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Local ecological knowledge of rural women living in the buffer zone of a conservation unit in Brazil

Waldiléia Ferreira de Melo Batista[1,*], Ian Gabriel de Melo Batista[2], Igor Ramon de Melo Batista[3], Reinaldo Farias Paiva de Lucena[2] e Roseli Farias Melo de Barros[4]

[1]Universidade Federal do Piauí. Departamento de Biologia. Doutorado em Desenvolvimento e Meio Ambiente (PRODEMA). *Campus* Universitário Ministro Petrônio Portela. Teresina-PI, Brasil (CEP 64049-550). *Email: wal_bio@hotmail.com.
[2]Universidade Estadual do Piauí. Centro de Ciências da Saúde. Curso Graduação em Medicina. Teresina-PI, Brasil (CEP 64002-150).
[3]Universidade Federal de São Paulo. Rua Sena Madureira, 1500. Vila Clementino. São Paulo-SP, Brasil (CEP 04021-001).
[4]Universidade Federal do Mato Grosso do Sul. Instituto de Biociências. Grupo de Pesquisa em Estudos Multidisciplinares: Aspectos Ambientais, Culturais e Socioeconômicos. Campo Grande-MS, Brasil (CEP 79070-900).

Abstract. Conservation Units are recognized worldwide as the best strategy to promote the protection of biodiversity. The local ecological knowledge of women who live in the surroundings of these spaces can be used to record the cumulative sets of knowledge passed down through generations by cultural transmission. The objectives of this study were to identify the wild tree/shrub species of the useful flora known/used in each cultural domain, verify the existence of cultural consensus in each domain indicated, and verify the similarity between species in the cultural domains. Forty interviews were conducted with residents of three communities located in the buffer zone of the Sete Cidades National Park using semi-structured forms and the free list method. Sixty six species belonging to 24 families and 62 genera were recorded, and the existence of three cultural domains was identified: health (36 species), nutrition (35 species), and timber (34 species). Cultural consensus was observed for the three domains. There was a low similarity between the mentioned species in the domains, indicating high versatility. The knowledge of the women about wild vegetation reaffirms their autonomy in different aspects, especially in the family's health care and food security and sovereignty in these rural populations. It can also contribute to the elaboration of public policies aimed at the conservation of ecological and cultural biodiversity.

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ORCID
0000-0002-4893-2873
Waldiléia Ferreira de Melo Batista

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Resumo. ***Conhecimento ecológico local de mulheres rurais residentes na zona de amortecimento de uma unidade de conservação no Brasil***. As unidades de conservação são reconhecidas mundialmente como a melhor estratégia para promover a proteção da biodiversidade. O conhecimento ecológico local das mulheres que vivem no entorno desses espaços pode ser usado para registrar os conjuntos cumulativos de saberes transmitidos de geração em geração por transmissão cultural. Os objetivos deste estudo foram identificar as espécies arbóreas/arbustivas silvestres da flora útil conhecidas/utilizadas em cada domínio cultural, verificar a existência de consenso cultural em cada domínio indicado e verificar a semelhança entre espécies nos domínios culturais. Foram realizadas 40 entrevistas com moradores de três comunidades localizadas na zona de amortecimento do Parque Nacional das Sete Cidades utilizando formulários semiestruturados e o método de lista livre. Foram registradas 66 espécies pertencentes a 24 famílias e 62 gêneros, e identificada a existência de três domínios culturais: saúde (36 espécies), nutrição (35 espécies) e madeireira (34 espécies). O consenso cultural foi observado para os três domínios. Houve baixa similaridade entre as espécies citadas nos domínios, indicando alta versatilidade. O conhecimento das mulheres sobre a vegetação silvestre reafirma sua autonomia em diversos aspectos, principalmente na atenção à saúde da família e na segurança e soberania alimentar dessas populações rurais. Também pode contribuir para a elaboração de políticas públicas voltadas à conservação da biodiversidade ecológica e cultural.

Palavras-chave: Consenso cultural; Domínio cultural; Etnobotânica; Mulheres.

0000-0003-4665-0482 Ian Gabriel de Melo Batista
0000-0002-7872-9913 Igor Ramon de Melo Batista
0000-0002-1195-4315 Reinaldo Farias Paiva de Lucena
0000-0001-9767-5546 Roseli Farias Melo de Barros

Introduction

The relationship between people and plants has been reported, from the ethnobotanical perspective, to be associated with a wide variety of environmental functions expressed in the daily lives of human populations since ancient times (Cassas et al., 2016). However, in the last decades, an unfavorable policy has been established in Brazil in relation to the conservation of biodiversity, indigenous peoples and local communities (Hanazaki, 2018).

The strong pressures exerted on natural environments also threaten the perpetuation of traditional peoples and their knowledge, as they depend directly on the biodiversity for their livelihood and cultural identity (Hanazaki, 2018). Given this scenario, strengthening and implementing actions to register, appreciate and guarantee the perpetuation of traditional knowledge related to the use of plants in Brazil, in its different biomes and ecosystems, is sorely needed.

In this sense, the knowledge of human populations which depend directly on natural resources can be used as a guide for effective actions for the management and conservation of natural and genetic resources (Pauly, 1995; Huntington, 2000; Johannes et

al., 2000; McClenachan et al., 2012; Fischer et al., 2015). Such knowledge can be recorded through the concept of local ecological knowledge (LEK), concerning the accumulation of this knowledge, practices and beliefs, passed on from generation to generation through cultural transmission (Berkes et al., 2000). In addition, LEK has been applied to fill gaps in scientific knowledge about the relationship between human populations and biodiversity (Huntington, 2000; Johannes et al., 2000; Silvano et al., 2006, 2008; Hallwass et al., 2013).

