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Sociobiodiversity Products: Potential of sustainable agroextractivism in Mato Grosso do Sul

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Abstract: The search for sustainable agri-food systems is increasing. This study aims to identify the main initiatives of agroextractivism in the state of Mato de Grosso do Sul (Cerrado and the Pantanal biomes), their products, market/consumption perspectives, and the panorama of the institutional environment. Native species with processing and marketing conducted through family initiatives were selected. The relevant aspects of public policies and market potential analyses were based on a literature review. The use of 15 native species present in 12 communities demonstrates the potential of food systems with the recognition of indigenous peoples, quilombolas, traditional communities, and family farming. Sociobiodiversity products value their origin and social, environmental, and economic functions, and can conquer new sustainable markets, including international ones.

Keywords: Family farming; Savanna; Wetlands; Native species; Market.

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São Paulo. Vol. 26, 2023

Original Article

DOI: http://dx.doi.org/10.1590/1809-4422asoc0084r3vu2023L3OA

Introduction

Currently, 50,091 species are recognized among the Brazilian flora and fungi, including native, cultivated, and naturalized species (FLORA E FUNGA DO BRASIL, 2022). Only a fraction of this flora, which is rich in food species, is known, encouraging the consumption of fruits, which have potential health benefits, *in natura*, as well as using them for product development. This would contribute to improving the income of local populations and preserving the biodiversity (TEIXEIRA et al., 2019). Biodiverse products are essential for ensuring food and nutritional security for the human population and represent a path for the sustainable use of natural resources.

The development of these products forms productive systems associated with the maintenance and valorization of practices and knowledge of society, ensuring the rights arising from generating income and improving the quality of life and the environment (MATO GROSSO do SUL, 2018). They are also related to productive chains of interest for traditional people, communities, and family farmers (BRASIL, 2021a). The cultivation of native food species promotes strategies for the conservation of genetic resources and ecological restoration in degraded areas (GONDIM et al., 2021).

Mato Grosso do Sul has 71,164 rural establishments, of which 74.6% are represented by family farms (IBGE 2017). Regarding the Quilombos Remnant Communities, there are 22 recognized by the Palmares Cultural Foundation, distributed in 15 municipalities (SECID, 2021a), and 84 indigenous villages are located in 29 municipalities, represented by eight ethnic groups (SECID, 2021b). In addition to this social diversity with varied cultures, Bortolotto et al. (2018) listed 294 native food species or those with food potential, including those that have traditional uses and are already commercialized.

The importance of the economic and nutritional use of native plants of the "Cerrado" (savanna area) and "Pantanal" (wetlands) by local populations, as well as the role of women in the valorization and conservation of food plants in MS, has been recently discussed (BORTOLOTTO et al., 2017; BORTOLOTTO et al., 2021). Despite this, there has been a dismantling of food and nutrition security policies in Brazil, with the expansion of severe food insecurity and an increase in the prevalence of obesity and other diet-related chronic non-transmissible diseases, creating new challenges to boost the implementation of sustainable and healthy agri-food systems (POMPEIA; SCHNEIDER, 2021).

Articulating this potential for responsible production and consumption with public policies directed at traditional populations and communities is still very recent in MS. The State Policy for Agroecology, Organic Production, and Sustainable Organic Extractivism (PEAPO/MS) (MATO GROSSO DO SUL, 2018) aims to promote the strategic potential of socio-biodiversity products, supporting agro-industrialization and access to new sustainable markets. However, there is no consolidated market for most of these products, and it is necessary to identify their agro-extractivist potential, new partnerships, and public policies (BORTOLOTTO et al., 2021). Thus, there is a challenge to strengthen sustainable agroextractivism involving associations, cooperatives, networks, short and medium marketing circuits, and promoting the consumption of their products.

The present work aims to highlight the socio-biodiversity products and agroex-

tractivist initiatives in Mato Grosso do Sul, as well as to discuss the potential for market access and the public policies related to the development of agroextractivism in the perspective of implementing a sustainable agri-food system. This article is divided into four parts: the first introduces the native plant species used in the investigated food products; the second underlines the agroextractivist initiatives that generate income from these products; the third discusses the market potential, consumption, and productive chains of sociobiodiversity in MS. The fourth part discusses the institutional environment considered relevant for sustainable agroextractivism, followed by the final considerations.

Methodology

The information considered relevant to the perspectives of sustainable agroextractivism in the state of Mato Grosso do Sul was collected and organized using a qualitative and descriptive approach. Data were collected through non-participant observations and from documents and bibliographic reviews. Non-participant observation is a technique that involves the recording of information and acts by an attentive observer (GODOY 1995).

In this paper, information from the non-participant observation adopted during the extension workshops conducted between 2006 and 2021, within the scope of the projects of the Federal University of Mato Grosso do Sul, is reported. In these workshops, preparations and processed products were developed from native species with the participation of representatives from indigenous communities, quilombolas, and rural settlements with extractive activities.

