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Guardians of the forest: the traditional knowledge associated to sociobiodiversity productsin the Middle Juruá territory,Carauari, Amazonas, Brazil

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ABSTRACT. The sustainable use of resources and the traditional knowledge of human populations in sustainable use UCs characterize these spaces as places of refuge for sociocultural expressions, ways of life, territorial protection, and maintenance of knowledge. The present study aimed to reveal traditional knowledge regarding flora and fauna species by riverside communities in the Amazon basin. To this end, it investigated how residents of two communities in the Middle Juruá territory identified and used local species. The analysis of similarities enabled the creation of a flowchart illustrating the process of traditional knowledge consolidation based on the application of semi-structured forms, open interviews and bibliographic review. Ninety-five species and 112 uses were identified and categorized, the most frequent uses being associated with healthcare (68%), cosmetics (10%), and food (9%). Cluster formation was observed among members of the same community, suggesting that traditional knowledge transmission is consistent with living closer together. Therefore, we understand that the region has great potential for products and uses of socio-biodiversity, and traditional populations are responsible for protecting territorial and natural resources through sustainable management, using their traditional knowledge. However, the erosion of this knowledge in regions with intense trade with companies that use these raw materials for products highlights the need to guarantee the rights of these populations, especially in relation to the sharing of benefits from products derived from associated traditional knowledge and heritage genetic (Brasil, 2015).

Keywords: traditional use; Carauari; sustainability; natural resources; haring of benefits.

Guardiões da floresta: O conhecimento tradicional associado a produtos da sociobiodiversidade no território do Médio Juruá, Carauari, Amazonas, Brasil

RESUMO. O uso sustentável dos recursos e o conhecimento tradicional das populações humanas em Unidades de Conservação (UC) de uso sustentável caracterizam estes espaços como locais de refúgio para as expressões socioculturais, modos de vida, proteção territorial e manutenção do conhecimento. O presente estudo teve como finalidade desvelar o uso do conhecimento tradicional associado às espécies de flora e fauna por comunidades ribeirinhas na Amazônia a partir da identificação das espécies de uso pelos moradores de duas comunidades no território Médio Juruá. Dessa forma, analisou-se a similaridade de usos entre as comunidades estudadas e construiu-se um fluxograma do processo da consolidação do conhecimento tradicional pelas populações humanas a partir da aplicação de formulários semi-estruturados, entrevistas abertas e revisão bibliográfica. Como resultado, foram identificadas 95 espécies de uso e 112 usos, distribuídos em 07 grandes categorias. Os usos mais recorrentes são da categoria de cosmético e medicinal. Percebeu-se a tendência a formação de grupos entre entrevistados da mesma comunidade, o que evidencia que o conhecimento tradicional é repassado de forma mais consistente com a convivência mais próxima. A categoria medicinal é a que possui mais usos (76), o que representa 67,85% do total, seguida da categoria de cosmético com 11 usos (9,82) e alimentício com 10 usos (8,92%). Entendemos que a região possui um grande potencial de produtos e usos da sociobiodiversidade, e as populações tradicionais são as responsáveis pela proteção territorial e dos recursos naturais por meio do manejo sustentável, utilizando seu conhecimento tradicional. No entanto, a erosão desse conhecimento em regiões com um comércio intenso com empresas que utilizam essas matérias-primas para produtos destaca a

necessidade de garantir os direitos dessas populações, especialmente em relação à repartição de benefícios de produtos derivados do conhecimento tradicional associado e do patrimônio genético (Brasil, 2015).

Palavras-chave: uso tradicional; Carauari; sustentabilidade; recursos naturais; repartição de Benefícios.

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Introduction

The sustainable use of resources by local populations based on traditional knowledge makes conservation units (UCs) sanctuaries for sociocultural expressions and preservation of this knowledge. In this perspective, the creation of the Middle Juruá RESEX (Middle Juruá Extractivist Reserve) and the Uacari RDS (Uacari Sustainable Development Reserve) UCs in the Middle Juruá territory constituted an important 'legal landmark that legitimized local populations' unique lifestyles, customs, and traditional knowledge regarding the use of flora and fauna species (Amazonas, 2005; Guimarães et al., 2022; Ferreira, Cunha, & Guimarães, 2023).

Preserving traditional knowledge is a challenging task in today's world. Due to its multiplicity, multidimensionality, and complexity, it requires the interdisciplinary analysis. Thus, the understanding traditional knowledge and the way it is constructed and passed down requires a complex system of analysis. Various theories and forms of analysis help to understand this complexity, for example in the perspective of environmental anthropology (also known as ecological anthropology). Ingold (2012) points to a deeper understanding of the interactions between human societies and ecosystems, helping to formulate policies and actions that promote harmonious coexistence between people and the nature. While Morin (2016), in the field of complexity theory, offers a comprehensive perspective to understand the unique network of relationships between different elements, including human interactions with the natural environment.

In the context, the confirmation and identification of an important potential for sociobiodiversity in the Middle Juruá territory, along with the unique forms of governance of its communities, were the main reasons for selecting this area for the research. This study aimed to investigate the species used by the residents of two Middle Juruá communities, identify similarities in species and their uses, and propose an archetypal flowchart for the process by which traditional populations construct and consolidate knowledge regarding the use of sociobiodiversity products in different contexts.