Thus, the study of cultural domains in these spaces is fundamental as, according to Caulkins and Hyatt (1999), it can contribute to the understanding not only of possible structural and procedural differences between organizations, but also of the changes that take place over time. This is so because, according to Voglet et al. (2004), they are elements or items organized according to culturally determined rules or criteria, which can be defined, for example, by the use criterion.

In this sense, considering that the conservation units (CUs) are spaces globally recognized as the best alternative to promote the protection of biodiversity (MMA, 2004), studies that register the practices of use and management of vegetation in the surroundings in these areas are essential. The recognition of the activities carried out in CUs and their surroundings is necessary because they directly or indirectly influence the environmental conservation and ecological balance of these spaces (Santos e Coelho Ferreira, 2012).

In this context, rural women actively participate and interact with the environment and have rich experiences of production, extraction and management of resources in these spaces. Thus, the traditional values from the perspective of the knowledge of these women represent a promising topic for investigation, fundamental to understand the process of organization and transformation of the environment.

In this scenario, our hypothesis is that the women who live around the Sete Cidades National Park (SCNP/PI) have different sets knowledge and organize their LEK according to the use of local vegetation. We sought to meet, therefore, the following objectives: i) to identify the wild tree/shrub species of the useful flora known/used by the informants in each cultural domain; ii) to verify the existence of cultural consensus in each domain indicated by the informants; and iii) to verify the similarity between species in the domains.

Methodological procedures

Study area

The survey was conducted in three communities settled in the buffer zone of the SCNP. The CU was created by Federal Decree No. 50,744 of 1961 (Brasil, 1961) and is located in the Northeast of the State of Piauí, between the Municipalities of Piracuruca and Brasileira (Figure 1), with seat located at coordinates 04° 02’ 08” S and 41° 40’ 45” W. The main access roads are the Piripiri/Fortaleza stretch of the BR-222 highway, and Teresina/Parnaíba stretch of the BR-343 highway (Mesquita and Castro, 2007). It has an area of 6,221.48 ha and an irregular water regime (Castro et al., 2002). The climate is Aw’, hot sub-humid, according to Köppen climate classification. The average annual rainfall is 1,558 mm, concentrated in the months of February, March and April, and the average temperature is 28 °C (Oliveira, 2004). The CU is inserted in the Sedimentary Basin of Parnaíba, Meio-Norte or Piauí/Maranhão in a transition area between Cerrado and Caatinga, with predominance of physiognomies belonging to the Cerrado biome, distributed in forest, savanna and grassland types (Oliveira et al., 2007).

Data collection

Data were collected monthly through the method of household interviews, as defined by Begossi et al. (2009), with the 40 women residents of the communities

Cachoeira, Vamos Vendo and Cigalha. These communities have no residents' association and receive regular visits of health agents. Cachoeira (04° 08' 31.06" S and 41° 44' 45.09" W), located approximately 6 km from the seat of Municipality of Brasileira, has 26 households and 22 women aged between 18 and 71 years. The Communities Vamos Vendo and Cigalha (04° 04' 35.81" S, 41° 40' 36.38" W and 04° 04' 35.81" S, 41° 40' 36.38" W, respectively) are located 20 and 17 km from the seat of Piracuruca; the first has eleven and the second seven women residents.