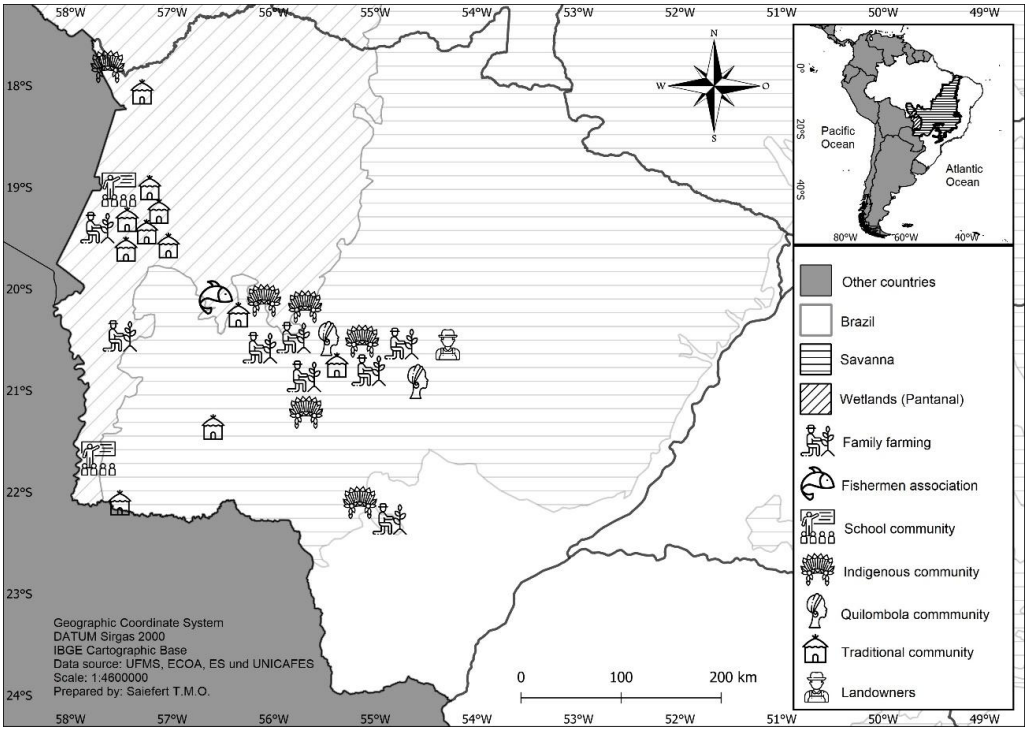
The identification of the species discussed in this study was based on the experiences in these workshops. The criteria for choosing species and their main products also considered their participation in the production and marketing dynamics of these communities, as proposed by Bispo et al. (2021), considering their relevance to the local economy.

Information regarding the description of agroextractivist initiatives and distribution channels was obtained from the websites of extension projects developed between 2019 and 2021, namely: Sustainable Agroextractivism: sharing local cultural knowledge and practices (https://agroextrativismosustentavel.ufms.br/) and Valorization of Food Plants from the Cerrado and Pantanal (https://sabores.ufms.br/projeto/); and from other institutions and organizations: Union of Family Agriculture and Solidarity Economy Cooperatives - Unicafes/MS (https://www.unicafes.org.br/uf/MS) and Network of Women Producers of Cerrado and Pantanal - CerraPan (https://ecoa.org.br/conheca-os-produtos-e-comunidades-da-rede-cerrapan). Figure 1 shows the location of agro-extractivist initiatives in the Cerrado-Pantanal connection (BORTOLOTTO et al., 2021).

The focus on the importance and possibilities of identifying new markets was based on the literature review using the Capes online journal portal, as well as the survey on the current public policies, to obtain an update on the legislation that contributes to the valorization of sociobiodiversity products. In addition, as a focus of discussion, an approach to sustainable agri-food systems is proposed as a possibility of linking and interconnect-

ing the links of this productive chain to promote agroextractivism as a sustainable local development alternative.

Figure 1 – Location of communities with extractive activities for food production from native plants in Mato Grosso do Sul, Brazil



Font: Extracted from BORTOLOTTO et al., 2021.

Results and Discussion

Sociobiodiversity products in MS

The use of fruits (nuts and pulp), palm hearts, and stems (represented by the main products of sociobiodiversity) *in natura* or after processing, which is agroindustrialized and commercialized from local initiatives by agro-extractivist organizations in MS, demonstrated the potential of using native species as food (Table 1).

The products highlighted in Table 1 were derived from more than 20 species of native plants, considering that there are 8 species of *Campomanesia* (guaviras), three of *Hymenaea* (jatobás), and three of Acrocomia (bocaiuvas) cited in MS (FLORA E FUNGA DO BRASIL, 2022). Acuri/bacuri, baru/cumbaru, mangaba, and pequi also stand out because they have great potential for the extractive use of fruits and/or nuts, with diverse applications in food products for commercial purposes associated with management strategies. Other fruits, such as araçá, jenipapo, jabuticaba, and marolo, and the fruit

and stem of jaracatiá have been used in some products with aggregated values, such as ice creams, jellies, and liqueurs.