It is expected that the results from this research can contribute to public policy making in line with local economic development, environmental conservation, and fair and equitable sharing of benefits derived from judicious use of genetic heritage and traditional knowledge, as stipulated in Law 13.123/2015(Brasil, 2015; Brasil, 2016). Moreover, it is anticipated that this study will add value to sociobiodiversity products and assist in the exploration of new products and markets at different levels and segments.

Methodological procedures

The research was conceived and designed in line with the complexity episteme, as defined by Morin (2016), i.e., allowing for a comprehensive analysis, at different levels and taking into consideration complex systems and related emerging phenomena. While theoretical-methodological discussions cannot reach a definitive conclusion when the analysis of complexity is centered on the research participants, their sociocultural practices, and socioenvironmental knowledge, they can assist researchers in understanding how traditional knowledge of the uses of sociobiodiversity is constructed by human populations. In doing so, they can shed light on these communities' harmonious and healthy relationships with the environment, which characterizes sustainability itself. This research was sanctioned by the CEP/CONEP (Research Ethics Committee) on February 20, 2022, under CAAE (Certificate of Submission to Ethical Appraisal) 54763221.0.0000.5020.

Study area

The study was conducted in the Middle Juruá territory, which encompasses two large morphostructural regions: *terrafirme* (a low plateau in western Amazonas State) and a floodplain (an Amazon River plain), also known regionally as the Juruá plain (Franco, 2007).This area is located in the municipality of Carauari, in the southwest of the state of Amazonas, 786 kilometers away from the capital, Manaus (approximately 6 to 7 days by boat).

Two Conservation Units are located in the Middle Juruá territory (Figure 1). Covering an area of 286.954,81 hectares, the Middle Juruá RESEX (Middle Juruá Extractivist Reserve) was created by a presidential decree in 1997 whereas the Uacari RDS (Uacari Sustainable Development Reserve), an area of 632.949,02 hectares, was established by the State of Amazonas (Decree No. 25.039 of June 1, 2005) (Amazonas, 2005).

Two communities were chosen to participate in the study: São Raimundo, located in the Middle Juruá RESEX (5 hours from the municipal seat), and Bauana, located in the Uacari RDS (3 hours from the municipal seat of Carauari). These communities were selected because they met the criteria for diversification of production chains and were located in the aforementioned Conservation Units (UCs).

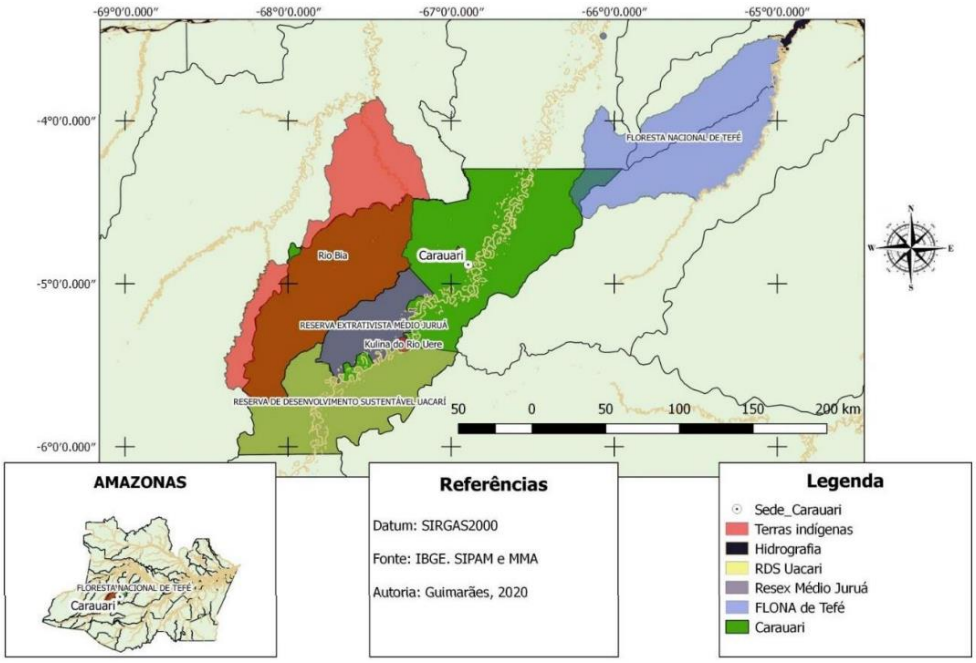


Figure 1. Location of the Middle Juruá communities under investigation (Guimarães et al., 2022, p. 23).

Data collect

This study made use of many methodological procedures, such as semi-structured questionnaires, open-ended interviews, field observations, literature review, and participation in gatherings and meetings with the participants. These procedures generated relevant information and data for understanding the traditional uses of fauna and flora by the residents of the Middle Juruá communities under investigation.

The first visit to the communities was aimed at presenting the project to the community members and administrators as well as participate in gathering and meetings with them. On the second visit, data were collected by means of semi-structured questionnaires at communities under investigation, i.e., São Raimundo (Middle Juruá RESEX) and Bauana (Uacari RDS). The interviews were conducted with male and female individuals aged 18 years or older who had been living in the aforementioned communities longer than one year.