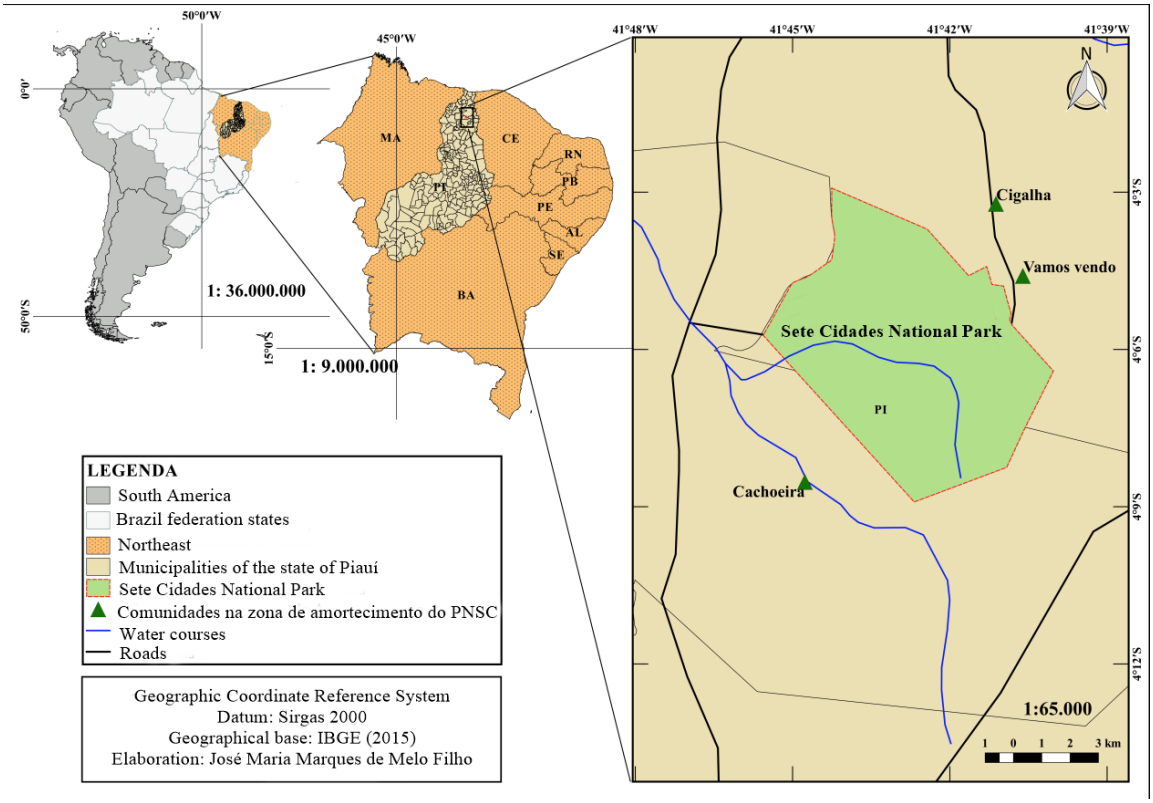

Figure 1. Location of the Sete Cidades National Park, Piauí/Brazil, and the Communities Vamos Vendo and Cigalha (Piracuruca) and Cachoeira (Brasileira). Source: IBGE (2020), modified by José Maria Marques de Melo Filho, 2020.

Methods and techniques

In compliance with ethical precepts (Resolution No. 466/2012, of the National Health Council), the project was approved and consubstantiated by the Research Ethics Committee (REC) of the Federal University of Piauí (UFPI) under number 2,689,570. In compliance with Brazilian Law No. 13,123/2015 (Brasil, 2015) and its regulations, the project was also registered in the National System for Management of Genetic Heritage and Associated Traditional Knowledge (SISGEN) under number AB6672E. The researcher is registered in the Biodiversity Authorization and Information System (SISBio) under number 7154425. Data obtained in the research were qualitatively and quantitatively analyzed and before each interview, the objectives of the work were explained to the selected social actors. After clarifications, they were asked to give their permission to conduct the research and use the images by signing the Informed Consent Form (ICF).

The first meetings with the communities were held using the Rapport Method (Bernard, 1989), with the purpose of establishing trust and familiarization with the residents. This contact happened with the help of a community health agent and one of the guides of the SCNP, during meetings to present the purposes of the work and during home visits.

The sample universe of the research corresponded to 100% of women living in the chosen communities, following the recommendations of Begossi et al. (2004).

A free list was used to obtain data on known and used plants (Weller and Romney, 1988). According to Borgatti (1996), this is an efficient tool to indicate which items belong to a cultural domain. Information on the use of plants was collected with the aid of a semi-structured form (Apolinário, 2006).

The floristic survey was carried out in parallel to the interviews, through guided tours (Bernard, 1988) with the help of key informants who were willing to participate. The plants mentioned by the informants were collected, according to the recommendations of Mori et al. (1989), for taxonomic identification. The specimens were identified with aid of specialized bibliography and comparison with herborized materials, and confirmed by specialists. The organization of the species list followed APG IV et al. (2016). Vouchers are deposited at the Graziela Barroso Herbarium (TEPB), of the Federal University of Piauí (UFPI). The spelling of the names of the species and authors was confirmed through MOBOT (2020).

Data analysis

The initial data were distributed in an MS Excel spreadsheet, in a presence/absence matrix of all plants mentioned in the interviews. Then analyses were made using the Smith's Salience Index (SI) and Cultural Consensus (CC) with the use of the software Anthropac 4.0 (Borgatti, 1996).

The Smith SI was used to measure the salience of species in the free lists (nutrition, health and timber). High values of this index reflect a high frequency of citation and similarity of ordering, which allows finding possible "breaks" or ruptures between one item and another caused by differences in the informants' quotes based on the number of times these items were mentioned (Borgatti, 1996). A Venn Diagram was used to verify the floristic similarity between cultural domains, with calculation of the Z Coefficient, through a presence/absence matrix of species in each studied domain.

Results and discussion

In the analysis of the free list of wild plants known/used by the women, 66 species distributed in 24 families and 62 genera were mentioned. Other studies developed in Cerrado reported similar numbers, such as Lima et al. (2012), who found 69 native species in the north of the State of Minas Gerais, and Guarim Neto and Pasa (2012) who found 71 species in their study in the state of Mato Grosso, of which 22 coincide with the species mentioned in the present study, and who also found Fabaceae to be the most representative family.

The uses of wild vegetation by the women living in Cachoeira, Vamos Vendo and Cigalha fall in three cultural domains: nutrition, health and timber. Plants used as human and animal food were considered to belong to the nutrition domain; those used to treat illnesses and for general body care were considered to belong to the health domain; and those used for different uses, including construction, artifact production, coal and firewood were considered to belong to the timber domain.

The SI showed that use is important in establishing and structuring the three domains, and also that there was a cultural consensus among the responses given by the

women, since there was a high agreement in their responses. These data reinforce the hypothesis that the cultural domains detected are defined by the use of the species.