Many preparations of craft products, such as those derived from jaracatiá (*Jacaratia corumbensis* Kuntze), tarumã (*Vitex cymosa* Bertero ex Spreng.), canjiqueira (*Byrsonima cydoniifolia* A. Juss.) for example, present potential to increase their commercialization and their uses by local populations have been encouraged (DAMASCENO-JÚNIOR; SOUZA, 2010; BORTOLOTTO et al., 2017). They are not included in Table 1 because they are not commercialized, although they are processed into juices, jellies, and sweets for local consumption. The same occurs with Pantanal rice (*Oryza* spp.), a seasonal product that has not been harvested in the last four years (2019–2022).

Table 1 – Food plants and sociobiodiversity products related to the initiatives and organizations in the state of Mato Grosso do Sul, Brazil

Name (common and scientific)	Main Products	Initiative and Organizations
Acuri, bacuri *(Attalea phalerata)*	Flour from pulp, bread, nuts and vegetable extract from nuts, heart of palm	NSVV, Porto Esperança, Indigenous village Limão Verde and La Lima
Baru, cumbaru *(Dypterix alata)*	Flour from pulp, flour from nuts, toast, bread, nuts and vegetable extract from nuts, cakes and biscuts	AMAM, Ceppec, APAB, Cooperana, Copran, NSVV, Grupo Baru, AMAI
Bocaiuva, macaúba *(Acrocomia spp.)*	Fruit in natura, pulp flour, breads and cakes, frozen pulp, raw or toasted nuts, olive oil and palm heart	NSVV, AMAM, CAMC, Ceppec, AMAI
Guavira, gabiroba *(Campomanesia* spp.)	Fruit in natura, juice, jam and ice cream	AMAM, NSVV, APPASL, AMAI, Indigenous village Limão Verde and Lalima
Jabuticaba *(Plinia cauliflora)*	Fruit *in natura*, jam, vinagre geleia, vinegar and liquor	Ceppec, APPASL
Jaracatiá (*Jacaratia spinosa)*	Rapadura, candy in syrup with the aerial stem and fruits	APPASL
Jatobá *(Hymenaeae spp.)*	Pulp flour, baking preparations	NSVV, AMAM Ceppec, AMAI
Jenipapo *(Genipa americana)*	Jams, liqour, juice and cakes	AMAI Ceppec
Laranjinha-de-pacu *(Pouteria glomerata)*	Fruit *in natura*, juice, jam, ice cream and cakes	Pantanal Communities
Mangaba *(Hancornia speciosa)*	Fruit *in natura*, juice, jam, ice cream and pulp	AMAM

Marolo (*Annona coriacea*)	Fruit *in natura*, juice, jam, ice cream and biscuits	AMAM
Pequi *(Caryocar brasiliense)*	Stew, pickled pulp, pulp paste or cream, oil, ice cream and nuts	AMAM, Ceppec, Indigenous village Limão Verde and Córrego Seco, Extractivists from Camisão

Notes:

AMAM - Association of Women of the Monjolinho Settlement; GB - Sustainable Production Group; Copran - Cooperative of rural producers of the Pulador de Anastácio region; AMAI - Association of Indigenous Women of the Imbirussu Village; Ceppec - Cerrado Production, Research and Training Center; APPASL - Association of Small Producers of the Santa Lúcia Settlement; CAMC - Center for Processing Derivatives of bocaiuva; Communities of the Pantanal - Association of Women Extractionists of the Community of Porto da Manga and Association of Riverbank Women of Porto Esperança; APAB - Association of Producers of the Bandeirantes Settlement; NSVV - Núcleo Ser Vir a Vida; and COPERANA - Cooperative of Rural Producers of the Nova Aliança Settlement.

Font: Prepared by the authors, based on projects conducted by the Federal University of Mato Grosso do Sul between 2006 and 2021.

Several species and products shown in Table 1 are included in the MAPA/MMA Interministerial Ordinance No. 10 of July 21, 2021 (BRASIL, 2021a), which established a list of native species and their products derived from sociobiodiversity for commercialization in the context of public purchases, containing 94 items with popular names, most used parts, examples of use, geographic distribution, and cultivation situation (harvested from the wild or cultivated). Acuri, Marolo, and Laranjinha-de-pacu are not included in this ordinance, and for bocaiuva, the state of MS is not included in the geographical distribution. Fruits of Pantanal species, such as laranjinha-de-pacu, have great potential for the development of new food products in riverside communities. Similarly, there is an important production of bocaiuva flour in the municipalities of Corumbá and Aquidauana, MS. The absence of the species and derived products in the Interministerial Ordinance demonstrates the need for greater visibility of the occurrence of species and products of agroextractivism in the state.