Analysis of data

The flora and fauna species were identified with the aid of specialized literature (Shanley & Medida, 2005). As to the flora species, the botanical nomenclature conformed to the APG IV classification system (Angiosperm Philogeny Group [APG], 2017). The identification of the fauna species was consistent with the International Code of Zoological Nomenclature. The accuracy of species nomenclature was checked against databases such as the virtual herbarium Reflora, Species Link, the Taxonomic Catalog of Brazilian Fauna, the International Plant Names Index (IPNI), and Embrapa (Fowler, 2011).

Data were tabulated in Excel spreadsheets (Microsoft, 2024). A simple statistical description of the study sites was performed and compared to the lists of traditional uses from the sociobiodiversity inventory for the Middle Juruá's São Raimundo and Bauana communities. The inventory consisted of questions related to the uses of the identified species: its origin (animal or plant), category of use (food, medicine, cosmetics, household, building, manufacture, other), use details, section of the plant or animal used, type of material

(oil, nut, leaf, pulp, other), origin details (naturally occurring or planted for plant species and hunting, fishing, handling or breeding for animals), and mapping of collection site.

Data were treated in Excel using pivot tables. The similarity analysis was performed using the Jaccard similarity index (JSI) and PAST 4.07 software (Hammer, Harper, & Paul, 2001), with presence-absence binary range from -1 (dissimilarity) to 1 (similarity). Data treatment and analysis led to the creation of a flowchart illustrating the process by way of which traditional knowledge is constructed and consolidated by human populations as regards the uses of products of sociobiodiversity in light of the Complexity Theory and processes of knowledge safeguarding and conservation in their territories.

Traditional uses of products of sociobiodiversity in the middle Juruá territory

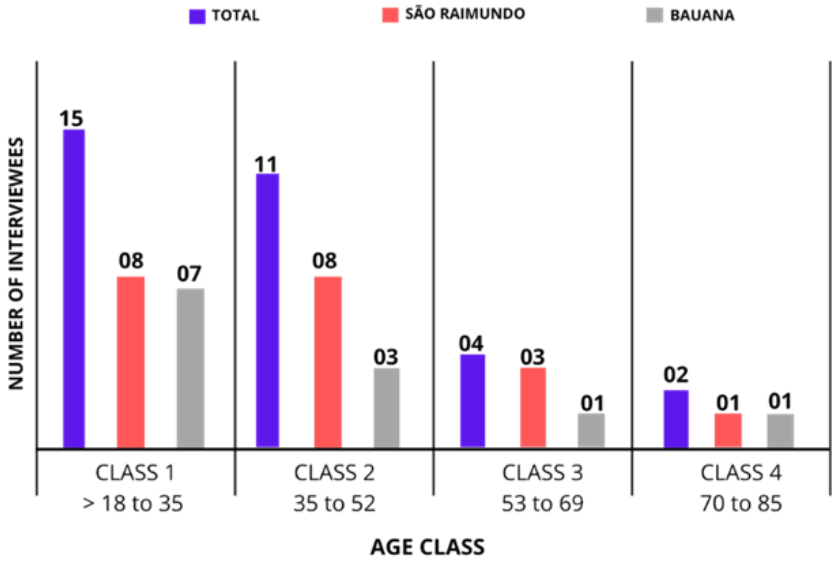
Thirty-two community members were interviewed, 19 men (59%) and 13 women (41%) aged between 20 and 83 years. Twenty of them were residents of São Raimundo (Middle Juruá RESEX), six women (30%) and 14 men (70%). The remaining 12 interviewees were members of the Bauana community (Uacari RDS), seven women (58%) and five men (42%). Ninety-five species were identified as used by the communities: 15 of animal origin (16%) and 80 of plant origin (84%), as shown in Table 1.

Table 1. Comparison of descriptive data from São Raimundo and Bauana.

Parameters	São Raimundo	Bauana	Total
	20	12	32
No. of women	07	06	13
No. of men	05	14	19
Total No. of species	61	68	95
No. of exclusive species*	27	34	-
% of exclusive species	28%	36%	-
No. of use categories	07	05	07
No. of identified uses	61	59	112

Source: Authors. *Species identified in just one community.

As to the interviewees' ages, 47% were in Bracket 1 (18-35 years old) followed by 38% in Bracket 2 (36-52 years old). Brackets 1 and 2 represented 80% of the interviewees in São Raimundo (8 interviewees each), whereas 83% of Bauana interviewees were in these two age brackets (7 in Bracket 1 and 3 in Bracket 2), as shown in Figure 2.



2. Variation in age of São Raimundo and Bauana interviewees.
Source: Authors. Age bracket / No. of interviewees.

In all, 112 uses were identified, distributed under seven major categories (Figure 3). The category with the highest number of uses by the interviewees was medicine with 76 uses (68% of the uses identified), followed by the cosmetics category with 11 uses (10%) and food with 10 uses (9%). The household and manufacture categories presented eight (7%) and five uses (4%), respectively.