The registration sets of knowledge is essential for LEK and scientific knowledge to support public policies for the development of strategies aimed at the conservation of ecological and cultural biodiversity. This combination has been very frequently used to facilitate the discussion between resource users and managers, aiming at the creation of policies with better chances of sustainability (Azevedo and Apel, 2004; Berkes et al., 2006; Begossi, 2012).

Cultural Domain Nutrition

Nutritional plants were represented by 35 species belonging to 21 families (Table 1). The SI evidenced five ruptures: the first was composed of one species, the "pequi"; the second was composed of cashew; the third consisted of two species, "jatobá" and "faveira"; the fourth consisted of six species, namely, "guabiraba", "tucum", "murici", "pitomba", "mirindiba", "araticum"; and the last rupture gathered the other species.

Table 1. Free list of species in the cultural domain nutritioncited by women residents of the Communities Cachoeira, Vamos Vendo and Cigalha in the vicinity of the Sete Cidades National Park. Legend: CN = common name; Fr% = relative percentage of citations; R = average position of the citation; S = Smith's salience index; Tr = tree; Bu = bush. The table is organized according to Smith's salience indices in descending order.

Common name	Species	Family	Habit	Fr%	R	S
Pequi	*Caryocar coriaceum* Wittm.	Caryocaraceae Szyszl.	Tr	73.20	3.00	0.542
Caju	*Anacardium occidentale* L.	Anacardiaceae R. Br.	Tr	75.60	4.26	0.437
Jatobá	*Hymenaea courbaril* L.	Fabaceae Lindl.	Tr	56.10	3.22	0.381
Faveira-de-bolota	*Parkia platycephala* Benth.	Fabaceae Lindl.	Tr	48.80	3.65	0.328
Guabiraba	*Campomanesia aromática* (Aubl.) Griseb	Myrtaceae Juss.	Bu	48.80	4.10	0.294
Tucum	*Astrocaryum vulgare* Mart.	Arecaceae Bercht. & J. Presl	Tr	56.10	5.09	0.236
Murici	*Byrsonima crassifolia* (L.) Kunth	Malpighiaceae Juss.	Bu	34.10	4.50	0.198
Pitomba	*Talisia esculenta* Radlk.	Sapindaceae Juss.	Tr	34.10	5.36	0.175
Mirindiba	*Buchenavia tetraphylla* (Aubl.) R. A. Howard	Combretaceae R. Br.	Tr	24.40	3.80	0.171
Araticum	*Annona paludosa* Aubl.	Annonaceae Juss.	Bu	31.70	5.69	0.170
Buriti	*Mauritia flexuosa* L. f.	Arecaceae Bercht. & J. Presl	Tr	17.10	5.71	0.089
Crioli	*Mouriri samanensis* Urb.	Melastomataceae A. juss.	Tr	12.20	3.00	0.073
Ameixa	*Ximenia americana* L.	Olacaceae R. Br.	Bu	7.30	2.33	0.063
Marmeleiro	*Alibertia edulis* (Rich.) A. Rich.	Rubiaceae Juss.	Bu	14.60	7.50	0.058
Tarumã	*Buchenavia tomentosa* Eichler	Combretaceae R. Br.	Tr	4.90	1.00	0.049
Babaçu	*Attalea speciosa* Mart. *ex* Spreng	Arecaceae Bercht. & J. Presl	Tr	9.80	4.00	0.048

Table 1. Continued.

Common name	Species	Family	Habit	Fr%	R	S
Copaíba	*Copaifera langsdorffii Desf.*	Fabaceae Lindl.	Tr	4.90	1.50	0.046
Bacuri	*Platonia insignis Mart.*	Clusiaceae Lindl.	Tr	4.90	3.00	0.043
Cajá	*Spondias lutea L.*	Anacardiaceae R. Br.	Tr	7.30	4.00	0.041
Sambaíba	*Curatella americana L.*	Dilleniaceae Salisb.	Bu	7.30	5.00	0.035
Pitomba-de-leite	*Pouteria ramiflora* (Mart.) Radlk.	Sapotaceae Juss.	Tr	4.90	5.00	0.030
Maria-preta	*Myrcia multiflora* (Lam.) DC.	Myrtaceae Juss.	Bu	7.30	9.33	0.029
Mangaba	*Hancornia speciosa* Gomes	Apocynaceae Juss.	Bu	7.30	9.33	0.026
Cajuí	*Anacardium humile* A. St.-Hil.	Anacardiaceae R. Br.	Tr	7.30	11.67	0.020
Ingá	*Inga* sp	Fabaceae Lindl.	Tr	4.90	11.50	0.018
Caroba	*Jacaranda brasiliana* (Lam.) Pers.	Bignoniaceae Juss.	Tr	4.90	12.50	0.015
Farinha-seca	*Ouratea castaneifolia* (DC.) Engl.	Ochnaceae DC.	Tr	2.40	6.00	0.015
Gameleira	*Clusia bercheehellii* Engl.	Clusiaceae Lindl.	Tr	7.30	6.00	0.012
Araçá	*Psidium myr*sinites DC.	MyrtaceaeJuss.	Tr	2.40	6.00	0.012
Marfim	*Agonandra brasiliensis* Miers *ex* Benth. & Hook. f.	Opiliaceae Valeton	Tr	2.40	10.00	0.008
Murta	*Sebastiania* sp	Euphorbiaceae Juss.	Bu	2.40	6.00	0.007
Jenipapo	*Genipa americana* L.	Rubiaceae Juss.	Tr	7.30	14.33	0.006
Açoita-cavalo	*Luehea alternifolia* (Mill.) Mabb.	Malvaceae Juss.	Tr	2.40	12.00	0.004
Umbu	*Spondias tuberosa* Arruda.	Anacardiaceae R. Br.	Tr	2.40	12.76	0.003
Unha-de-gato	*Mimosa caesalpiniifolia* Benth.	Fabaceae Lindl.	Bu	2.40	13.00	0.002