These native plants have been part of the diet of the communities of the Savanna and the wetlands in South America for hundreds of years; however, in the last two decades, they have become more frequently used as a result of community initiatives and the support of educational institutions, research, and NGOs, for the creation and implementation of processing areas, studies on nutritional value, and possibilities of adding value, especially for fruits (BORTOLOTTO et al., 2021). Positive reflexes can be observed in the Andalucia Settlement, Nioaque-MS, with emphasis on the use of plant resources of the Cerrado Savannah, adding value to products, and on the production of baru seedlings to encourage the process of local development with sustainability (ARAKAKI et al., 2009).

Baru and its products (flour from the pulp, roasted nuts, and vegetable extract from the nut) showed the highest frequency of utilization in agro-extractive initiatives and organizations in MS (Table 1), with eight initiatives involved in its collection and

processing. In 2021, 68 tons of baru fruit were collected from 10 local, indigenous, and traditional communities (ECOA, 2022), five of which are preseBnted in this paper (Table 1). A similar finding was reported in southern Maranhão State, where baru stood out among the fruits of agroextractivism, particularly in the production of roasted nuts (BISPO et al., 2021).

Baru, along with Bocaiúva, was the first species exploited on a larger scale for commercial purposes in MS, presenting vast areas of occurrence in the state. Bocaiuva, jatobá, and acuri are processed in the communities themselves, mainly to make flour. The importance of obtaining flour, roasted nuts, oils, and liqueurs stands out because they allow storage at room temperature and have a longer shelf life, representing product innovation, in addition to the possibility of reaching new markets that are more geographically distant, without investing in the cold chain.

Pequi and guavira fruits are commercialized mainly *in natura*, although they can be developed into products with higher added value. Pequi nut presents countless possibilities for use in MS, possibly due to the difficulty in its extraction and the lack of appropriate technologies. In processed products from cupuaçu, passion fruit, and muruci, there is greater ease of access to markets in the form of pulp, which is easy to use in schools (MOTA et al., 2021). The elaboration of products from agroextractivism was relevant to local economies, standing out both in the scope of scientific and market research, focusing on use, processing, and commercialization (BISPO et al., 2021).

Diverse and special flavors were evident in the organization of several recipes, favoring income generation and quality of life in traditional communities (DAMASCENO-JÚNIOR; SOUZA, 2010, BORTOLOTTO et al., 2017). Methods for identifying and differentiating between these types of products and their origins need to be encouraged, as well as markets with fair prices (GUÉNEAU et al., 2017). The valorisation of native species in MS with the added value of the sociobiodiversity products discussed can represent differential sustainable-based agroextractivism.

Agro-extractive initiatives in MS

The initiatives analyzed in this article show the use of native fruit species, especially those found in indigenous villages, quilombola, and riverside communities, as well as in family farming. In Chart 2, these communities and their main associations, cooperatives, and related groups of agroextractivism in MS, which commercialize native fruits and their products, are indicated, as well as the characteristics related to the area and the time of performance of these initiatives.

Table 2 - Information on the main sustainable agroextractivism initiatives that commercialize food species in Mato Grosso do Sul, Brazil

Location of the initiatives	Initiative name	Brief description
Settlement Monjolinho Anastácio/MS	Associação das Mulheres do Assentamento Monjolinho (AMAM)	Founded in 2019, it is managed 100% by women. It has been operating since 1987, at the time as a Mothers' Club. It stands out for its variety of savanna fruit and diversity of products.
Settlement São Manuel Anastácio/MS	Sustainable Production Group - Grupo Baru (GB)	Headquarters in the São Manoel settlement, established in 2008. The group is managed 100% by women and performs collective activities, such as harvesting, breaking, and developing products with baru, and other fruits like bocaiuva and pequi.
Pulador de Anastácio Region/MS	Cooperativa dos produtores rurais da região do Pulador de Anastácio – Copran	Founded in mid-2005 by the traditional rural producers of the Colony Pulador - Production Basis Ladislau Gomes de Brito. It produces the traditional Pulador manioc flour and other products such as eggs, dairy products, and baru.*
Indian Village Imbirussu Terra Indígena de Taunay Aquidauana/MS	Associação das Mulheres Indígenas da Aldeia Imbirussu	Founded on February 24, 2018, the women were already working in small groups, producing bread and sweets, cassava derivatives, vegetables, and native savanna fruits.
Settlement Andalúcia Nioaque/MS	Centro de Produção, Pesquisa e Capacitação do Cerrado - Ceppec	Founded in 2005, it has an agro-industry to process and store food products, with emphasis on the extraction of native savanna fruit. Important reference for women.**
Settlement Santa Lúcia Bonito/MS	Associação dos Pequenos Produtores do Assentamento Santa Lúcia	Started in 1999. It produces rapadura of different flavors, jaracatiá, bocaiuva, guavira, baru, among others, besides jams and candies.
Community of Antônio Maria Coelho Corumbá/MS	Centro de Processamento de Derivados da Bocaiuva	Created in 2006, located on the western edge of the wetlands, 45 km from the urban area of Corumbá/MS. Flour and other derivatives of bocaiuva.**
Community of Porto da Manga Corumbá/MS	Associação de Mulheres Extrativistas da Comunidade de Porto da Manga	Registered in 2016, this Pantanal community is located 60 kilometers from Corumbá, MS and processes native fruits, derived from the laranjinha-de-Pacu, including jam.**
Riverside community Porto Esperança Corumbá/MS	Associação de Mulheres Ribeirinhas do Porto Esperança	Created in 2016, in a district located 70 km from the town's headquarters on the left bank of the Paraguay River about 25 km from the town of Porto Morrinho.**