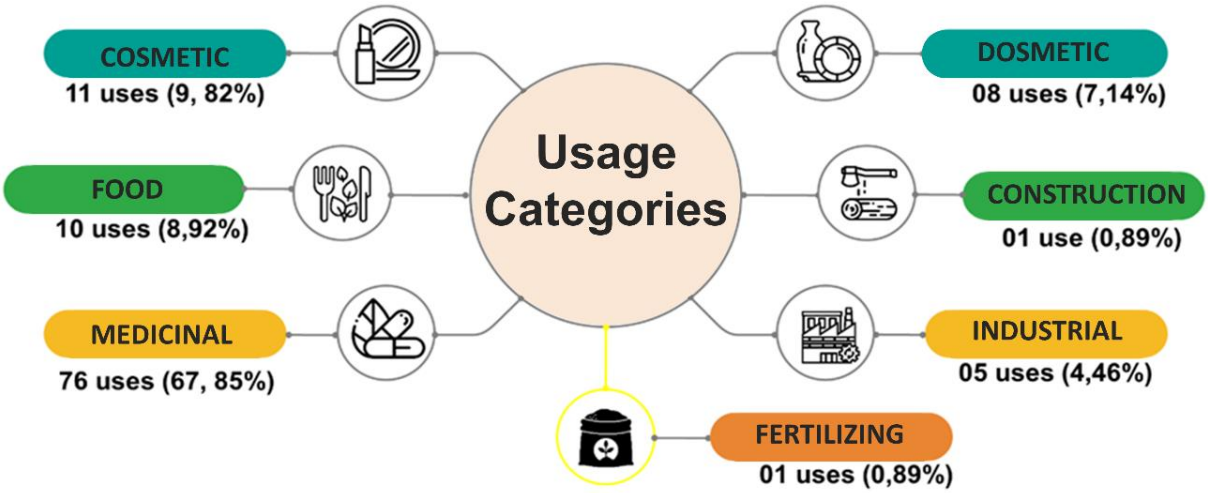


Figure 3. Categories of use of identified species.
Source: Authors.

The community members most frequently reported the uses of species for treating flu symptoms (eight species), building boats (eight species), healing wounds (six species), and as anti-inflammatory medication (five species). Some species, such as açaí (*Euterpe precatoria* Mart.) and andiroba (*Carapa guianensis* Aubl.), fell under more than one category. Açaí (*Euterpe precatoria* Mart.) fell underfourdifferent categories of use: food, cosmetics, medicine, and other (fertilization), whereas andiroba (*Carapa guianensis* Aubl.) fell under three categories: cosmetics, building, and medicine, evidencing the high versatility of some products of sociobiodiversity and the way traditional knowledge is passed down of from generation to generation. Other species, such as the rubber tree (*Hevea brasiliensis* L.), whose sap is used to produce rubber, fell under only one category of use (manufacture).

This species has been of great importance to the region, not only of economic importance, but also of sociocultural importance, due to its immense contribution to the establishment of the Middle Juruá territory. As recalled by many community members during meetings and gatherings, this territory resulted from the rubber tappers' organization, struggles, and resistance in order to safe guard their right to land and better living conditions. They fought "to free themselves from the bosses' grip" and to reduce the disparity between the economic gains of rubber tapper sand those of 'rubber colonels.'

However, only interviewees from the São Raimundo community (Middle Juruá RESEX) alluded to the rubber tree probably because it was the first UC to be established in the territory, the outcome of social struggles, articulation, and organization originally aimed at achieving socio-environmental justice for rubber tappers. It later on came to encompass other extractivists, anglers, and family farmers. The São Raimundo community is the birthplace of many community leaders, who participated in the early struggles for land security, which culminated in the establishment of the conservation units. Many of these leaders are still active, now to fight off challenges that threaten their local governance.

Falling under two categories of use, murumuru (*Astrocaryum murumuru* Mart.), mutamba (*Guazuma ulmifolia* Lam.) and marã vine (*Omphalea diandra* L.) stand out in the oilseed production chain. Used for manufacturing cosmetics, ucuúba (*Virola surinamensis* (Rol.) Warb) is also an important product of sociobiodiversity as evidenced by its commercialization with Natura™in the region (Figure 4).

Under the cosmetics category, the uses of andiroba (*Carapa guianensis* Aubl.), murumuru (*Astrocaryum murumuru* Mart.), ucuúba (*Virola surinamensis* (Rol.) Warb.), and mutamba (*Guazuma ulmifolia* Lam.) oil seeds were mentioned by the interviewees in relation to commercialization with Natura™, which may negatively affect the traditional use of these species. The economic gains deriving from the commercialization of most of the collected oilseeds or even their being collected just for commercial purposes maylead to a loss of ethnobotanical knowledge among future generations (Alves et al., 2022).

According to Zuchiwschi, Fantini, Alves, and Peroni (2010), there may occur a gradual loss of conditions for traditional knowledge transmission, risking the erosion of accumulated knowledge due to lack of daily use of these species. Not with standing, Calazans, Collares, and Ribeiro (2019) believes that this loss can be reverted by valuing traditional knowledge, which in turn can promote a cultural revival closely associated to the

communities' identity. In a study conducted by Oliveira (2023) in the in the Middle Juruá region, the author points out that in this region the communities are rich in biodiversity, local inhabitants have an intrinsic relationship with local biodiversity, sustainably exploiting natural resources for productive activities.

