0.04
	quina-quina	Medicine - Tea made from leaves and drunk for infections.	Native	Tree	0.04
	Pequimbola	Other - Leaves broken and rubbed in the insides of shrimp vases to attract shrimp.	Native from surrounding forests	Tree	0.04
	Podarco	Wood/fibre - Branches used to make fishing implements to catch Aratu crabs.	Native. Harvested from forest	Tree	0.07
	Pau d'arco	Medicine - Bark boiled to make a tea and drunk for infection. Wood/fibre -	Native. Harvested from forest	Tree	0.11

	Wood used for constructing canoes and also for joining the poles when constructing rafts.			
Imadeira	Wood/fibre - Wood used for construction .	Native. Harvested from forest	Tree	0.04
Ingá-Poca	Wood/fibre - Wood used for construction of boats and canoes.	Native. Harvested from forest	Tree	0.18
Lande	Wood/fibre - Wood used for construction of canoes.	Native. Harvested from forest	Tree	0.04
Leiteira	Wood/fibre - Wood used for construction of rafts.	Native. Harvested from forest	Tree	0.04
Jequitiba	Wood/fibre - Wood used for construction of boats and canoes.	Native. Harvested from forest	Tree	0.11
Juerana-Branca	Wood/fibre - Wood used for construction of boats and canoes.	Native. Harvested from forest	Tree	0.04
Juerana-Vermelha	Wood/fibre - Wood used for construction of boats and canoes.	Native. Harvested from forest	Tree	0.04
Jangada, Pau de jangada	Wood/fibre - Wood used for construction of canoes and rafts.	Native. Harvested from forest	Tree	0.11
Flor de veado	Food (NCPF) - Flowers eaten.	Native. Harvested from forest	Vine	0.04
Cipo para conjuntivite	Medicine - Vine cut and the water inside used as an eyedrop for conjuntivitis.	Native. Harvested from forest	Vine	0.04
Louro-sabão	Medicine - Leaves generate a lather that can be used to wash hair.	Native. Harvested from forest	Tree	0.04
Bugi	Food (NCPF) - Fruits eaten.	Native. Harvested from forest	Shrub	0.04
Gelol	Medicine - Roots collected, crushed and applied on wounds.	Native. Harvested from forest	Shrub	0.04
Angelim pedra	Wood/fibre - The wood is used for making boats and canoes.	Native. Harvested from forest	Tree	0.07
Angelim amargoso	Medicine - The stem is used to make tea for stomach complains. Wood/fibre - The wood is used for making boats and canoes.	Native. Harvested from forest	Tree	0.11

	Oiticica	Wood/fibre - The wood is used for making boats and canoes.	Native. Harvested from forest	Tree	0.04
	Vinhático	Wood/fibre - The wood is used for making boats and canoes.	Native. Harvested from forest	Tree	0.04
	Sapucarana	Wood/fibre - Fibres from the stem is extracted for cordage.	Native. Harvested from forest	Tree	0.04
	Timborana sp. 1	Wood/fibre - The wood is processed into planks for making boats.	Native. Harvested from forest	Tree	0.11
	Timborana sp. 2	Wood/fibre - The vine stem is used to make the covo and fishing fences (camboa).	Native. Harvested from forest	Vine	0.21
	Espinho cheiroso	Medicine - Leaves boiled to make a tea and drunk to treat inflammation.	Native. Bought in markets	Tree	0.18