In this group, the most representative family was Fabaceae (with five species), followed by Anacardiaceae and Arecaceae, both with three species. A similar result was found by Nascimento et al. (2015) in a study with spontaneous food plants in an ecotonal area of western Bahia, Northeastern Brazil. Fabaceae has some species with a high nitrogen fixation capacity; the life strategy of these plants is likely what favors their high richness as well as considerable abundance and high adaptive potential (Santos e Coelho Ferreira, 2012), making them of great importance among northeastern populations.

The residents' reports showed that the first rupture in the nutrition domain included "pequi", the species most used in the food of populations in areas of Cerrado, with a great variety of forms of preparation in the Brazilian cuisine. In Piauí, its seeds are used to prepare traditional recipes, such as those in which they are mixed with rice, chicken or beans, "galinhada" (typical chicken stew), sweets, liqueurs, and desserts. The second rupture included cashew, a species with high availability, both around the residences and inside the forest. This plant also presents two edible parts, the pseudofruit and the seed, a

resource much appreciated by the interviewees. The third rupture showed "jatobá" and "faveira", species used in animal feed. The fourth included "guabiraba", "tucum", "murici", "pitomba", "mirindiba" and "araticum", species used in both human and animal feed, but which are found closer to homes. And the last rupture was characterized by the presence of species considered wilder, that is, found more often in the forest and far from homes.

All of these species were also found in a transitional area between Caatinga and Cerrado in Western Bahia (Nascimento et al., 2015) and have some similarity to those reported in surveys of food plants in other dry areas of Northeast Brazil (Chaves e Barros, 2012; Nascimento, 2013).

Both "pequi" and cashew are extremely important in the diet of the communities, especially because they represent important nutritional resources and are consumed in many ways, such as fresh or as sweets, juices, and in the case of "pequi", even cooked for food and for the preparation of oil for medical use. "Jatobá" and "faveira" are recognized as important species in animal feed due to their high nutritional value. The flour produced with the seeds of "jatobá" has a high content of dietary fibers (Matuda and Maria Neto, 2005), making it potentially useful in the preparation of foods, such as, for example, cookies (Silva et al., 1998; 2001). In turn, "faveira" has been considered one of the promising alternatives to reduce the nutritional problems of ruminants in the Mid-North of Brazil (Machado, 1999).

Table 2. Free list of species in the cultural domain health cited by women residents of the Communities Cachoeira, Vamos Vendo and Cigalha in the vicinity of the Sete Cidades National Park. Legend: VN = vernacular name; Fr% = relative percentage of citations; R = average position of the citation; S = Smith's Salience Index; Tr = tree; Bu = bush. The table is organized according to Smith's Salience Indices in descending order.

Common name	Species	Family	Habit	Fr%	R	S
Ameixa	*Ximenia americana* L.	Olacaceae R. Br.	Bu	92.70	2.55	0.691
Pequi	*Caryocar coriaceum* Wittm.	Caryocaraceae Szyszl.	Tr	31.70	4.46	0.204
Aroeira	*Myracrodruon urundeuva* M. Allemão	Anacardiaceae R. Br.	Tr	29.30	5.17	0.181
Jatobá	*Hymenaea courbaril* L.	Fabaceae Lindl.	Tr	22.00	2.78	0.172
Imburana	*Amburana cearenses* (Allemão) A.C.Sm.	Fabaceae Lindl.	Tr	24.40	3.90	0.17
Angico-branco	*Albizia niopoides* (Spruce *ex* Benth.) Burkart	Fabaceae Lindl.	Tr	19.50	2.50	0.153
Janaguba	*Himatanthus drasticus* (Mart.) Plumel	Apocynaceae Juss.	Tr	22.00	4.33	0.147
Sambaíba	*Curatella americana* L.	Dilleniaceae Salisb.	Bu	17.10	6.00	0.103
Açoita-cavalo	*Luehea alternifolia* (Mill.) Mabb.	Malvaceae Juss.	Tr	12.20	3.20	0.098
Cascudo	*Terminalia fagifolia* Mart. & Zucc. *ex* Eichler	Combretaceae R. Br.	Tr	14.60	4.17	0.096
Bulandi	*Virola surinamensis* (Roi. *ex* Rottb.) Warb.	Myristicaceae R. Br.	Tr	9.80	2.75	0.08
Tingui	*Magonia pubescens* A. St.-Hil.	Sapindaceae Juss.	Tr	22.00	6.67	0.073
Jucá/Pau-ferro	*Libidibia ferrea* (Mart. *ex* Tul.) L.P. Queiroz	Fabaceae Lindl.	Tr	17.10	5.43	0.069

Table 2. Continued.