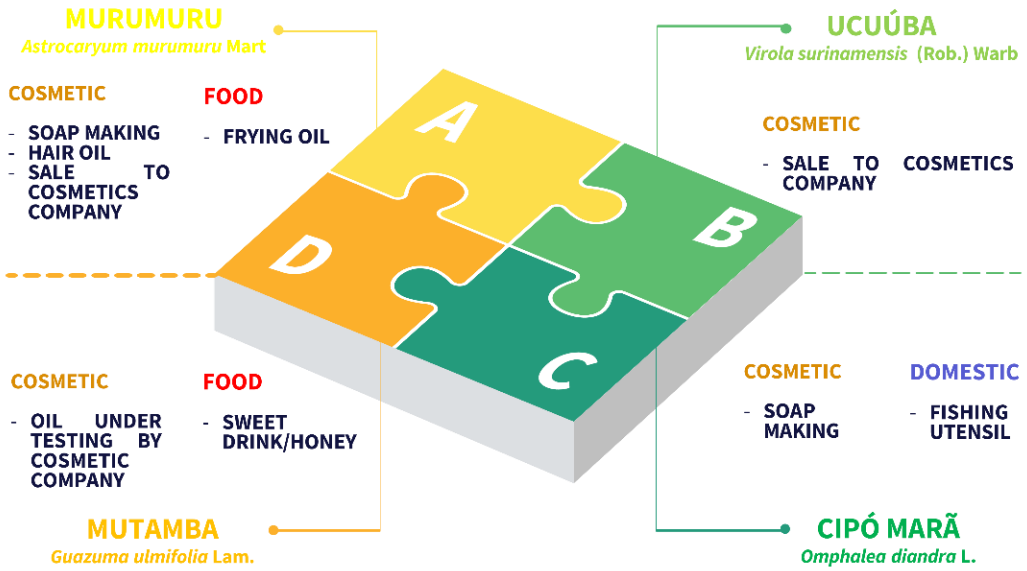


Figure 4. Species pertaining to the oilseed production chain in the Middle Juruá territory, and their uses as mentioned by the interviewees.
Source: Authors.

In his study with lace makers from Santa Catarina Island, Sabino (2019) discusses the need to incorporate culture when conducting investigations, writing guidelines, and proposing policies that involve sustainability. The author suggests that the economic, environmental, and social trivet be turned into a mosaic of pillars capable of representing and apprehending the complex dynamics surrounding this issue. In this vein, Arruda (1999) criticizes environmental conservation initiatives focused on establishing conservation units in sole view of human occupation. Indeed, Carvalho (2019), studying the Jutaí and Middle Juruá RESEXs, indicates that sociobiodiversity can be deployed in ways that promote sustainable use of resources, ensure subsistence, and contribute to land security, which are foundations ofthe sustainable use UCsqua loci for cultural expression and traditional knowledge conservation throughout generations.

In their study about the uses of tucum (*Bactris setosa*), Abreu and Nunes (2012) indicate that traditional knowledge is conserved by being passed down from generation to generation*in loco*. It should be noted that this type of knowledge is often intangible (Calazans et al., 2019). Given the fact that the São Raimundo and Bauana communities are about 2h apart from each other, the existence of clusters of traditional knowledge holders within both of them suggests that traditional knowledge is passed down through close interactions among community members, which implies that communities constitute units of knowledge conservation.

Among the most frequently cited species of animal origin were sucuri or sucuriju (*Eunectes* spp.), whose lard is used to heal wounds and treat joint pains, cough, and influenza symptoms (17 interviewees), and honey, used*in natura*as food and, under the medicine category, as anti-inflammatory medication to treat pneumonia and influenza symptoms (cough and sore throat), associated with copaiba oil (*Copaifera langsdorffii* Desf.).

> Here, sucuri lard [...]. Sucuris are the little drop; you take the lard with something. With a cup of tea or something [...]. This is rum... When they're killed, there's a lot of them here, but they're hard to kill. When they're killed, there's lard; we'll take it out of them. Hail Mary! Someone may arrive with three sucuris and puts them with another because their lard's good for a lot of things. Nothing else's as good for healing as sucuri lard, man. It heals things really fast. If you get a wound like this or have a disease, you shouldn't rub it on it right away, otherwise it'll heal so fast that it'll heal only on the surface and become inflamed. Preferably [...] It tastes bad, but I prefer to take it with something. It's much better to take it. It works wonders for my backbone. It's so much pain that we feel, I mean, people who do heavy manual work as we do at the age I am now [...] You feel a lot of pain. Then, when the boys kill some sucuris and I have the lard, I start taking it. I take it at breakfast every morning, 4 or 3 drops. Then, I feel a lot better in the morning. The pain really disappears (A. M., community member).

In study conduct by Braga and Rebêlo (2015) in the lower Juruá river that indicate that sucuri lard/fat is widely used for cuts, 'unmasking' and healing. This knowledge is an integral part of Amazonian culture and traditional medicine, offering healthcare alternatives that are often effective and affordable, especially in remote regions where access to medical services may be limited.

As to the uses of plant species, the species most frequently cited by the interviewees were andiroba (*Carapa guianensis* Aubl.) and copaíba (*Copaifera langsdorffii* Desf.) with 49 and 30 mentions, respectively, associated to various uses. Both species were employed in the manufacture of artisanal biocosmetics at the ASMAMJ (Middle Juruá Association of Agroextractivist Women). The ASMAMJ also tended to a community garden with great potential as attested by its large quantity of different herbs and vegetables.