Settlement Bandeirantes Miranda/MS	Associação de Produtores do Assentamento Bandeirantes (APAB)	Around 68 families and 89 cultivated hectares, 25 km from the city of Miranda-MS. Honey production (Apis mellifera), potential to use native fruits, besides the baru nut.**
Family farmers Miranda/MS	Núcleo Ser Vir a Vida (NSVV)	Since 2015, it has been developing work aimed at spreading the ideals of permaculture. It supports the development and marketing of various products in the villages Lalima, Mãe Terra, and Limão Verde.
Settlement Nova Aliança Terenos/MS	Cooperativa dos Produtores Rurais do Assentamento Nova Aliança – Cooperana	Founded in 2010. They work mainly with horticultural products and cassava derivatives, but also with savanna's fruit extraction.*

Notes:

* Linked to the Union of Family Agriculture and Solidarity Economy Cooperatives, Unicafes/MS.

** Rede CerraPan - aims to strengthen the collective work of women in the Cerrado and Pantanal, who carry out sustainable extractivism and conservation of their territories, with the support of the NGO Ecologia e Ação (ECOA).

Font: Prepared by the authors from project websites of the Federal University of Mato Grosso do Sul, Unicafes/MS, and CerraPan between 2019 and 2021.

The initiatives presented in Chart 2 articulate and stimulate people's participation in the development of sustainable agroextractivism and the commercialization of products. Some already produce seedlings of native species and are beginning to implement agroforestry systems, demonstrating the potential to strengthen the territorial processes of conservation and the promotion of sustainable food systems. In brief, most of the agroextractive initiatives presented in this study began before 2010. Among the 12 communities presented in Table 2, five are part of CerraPan, a network composed of women articulated with the NGO Ecoa, two cooperatives belong to the National Union of Family Agriculture and Solidarity Economy Cooperatives (Unicafes) of MS, and four mention women as managers, which characterize a workforce of women and a differential in this line in the state.

Previous studies have presented movements that stand out in MS with the social organization of women focused on extractivism, besides ECOA and Unicafes/MS, such as the Solidarity Economy Movement (especially by indigenous communities and female farmers from agrarian reform settlements), demonstrating the role of women in the appreciation and conservation of Cerrado and Pantanal food plants in MS, which is fundamental for boosting this movement in the network (BORTOLOTTO et al., 2021).

Rural communities, associations, and cooperatives of family and solidarity agriculture that process native species of MS, such as those illustrated in Table 2, have strengthened over the years to promote local culture and ecotourism. To this end, pro-

duction, commercialization, and consumption networks aim to advance environmental conservation and exchange methodologies and social technologies not only locally but also regionally, nationally, and internationally.

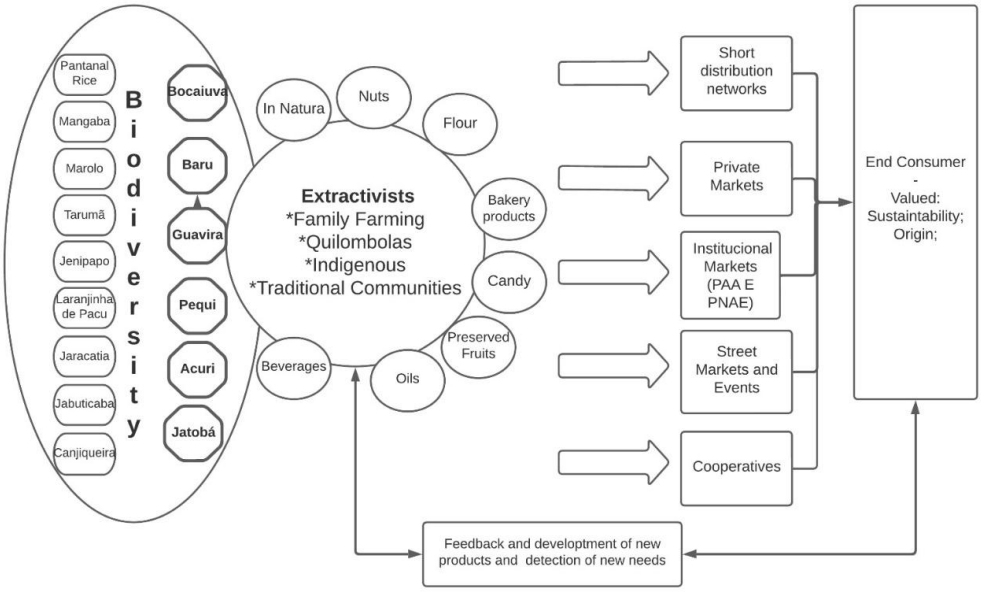
Similarly, Bispo et al. (2021) considered that the key factor for improving commercialization and, consequently, quality of life, in the case of agroextractivists, is the organization of the production chain, where the quality of raw material, the improvement of logistics and processing of native fruits, and greater interaction along the chains.