Common name	Species	Family	Habit	Fr%	R	S
Caju (Cashew)	*Anacardium occidentale L.*	Anacardiaceae R. Br.	Tr	7.30	3.00	0.061
Copaíba	*Copaifera langsdorffii Desf.*	Fabaceae Lindl.	Tr	17.10	9.29	0.052
Barbatimão	*Stryphnodendron coriaceum Benth.*	Fabaceae Lindl.	Tr	12.20	8.60	0.049
Mangaba	*Hancornia speciosa* Gomes	Apocynaceae Juss.	Tr	7.30	3.33	0.047
Amargoso	*Vatairea macrocarpa* (Benth) Ducke	Fabaceae Lindl.	Tr	9.80	8.25	0.038
Cajuí	*Anacardium humile* A. St.-Hil.	Anacardiaceae R. Br.	Tr	7.30	6.33	0.036
Marmeleiro	*Alibertia edulis* (Rich.) A. Rich.	Rubiaceae Juss.	Bu	4.90	2.00	0.028
Pau-d'arco-roxo	*Handroanthus impetiginosus* (Mart. *ex* DC.) Mattos	Bignoniaceae Juss.	Tr	12.20	10.40	0.025
Tucum	*Astrocaryum vulgare* Mart.	Arecaceae Bercht. & J. Presl	Tr	2.40	1.00	0.024
Mufumbo	*Combretum leprosum* Mart.	Combretaceae R. Br.	Bu	2.40	1.00	0.024
Conduru	*Ephedranthus pisocarpus* R.E. Fr.	Annonaceae Juss.	Tr	2.40	1.00	0.024
Coronha	*Vachellia farnesiana* (L.) Wight & Arn	Fabaceae Lindl.	Tr	7.30	6.67	0.022
Catingueira	*Poincianella pyramidalis* (Tul.) L. P. Queiroz	Fabaceae Lindl.	Tr	4.90	5.00	0.02
Quina-quina	*Strychnos pseudoquina* A.St.-Hill.	Loganiaceae R.Br. *ex* Mart.	Tr	4.90	8.00	0.019
Araçá	*Psidium myr*sinites DC.	Myrtaceae Juss.	Tr	2.40	5.00	0.016
Angico-preto	*Anadenanthera colubrina* var. cebil (Griseb.) Altschul	Fabaceae Lindl.	Tr	2.40	5.00	0.014
Pau-d'arco-amarelo	*Handroanthus serratifolius* (Vahl) S. O. Grose	Bignoniaceae Juss.	Tr	4.90	7.00	0.012
Carnaúba	*Copernicia prunifera* (Mill.) H. E. Moore	Arecaceae Bercht. & J. Presl	Tr	2.40	7.00	0.011
Cajá	Spondias lutea L.	Anacardiaceae R. Br.	Tr	2.40	4.00	0.01
Unha-de-gato	*Mimosa caesalpiniifolia* Benth.	Fabaceae Lindl.	Bu	2.40	3.00	0.008
Crioli	*Mouriri samanensis* Urb.	Melastomataceae A. Juss.	Tr	2.40	3.00	0.008
Piquiá-de-casca-grossa	*Aspidosperma subincanum* Mart.	Apocynaceae Juss.	Tr	2.40	11.00	0.004
Sucupira	*Bowdichia virgilioides* Kunth	Fabaceae Lindl.	Tr	2.40	12.00	0.002

Cultural domain health

In this domain, the free list was represented by 36 species distributed in 16 families (Table 2). The analysis of the SI showed four ruptures: the first was composed of one species, plum; the second was composed of "pequi"; the third had five species, namely, "aroeira", "jatobá", "imburana", "angico-branco", and "janaguba"; and the fourth rupture gathered the other species.

The most representative families were Fabaceae (12 spp.) and Anacardiaceae (4 spp.). The first was mentioned by Mendonça et al. (1998) as the family with the largest number of species in Cerrado and by Guarim Neto and Morais (2003) as one of the most representative in a bibliographic survey of medicinal resources among species from Cerrado areas in Mato Grosso.

In this domain, in the first rupture, there is plum, a species with the widest range of applications in the treatment of diseases. In the second, there was "pequi", a species with great versatility of use. The third rupture presented "aroeira", "jatobá", "imburana", "angico-branco", and "janaguba", species indicated for the treatment of diseases of the respiratory system; the bark is the most frequently used part in these cases. In the last rupture, there were species for the treatment of various diseases, such as those related to the skin and inflammations in general.

All of the above mentioned ethnospecies are cited in the literature (Oliveira et al., 2011; Fagundes et al., 2017) as therapeutic alternatives in folk medicine as they present pharmacological properties that show effective results in different treatments. Plum, for example, has been used for the healing of wounds, which can be explained by the presence of some substances such as tannins (Brasileiro et al., 2008). The oil extracted from "pequi" has several therapeutic applications, especially in the treatment of respiratory diseases (Septímio, 1994) and in inflammatory processes (Miranda-Vilela, 2009).

Table 3. Free list of species in the cultural domain timber cited by women residents of the Communities Cachoeira, Vamos Vendo and Cigalha in the vicinity of the Sete Cidades National Park. Legend: CN = common name; Fr% = relative percentage of citations; R = average position of the citation; S = Smith's salience index; Tr = tree; Bu = bush. The table is organized according to the Smith's Salience Index in descending order.