The ASMAMJ is active in the regional production chain of oilseeds with commercialization agreements with the AMARU (Uacari Association of RDS Residents) and CODAEMJ (Middle Juruá Mixed Cooperative for Sustainable Development and Solidarity Economy). The AMARU and CODAEMJ are two locally-based organizations that operate in the Uacari RDS and Middle Juruá RESEX, respectively, concerning the commercialization of andiroba (*Carapa guianensis* Aubl.), murumuru (*Astrocaryum murumuru* Mart.), and ucuúba (*Virola surinamensis* (Rol.) Warb.) with Natura™ in addition to currently conducting the prospection of mutamba (*Guazuma ulmifolia* Lam.) and marã vine (*Omphalea diandra* L.) for future commercialization. It should be noted that Natura™ shares its monetary gains with the Middle Juruá Sharing Fund, created in 2013 and established in 2017, in compliance with Law 13.123/2015 (Brasil, 2015), which deals with fair and equitable sharing of benefits from commercialization of products of sociobiodiversity derived from genetic heritage and traditional knowledge associated to andiroba (*Carapa guianensis* Aubl.).

Knowledge does (not) walk[1]: similarities between communities as to sociobiodiversity species and their uses

As to the similarities between species used at both communities, Figure 5 shows the dendrogram obtained from the species mentioned by the interviewees using the unweighted pair group method with arithmetic mean method (UPGMA), based on the Jaccard similarity index (JSI).

Figure 5 shows the formation of clusters among individuals, indicating similarities among used species. The highest similarity was observed in the formation of the SR9 and SR18 cluster, both interviewees being from the São Raimundo community (SR9/L. G. da S and SR18/R. C. V). They both cited the same species, i.e., andiroba (*Carapa guianensis* Aubl.), murumuru (*Astrocaryum murumuru* Mart.), and açaí (*Euterpe precatoria* Mart.), albeit indicating different uses for the last species. While SR18/R.C.V used açaí only as food, SR9/L.G da S used it as food as well as medicine. The dendrogram also shows a clustering tendency among members of the same community, corroborating the idea that traditional knowledge is passed down in ways consistent with relationship closeness.

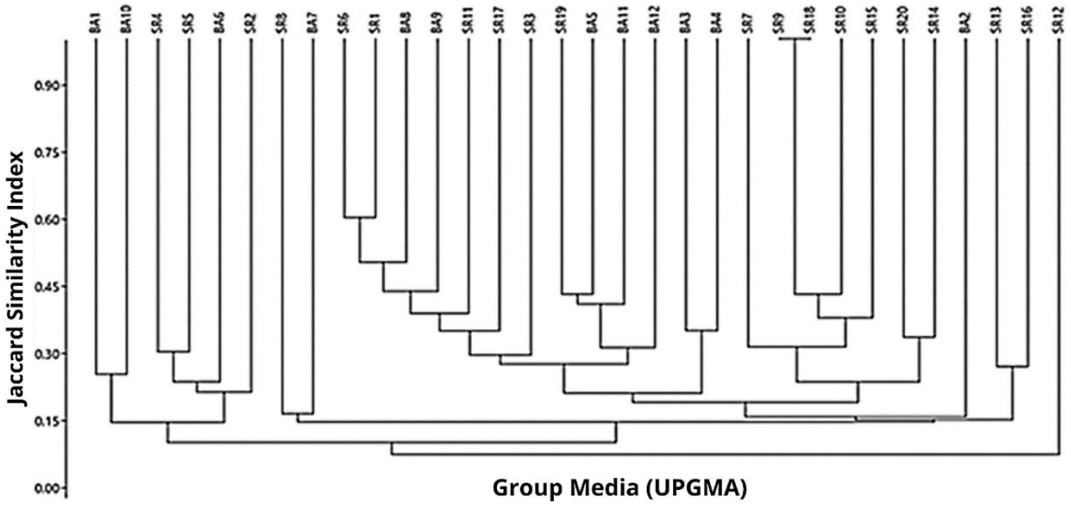


Figure 5. Dendrogram based on the Jaccard similarity index for data on the presence (or absence) of mentions of sociobiodiversity species by the São Raimundo e Bauana community members.

Source: Authors with PAST 4.07 software (Hammer et al., 2001, p. 3).

[1]Phrase from dialogue with community leader Cesar Henrique Cunha de Lima from the São Raimundo community, Resex Médio Juruá.

The only cluster with interviewees from both communities was that formed by SR19 (R. C. from São Raimundo) and BA11 (M. L. from Bauana), whose similarity coefficient of used species is 0.4. Both individuals mentioned the same five species of plant origin, i.e., andiroba (*Carapa guianensis* Aubl.), copaiba, uxi (*Endopleura uchi* (Huber) Cuatrec.), açaí (*Euterpe precatoria* Mart.), and maçaranduba (*Manilkara huberi* (Ducke) A. Chev.), under different categories of use, and one species of animal origin, i.e., sucuri lard. On the other hand, the lowest similarity in the dataset corresponded to the interviewee SR12 (M. da C. from São Raimundo), who displayed the greatest distance in uses of species as compared to those of other interviewees

As to the comparison among categories of uses, Figure 6 shows the dendrogram obtained from the species mentioned by the interviewees and their categories of use, also using the UPGMA method based on the JSI. It is worth noting that clusters did not form amongst the categories, suggesting dissimilarity in the use of the mentioned species. The highest similarity was observed in the formation of the food and cosmetics cluster associated to murumuru (*Astrocaryum murumuru* Mart.), mutamba (*Guazuma ulmifolia* Lam.), and açaí (*Euterpe precatoria* Mart.).