In this sense, it is possible to observe that agro-extractivist initiatives, as well as the aggregation of value to the processed products, have enabled the maintenance of the conditions for commercialization. It is recommendable to encourage access to more dynamic markets, a decisive factor in obtaining competitive advantages, thus valuing producers and inclusive local practices.

Markets and consumption for sustainable products

In general, sociobiodiversity products presented reduced participation in the market of agro-industrialized products, and most of them were processed on a small scale. However, the perspective of a sustainable production chain for the native species of the Savanna and Wetlands of Mato Grosso do Sul was identified in this study, the main players of which are highlighted in Figure 2. The main elements were observed, starting from some native fruits, for the elaboration of foods with added value and their marketing channels to the final consumer.

Figure 2 - Schematic representation of an agroindustrial chain of sustainable agroextractivism products with emphasis on sociobiodiversity in the state of Mato Grosso do Sul, Brazil



Font: Prepared by the authors based on projects at the Federal University of Mato Grosso do Sul conducted between 2019 and 2021.

The native fruit flours presented several distribution chains and are commercialized in artisan houses in different municipalities such as Aquidauana, Campo Grande, and Corumbá-MS, in the municipal market of Campo Grande, and in local businesses, such as fairs, emporiums, stores, and commercialization centers of the solidarity economy, among other local commercial establishments. In the case of guavira fruit, with the harvest concentrated between November and early December, the presence of middleman schemes that offer these fruits on the highways and urban centers of MS is frequent. However, at the indigenous fair in Campo Grande, there is traditionally a direct sale of guavira in bulk, coming from the collection of fruits by the indigenous people. Strong participation of middlemen was reported in the commercialization of pequi in savanna areas of Minas Gerais State and Maranhão State, as well as the decreased participation of agroextractivists in the final price of the product and possible dependence and subordination on the rules established by the middleman (BISPO et al., 2021).

The market for products of sociobiodiversity still occurs punctually in MS, without regularity of production and distribution over the years. However, despite an incipient market, new partnerships are being created for marketing, emphasizing aspects related to diet, nutrition, and environment/conservation (BORTOLOTTO et al., 2017; BORTOLOTTO et al., 2021). To create locality-based markets or supply chain structures, it

is necessary to rethink issues such as the productive potential of the region, consumer market analysis, the tradition and culture of the region, and marketing and social factors (SOUZA et al., 2020).

In recent years, sociobiodiverse products have been commercialized at local fairs and scientific events such as the Symposium of Native and Exotic Fruits and the Guavira State Seminar, bringing producers and consumers closer together. Regarding market networks in Campo Grande, MS roasted, portioned, and packaged baru nuts were found by companies that were not directly linked to agroextractivist initiatives. Given the trend of long commercialization and gastronomy circuits, Guéneau et al. (2017) emphasize the need to include a system that identifies and differentiates the products of cooperatives concerned with quality and fair prices and that value the socio-environmental context of extractivist communities. Also, consumers can be influential in promoting sustainability by aligning their purchases with sustainable thinking (NYSTRÖM et al., 2019).

Some of the initiatives described in Table 2 participate in public procurement programs, such as the Family Farming Food Acquisition Program (PAA) and the National School Feeding Program (PNAE), although the acquisition of products with native fruits in these programs is still small. Bispo et al. (2021) warned about the strong dependence on public purchases for the maintenance of agroextractivism production chains, especially by cooperatives and associations that direct sales and product standards to institutional markets such as the PNAE and PAA.

Agro-industrialized products from savanna fruit baru/cumbaru, pequi, and babaçu have allowed commercialization in institutional markets, which has contributed to the strengthening of local production systems, consolidating important income complementation for family farming and the diversification of families' economic strategies (MENDES et al., 2014). The approach to local agri-food systems covers concepts related to rural development, sustainability, institutional markets, productive arrangements, quality production, economic impacts on communities, and changes in consumption patterns, in addition to the promotion of public policies that support the organization of its agents (SOUZA et al., 2020).

Thus, an effort must be made for a set of local products, obtained sustainably, to be present in a constant flow, involving the organization of the stages of collection, storage, agroindustrialization, and distribution/marketing. With this support, sociobiodiversity products could increase their presence in the different distribution channels represented in Figure 2, making them available to consumers and favoring regular habits of use and sustainable consumption.