Common name	Species	Family	Habit	Fr%	R	S
Jatobá	*Hymenaea courbaril* L.	Fabaceae Lindl.	Tr	31.70	2.15	0.264
Unha-de-gato	*Mimosa caesalpiniifolia* Benth.	Fabaceae Lindl.	Bu	39.00	3.06	0.227
Cascudo	*Terminalia fagifolia* Mart. & Zucc. *ex* Eichler	Combretaceae R. Br.	Tr	36.60	3.33	0.219
Pau-d'arco-amarelo	*Handroanthus serratifolius* (Vahl) S. O. Grose	Bignoniaceae Juss.	Tr	39.00	5.06	0.193
Piquiá-de-quina	*Aspidosperma discolor* A. DC.	Apocynaceae Juss.	Tr	26.80	3.64	0.149
Pau-pombo	*Tapirira guianensis* Aubl.	Anacardiaceae R. Br.	Tr	22.00	4.44	0.133
Piquiá-de-casca-fina	*Aspidosperma multiflorum* A. DC.	Apocynaceae Juss.	Tr	22.00	3.78	0.127
Carnaúba	*Copernicia prunifera* (Mill.) H. E. Moore	Arecaceae Bercht. & J. Presl	Tr	14.60	1.67	0.127
Tucum	*Astrocaryum vulgare Mart.*	Arecaceae Bercht. & J. Presl	Tr	17.10	2.29	0.114

Table 3. Continued.

Common name	Species	Family	Habit	Fr%	R	S
Pequi	*Caryocar coriaceum Wittm.*	Caryocaraceae Szyszl.	Tr	17.10	3.29	0.111
Babaçu	*Attalea speciosa Mart. ex Spreng*	Arecaceae Bercht. & J. Presl	Tr	14.60	1.83	0.101
Pau-d'arco-roxo	*Handroanthus impetiginosus* (Mart. *ex* DC.) Mattos	Bignoniaceae Juss.	Tr	26.80	6.55	0.100
Pau-terra da folha pequena	*Qualea parviflora* Mart.	Vochysiaceae A. St.-Hil.	Bu	14.60	5.33	0.080
Piquiá-de-casca-grossa	*Aspidosperma subincanum* Mart.	Apocynaceae Juss.	Tr	12.20	2.80	0.08
Sambaíba	*Curatella americana* L.	Dilleniaceae Salisb.	Bu	4.90	1.00	0.049
Copaíba	*Copaifera langsdorffii* Desf.	Fabaceae Lindl.	Tr	4.90	1.00	0.049
Aroeira	*Myracrodruon urundeuva* M. Allemão	Anacardiaceae R. Br.	Tr	9.80	7.25	0.043
Gonçalo-alves	*Astronium fraxinifolium* Schott	Anacardiaceae R. Br.	Tr	7.30	6.00	0.04
Faveira-de-bolota	*Parkia platycephala* Benth.	Fabaceae Lindl.	Tr	4.90	1.50	0.037
Amargoso	*Vatairea macrocarpa* (Benth) Ducke	Fabaceae Lindl.	Tr	7.30	4.00	0.035
Jucá/Pau-ferro	*Libidibia ferrea* (Mart. ex Tul.) L.P. Queiroz	Fabaceae Lindl.	Tr	4.90	2.50	0.034
Pau-terra-folha grande	*Qualea grandiflora* Mart.	Vochysiaceae A. St.-Hil.	Bu	4.90	4.00	0.033
Mufumbo	*Combretum leprosum* Mart.	Combretaceae R. Br.	Bu	4.90	4.00	0.03
Jacarandá	*Swartzia flaemingii* Raddi	Fabaceae Lindl.	Tr	4.90	6.00	0.027
Angico-branco	*Albizia niopoides* (Spruce *ex* Benth.) Burkart	Fabaceae Lindl.	Tr	2.40	1.00	0.024
Jurema	*Mimosa verrucosa* Benth.	Fabaceae Lindl.	Tr	2.40	1.00	0.024
Mirindiba	*Buchenavia tetraphylla* (Aubl.) R. A. Howard	Combretaceae R. Br.	Tr	2.40	2.00	0.021
Açoita-cavalo	*Luehea alternifolia* (Mill.) Mabb.	Malvaceae Juss.	Tr	2.40	3.00	0.018
Gameleira	*Clusia bercheehellii* Engl.	Clusiaceae Lindl.	Tr	2.40	5.00	0.016
Mocó	*Luetzelburgia auriculata* (Allemão) Ducke	Fabaceae Lindl.	Tr	2.40	3.00	0.015
Araticum	*Annona paludosa* Aubl.	Annonaceae Juss.	Tr	2.40	2.00	0.012
Marmeleiro	*Alibertia edulis* (Rich.) A. Rich.	Rubiaceae Juss.	Bu	2.40	6.00	0.009
Jenipapo	*Genipa americana* L.	Rubiaceae Juss.	Tr	4.90	9.00	0.006
Candeia	*Plathymenia reticulata* Benth.	Fabaceae Lindl.	Tr	2.40	7.00	0.003

Cultural domain timber

The free list of the cultural domain timber had 34 species distributed in 15 families (Table 3). The SI showed three ruptures: the first was composed of four species, "jatobá", "unha-de-gato" and "cascudo"; the second included nine species, namely, "pau-d'arco-amarelo", "pequiá-de-quina", "pau-pombo", "pequiá-de-casca-fina", "carnaúba", "tucum", "pequi", "babaçu" and "pau-d'arco-roxo". The third rupture gathered the other species.

The most representative families were Fabaceae (11 spp.) and Combretaceae, Apocynaceae, Anacardiaceae and Arecaceae, each represented by three ethnospecies.