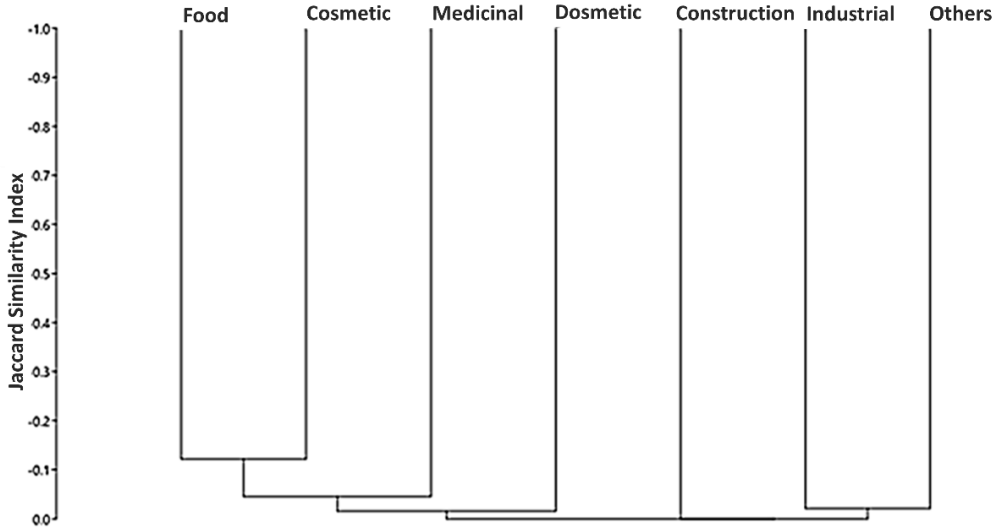


Figure 6. Dendrogram obtained throughthe Jaccard similarity index for the categories of use mentioned by the interviewees.
Source: Authors using PAST 4.07 software (Hammer et al., 2001, p. 3).

The building category displayed the greatest distance of use among the data. Most of the species cited under this category are forest species, such as carapanaúba (*Aspidosperma carapanauba* Pichn.), maçaranduba (*Manilkara huberi* (Ducke) A. Chev.), itaúba (*Mezilaurus itauba* (Meisn.) Taub. ex Mez), miratoá (*Apuleia leiocarpa* (Vogel) J. F. Macbr.), and mulateiro (*Calycophyllum spruceanum* (Benth) Hook f. ex K. Schum.). Although most interviewees citing species under this category were male (5 individuals), four women also contributed to it, suggesting that traditional knowledge breaks downgender stereotypes and gender-based demarcations of activities and knowledge.

Women's answers contributed to four categories of use, i.e., cosmetics, building, food, and medicine. The medicine category comprised 47 uses representing 61% of the uses for this category. Four of the plant species mentioned by the community members, i.e., mutuquinha (*Justicia pectoralis* Jacq), corama (*Kalanchoe brasiliensis* Cambess), mint (*Mentha* sp.), and mangarataia *(Zingiber officinale* Roscoe), are listed on the RENISUS (National Catalog of Medicinal Plants of Interest to Brazil's Unified Health System/SUS), created by the Ministry of Health in 2008 to promote the use of medicinal plants and herbal medicines in public healthcare systems at state and municipal levels.

The tree of knowledge[2]: consolidation of traditional knowledge by human populations regarding the uses of products of sociobiodiversity in their territories

The fundamentals of the Theory of Complexity described by Morin (2016) as applied to the context of the variety of uses of sociobiodiversity by communities whose traditional knowledge and biocultural memory are

[2]Reference to the work of Maturana and Varela (2015).

acquired through transgenerational knowledge transmission reinforce the knowledge interdisciplinarity present in the complex systems that bring sustainability to fruition in the Middle Juruá territory. This process is strengthened by the community's social organization, which arises from their governance models and is continually (re)constructed (Guimarães, Vasconcelos, Weil, & Schor, 2023).

In this sense, in order to understand the construction process of knowledge of sociobiodiversity products and their uses by human populations in their spaces of interaction and transference by means of sociocultural expressions, this study proposes an archetypal flowchart of traditional knowledge consolidation. It is based on the development, maintenance, consolidation, and outcomes of the process and potential of uses of sociobiodiversity (Figure 7).