A scenario is observed in which consumers in urban centers are unaware of most food products originating from local biomes. Support and efforts to strengthen sustainable agroextractivism can enable access to new markets for products with added value, honoring natural ecosystems, their origins, and their social, environmental, and economic functions.

Institutional environment and its importance to agroextractivism

When discussing agro-industrial chains, one of the main components of the institutional environment is the set of norms and laws that rule their operations, which can comprise habits and customs (ZYLBERSTAJN; NEVES, 2000). These rules govern the relationships between economic agents, the mode of operation of the activities, the forms of processing, product preferences, and many other elements that may be established, in some situations, mostly by custom and usage, and that, as the activity becomes formalized and consolidated in the productive system, ends up being the target of norms and regulations.

Legislation related to sustainable production is broad, with laws, decrees, programs, policies, and plans at both the federal and state levels. The Agricultural Policy Law (BRASIL, 1991) foresees that the support of the Public Power will be extensive: Art. 45 - "to indigenous groups, artisanal fishermen and to those engaged in non-predatory vegetal extractivism activities"; and Art. 48 - for "storage, processing, and installation of agro-industry." Regarding the Family Unit of Agricultural Production, in a recent decree (BRASIL, 2021b), public policies must consider rural family ventures (constituted by a legal entity and with the purpose of production, improvement, processing, commercialization, or even for the provision of rural tourism services), as well as associative forms of family farming organizations. In this way, the duty of Public Power was observed to support family enterprises, including processing and commercialization operations, as well as vegetal extractivism.

Due to the importance of the sustainable use of biodiversity and the protection of ancestral knowledge, Law No. 13,123 of May 20, 2015 (Biodiversity Law) was enacted, where indigenous peoples, traditional communities, and family farmers were given the right to decide on the use of traditional knowledge and benefit-sharing, among others (BRASIL, 2015).

Policies to support and encourage commercialization, aiming to generate income for family farmers, land reform settlers, foresters, extractivists, fishermen, indigenous people, and members of traditional peoples and communities, encourage the disposal of agro-extractivist production. Souza et al. (2020) highlighted the use of the PAA and PNAE to purchase food directly from these producers, contributing at least 30% of the resources to local food systems.

Recently, the individual limit of the sales value of family farmers and rural family entrepreneurs for school meals has doubled, reaching forty thousand reais per family DAP/year/executing entity (BRASIL, 2021c). The acquisition of sociobiodiversity products in the PNAE, besides promoting healthier food, can rescue food customs, value the forest and its ways of life, formulate new school menus, and boost the local economy (MOTA et al., 2021).

The Alimenta Brasil Program, equivalent to the PAA, aims to foster the sustainable production of family farming and promote its economic and social inclusion, processing, food industrialization, and income generation, as well as encourage the consumption and appreciation of these foods, among other purposes (BRASIL, 2021d). Since the creation

of the National System of Food and Nutritional Security (SISAN) to ensure the human right to adequate food, mechanisms have been foreseen to guarantee minimum prices for sociobiodiversity products, conservation, management, sustainable use of agrobiodiversity, and the food and nutritional security of traditional peoples and communities, among other actions (BRASIL, 2006). In 2021, the Policy to Guarantee Minimum Prices for Sociobiodiversity Products (PGPM-Bio) increased payments for direct subsidies to extractivist producers, guaranteeing a minimum price for marketing 17 native products, including baru, buriti, bocaiuva (macaúba), mangaba, and pequi (GOVERNMENT OF BRAZIL, 2021).

It is worth noting that government policies, as well as large transnational corporations, have taken a central role in global green production, with the ability to influence practices in local supply chains and having a powerful potential for change to improve sustainability (NYSTRÖM et al., 2019).

The 2008 National Plan for the Promotion of Sociobiodiversity Product Chains (PNPSB), 2012 National Policy for Agroecology and Organic Production (PNAPO), 2015 National Plan for Agroecology and Organic Production (Planapo), 2015 National Plan for Strengthening Extractive and Riparian Communities (Planafe), and the Bioeconomy Brazil Sociobiodiversity Program, which aim to promote the structuring of productive systems based on sustainable extractivism and sociobiodiversity, relate to the concept of bioeconomy (BRASIL, 2019).

In MS, native fruits may have greater repercussions with the certification of sustainable organic extractivism from the State Plan (PLEAPO) (MATO GROSSO DO SUL, 2020). This plan is part of the State Policy for Agroecology, Organic Production, and Sustainable Organic Extractivism (PEAPO), which provides incentives for diversification and the generation of jobs and income in rural areas by supporting agroindustrialization and rural tourism and prioritizing the organization of short chains, cooperative ventures, a solidarity economy, fairs, and various events with direct sales to consumers (MATO GROSSO DO SUL, 2018).