In the cultural domain timber, the first rupture consisted of three species: "jatobá", "unha-de-gato" and "cascudo". They are related to the construction of protective boundaries (fences, gates, and corrals). The second rupture had nine species ("pau-d'arco-amarelo", "pequiá-de-quina", "pau-pombo", "pequiá-de-casca-fina", "carnaúba", "tucum", "pequi", "babaçu" and "pau-d'arco-roxo"). These ethnospecies are used for structural woodwork in homes (columns, rafters, clapboards, doors, windows, ridges).The third and last rupture had the other species used for different ends such as manufacture of furniture, house artifacts, and production of firewood and charcoal.

These ethnospecies are common in the Brazilian Caatinga and Cerrado, being part of the daily life of rural communities living there. They are cited in several studies, such as that by Lima et al. (2011) in Agreste areas of Sergipe, and by Lima et al. (2012) in Cerrado areas of Minas Gerais, and by Guarim Neto and Pasa (2009) in Mato Grosso. These species can be used to supply the needs of local populations as fuel source, material for house construction, fences for land delimitation, manufacture of work tools, among others (Ramos et al., 2010). "Jatobá", "pau-d'arco" and "pequi" were found in all the studies afore mentioned, revealing the importance of these species in the timber sector and their priority relevance for conservation and management.

The Sorensen Index indicated low similarity between the domains studied (Figure 2), with eight species common to the three cultural domains. This similarity expresses the great knowledge of the women in these communities about the use of plant biodiversity. It also indicates that the species belonging to each domain are well delimited by the informants, despite the greater similarity between the health and timber domains, which presented similarity of J = 0.52 with ten shared species, due to the fact that some are present in more than one domain.

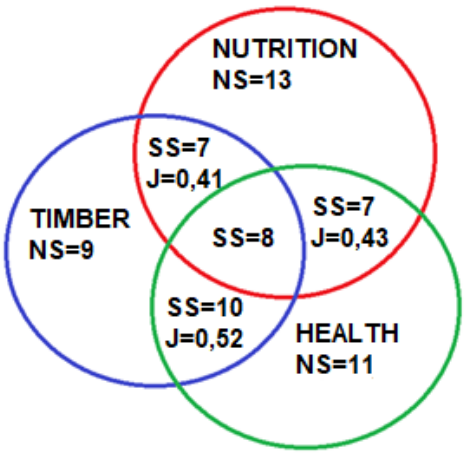

Figure 2. Venn Diagram for the cultural domains studied (nutrition, health and timber) in the Communities Vamos Vendo, Cigalha, and Cachoeira in the buffer zone of the Sete Cidades National Park (NS: number of species; SS: number of shared species; J: Sorensen Similarity Index).

Moreira and Guarim Neto (2009) highlighted that in traditional communities of the Cerrado, a species could be present in more than one category of use because of the wide knowledge of these communities and the potential use of biodiversity. There was a lower similarity between the nutrition and timber domains, with thirteen shared species (J = 0.41). The list of species shared by the domains is shown in Table 4, where it is possible to verify the great versatility of uses that are common to the three domains.

Table 4. List of species shared between the cultural domains studied (nutrition, health and timber) in the Communities Vamos Vendo, Cigalha, and Cachoeira in the buffer zone of the Sete Cidades National Park.

Common to the three domains	**Nutrition *x* timber**	**Timber *x* health**	**Nutrition *x* health**
Açoita-cavalo	Araticum	Amargoso	Ameixa
Copaíba	Bacuri	Angico-branco	Araçá
Jatobá	Faveira-de-bolota	Aroeira	Cajá
Marmeleiro	Gameleira	Carnaúba	Caju
Pequi	Genipapo	Cascudo	Cajuí
Sambaíba	Mirindiba	Jucá	Crioli
Tucum	Babaçu	Mufumbo	Mangaba
Unha-de-gato	-	Pau-d'arco-amarelo	-
-	-	Pau-d'arco-roxo	-
-	-	Pequiá-casca-grossa	-

In this sense, it is important to stress the need for the conservation of these species and also highlighting the knowledge of women in the scenario of rural communities settled in the surroundings of CUs. As Kainer and Duryea (1992) explain, the success of sustainable use CUs depends on the recognition and exploration of gender differences, as well as it is a fact that the knowledge of peoples in the surrounding areas of integral protection CUs is valuable since these CUs have a fundamental role in the organization and maintenance of the families' decision-making processes, becoming important sources of knowledge that can assist in the construction of strategies to mitigate environmental problems in these spaces.

Final considerations

The women living in the communities Vamos Vendo, Cigalha and Cachoeira organize the LEK on vegetation in three domains according to use. However, the similarity found between the three domains indicates the high versatility of the flora of the communities in the buffer zone of the SCNP, which further highlights the wide knowledge about plant diversity of women in the vicinity of this CU.

The knowledge of the women about the native vegetation reaffirms their autonomy in different aspects, especially in the family's health care and food security and sovereignty. The registered LEK of these residents must also be used in dialogues with scientific knowledge so as to subsidize public policies for the development of strategies for the conservation of ecological and cultural biodiversity. This is especially relevant for the preservation of the biological-cultural diversity present in the study area, considering that these communities are inserted in the buffer zone of an integral protection CU in an

ecotonal area affected by irreversible losses caused by factors of anthropic and/or climatic nature.

The data of this research may contribute with information for the update and improvement of the Management Plan of the SCNP, mainly because these social actors have direct and daily interaction with the local biodiversity.

Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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