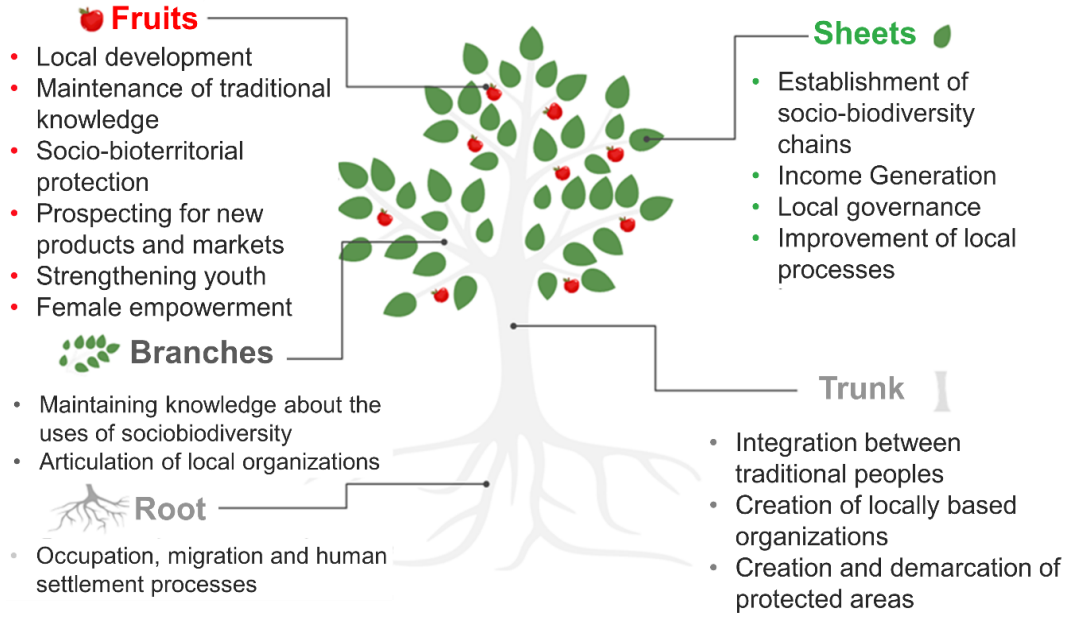


Figure 7. Tree flowchart for traditional knowledge consolidation by human populations regarding the products of sociobiodiversity and their uses *in loco*.

Source: Adapted by Alves et al. (2022, p. 15).

Aiming at widespread application and replication in different contexts and at different scales, but encompassing characteristics of territorial development models of traditional populations and their sociobiocultural heritage, the proposed tool, i.e., the tree flowchart for traditional knowledge consolidation by human populations regarding the uses of products of socio-biodiversity, indicates the path for protecting and maintaining traditional knowledge, which lies at the heart of how the Middle Juruá territory was created. Its creation and establishment resulted from social struggles and integration of indigenous knowledge with that of migrants from northeastern Brazil. This has given rise to a new way of being, living, doing, and organizing associated with a governance model under construction and in expansion based on the protection of traditional knowledge.

The Middle Juruá territory, qualocus of collective articulation, finds in its locally based organizations the gears of good governance of products and services of sociobiodiversity. However, their geographical isolation and poor communication of their outcomes have led to their absence in many places of deliberations. A study about governance in rural communities in the Amazon realized by Rezende, Witkoski, Fraxe, Costa, and Andrade (2021) evidence that governance constitutes and is constituted by management and governability expressed in the transversality between the symbolic and concrete dimension.

Potentialities of products and uses were identified via the quantity of species and uses mentioned by the interviewees, especially in the oilseed production chain, regarding future commercialization with Natura™ and other companies operating in this segment, in compliance with Law 13.123/2015 (Brasil, 2015), i.e., the National Policy for the Use of Genetic Heritage, Traditional Knowledge and Benefit Sharing. These species comprised murumuru (*Astrocaryum murumuru* Mart), ucuúba (*Virola surinamensis* (Rol.) Warb), which were already being commercialized, and mutamba (*Guazuma ulmifolia* Lam.) and marã vine (*Omphalea diandra* L.), which were being prospected by Natura™. According to Teixeira e Silva (2021), Law 13.123/2015 also ensures

the participation of indigenous peoples and traditional communities in decision-making processes concerning the access to associated traditional knowledge.

Conclusion

The Middle Juruá communities are knowledgeable about various medicinal and cosmetic uses for flora and fauna species from the region. However, commercial activities can potentially reduce these communities' traditional uses due to the harvesting of some species, e.g., andiroba (*Carapa guianensis* Aubl.) and murumuru (*Astrocaryum murumuru* Mart.), for strictly economic purposes in recent years.

On the other hand, it is worth noting that some organizations, such as the ASMAMJ (Middle Juruá Association of Agroextractivist Women), have been devising several strategies to value traditional uses of local resources by documenting them in books as a means of disseminating this knowledge.

The traditional use of these species is strategic to their own conservation, as in this context, the relationship between human beings and natural resources can foster the propagation of species and maintenance of their ecosystems in the Middle Juruá territory. Therefore, the traditional use of these species by human societies constitutes one of the most effective ways of protecting native flora and fauna and the environment.

The results obtained by this study can also contribute to the identification of traditional knowledge of native species, such as murumuru (*Astrocaryum murumuru* Mart.), rubber (*Hevea brasiliensis* L.), ucuúba(*Virola surinamensis* (Rol.) Warb.), mutamba (*Guazuma ulmifolia* Lam.), and marã vine (*Omphalea diandra* L.) with the aim of promoting the sharing of benefits from their commercialization in the Middle Juruá territory, in compliance with Law 13.123/2015 (Brasil, 2015).Therefore, the preservation and appreciation of this traditional knowledge not only contribute to the conservation of the forest but also to the well-being of the populations that depend on it.

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