In the last 20 years, the institutional environment has advanced in the determination of a legal support apparatus for family production, and more specifically, for the encouragement and support of sustainable production, understood here in terms of the nuances of organic production, production of local communities, and production of native, local, and regional products. In this sense, the involvement of actions in different spheres of federal, state, and municipal governments, as well as their public companies, universities, and research and extension institutes, can strengthen agroextractivist production to conserve biodiversity, food, and nutritional security, and promote sustainable development.

Therefore, the structuring of productive chains that allow for this regionally relevant production will value its cultural and sustainability aspects and may become a competitive advantage in food consumer markets sensitive to the socio-environmental and cultural profiles of its producers. Better structuring of the organizational environment and supporting associations, cooperatives, and other agroextractivists will allow for the expansion

of their participation in the market economy, including advancing into niches abroad.

Conclusions

Sociobiodiversity products have the potential for the endogenous development of savanna and wetland communities in the MS, especially those with organizational structures and collective food production areas, contributing to the promotion of food and nutritional security, indigenous communities, quilombolas, and family farming.

In the utilization of the fruits of native species, acuri, bocaiuva, cumbaru, jatobá, guavira, and pequi stand out because they are widely distributed in Mato Grosso do Sul, with a diversity of value-added products that value their origins and social, environmental, and economic functions, with possibilities for innovation and sustainability.

It was observed that conscious consumers are important in the establishment of differentiated markets for these products as well as in the identification of economies of scope, with the distribution of these products based on inclusive rural and local development.

Public policies for food and nutritional security and those related to sustainable extractivism, especially the Policy and State Plan of Mato Grosso do Sul, can contribute to the commercialization of these products, valuing local and sustainable food systems.

Legislation supporting agroextractivism also reflects that society is starting to recognize the importance of this segment, and its evolution in recent years has demonstrated the incorporation of this appreciation in the institutional environment.

The challenges are ample, and new studies are recommended with a focus on commercialization channels, fostering the organization of agroextractivist initiatives with a view to sustainability, communication of these products and their preparations, as well as the aspects of social and environmental valorization that differentiate them from conventional products, usually in the national food pattern.

Acknowledgments

We thank the communities that participated in the extension actions, the institutional partners, the Foundation for the Support of Research, Teaching, and Culture (FAPEC) for financial execution via Parliamentary Amendment No.14510014, and the Federal University of Mato Grosso do Sul.

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Submitted on: 20/05/2021
Accepted on: 13/02/2023
2023;26:e00843

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AMBIENTE & SOCIEDADE 25 anos 25 años 25 years

SciELO

Produtos da Sociobiodiversidade: potencial do agroextrativismo sustentável em Mato Grosso do Sul

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Rosane Juraci Bastos Gomes
Luis Alejandro Lasso Gutierrez
Tercio Jacques Fehlauer
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Resumo: É crescente a busca por sistemas agroalimentares mais sustentáveis. Este trabalho visa indicar as principais iniciativas do agroextrativismo no estado de Mato de Grosso do Sul – biomas Cerrado e Pantanal - seus produtos, as perspectivas de mercado/consumo e o panorama do ambiente institucional. Foram escolhidas espécies nativas que possuem processamento e comercialização realizados por iniciativas familiares. Aspectos relevantes das políticas públicas e análise do potencial de mercado foram baseados em revisão bibliográfica. O aproveitamento de 15 espécies nativas presentes em 12 comunidades, demonstram o potencial dos sistemas alimentares, com reconhecimento dos povos indígenas, quilombolas, comunidades tradicionais e da agricultura familiar. Os produtos da sociobiodiversidade valorizam sua origem e suas funções sociais, ambientais e econômicas, podendo conquistar novos mercados sustentáveis, inclusive os internacionais.

Palavras-chave: Agricultura Familiar; Cerrado; Pantanal; Espécies Nativas; Mercado.

São Paulo. Vol. 26, 2023

Artigo Original

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SciELO

Productos de sociobiodiversidad: potencial para el agroextractivismo sostenible en Mato Grosso do Sul

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São Paulo. Vol. 26, 2023
Artículo Original

Resumen: Crece la búsqueda de sistemas agroalimentarios más sostenibles. Este trabajo tiene como objetivo señalar las principales iniciativas de agroextractivismo en el estado de Mato Grosso do Sul - Biomas Cerrado y Pantanal - sus productos elaborados, perspectivas de mercado/consumo y el panorama del entorno institucional. Eligieron especies autóctonas y su procesamiento y comercialización son llevado a cabo por iniciativas familiares. Los aspectos relevantes de las políticas públicas y el análisis del potencial del mercado se basaron en una revisión de la literatura. El uso de 15 especies nativas presentes en 12 comunidades demuestra el potencial para viabilizar sistemas alimentarios, con el reconocimiento de los pueblos indígenas, quilombolas, comunidades tradicionales y la agricultura familiar. Los productos de sociobiodiversidad valoran su origen, función social, ambiental y económica, y pueden conquistar nuevos mercados sostenibles, incluidos los internacionales.

Palabras-clave: Agricultura familiar; Cerrado; Pantanal; Especies nativas; Mercado.