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STRENGTHS, WEAKNESSES, OPPORTUNITIES AND THREATS (SWOT MATRIX) OF TRADITIONAL COMMUNITIES UNDER THE PERSPECTIVE OF ECOLOGICAL AND SOCIOCULTURAL RESILIENCE IN THE PANTANAL BIOSPHERE RESERVE, MATO GROSSO, BRAZIL

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ABSTRACT

This study analyzed how the traditional communities of Sesmaria Boa Ventura and Água Branca see and respond to socio-environmental changes and public policies. These communities are located in the municipality of Santo Antônio de Leverger, with a population of 15 and 12 families, respectively, between the rivers Cupim and Água Branca in the inland region of Morrarias São Vicente, with the mouth in the Chacororé–Sinhá Mariana lake system in the Pantanal of the state of Mato Grosso, Brazil. The SWOT method (S - strengths, W - weaknesses, O - opportunities, T - threats) served as a guide for the semistructured interviews and data organization, and the Snowball method was used to indicate participants. The participants were born and always lived in the region, had a mean age of 71 years and 73% were male. The communities practice subsistence family farming, their residents have a low education level and social habits. The 15 participants mentioned 19 strengths, 16 weaknesses, 10 opportunities, and 16 threats. The most mentioned strengths were public security (15.48%), and peace and nature (11.90%), The weaknesses were water (18.87%) and food insecurity (15.09%) and deficient health (11.32%). The opportunities were electric power for everyone and the construction of roads (25.71%), construction of schools (17.14%), and health centers (11.43%). The threats were environmental (27.59%) and economic insecurity (13.79%), use of pesticides, and lack of rain (10.34%). The communities responded to weaknesses and threats with adaptations such as building and expanding wells (18.42%), changing the agricultural calendar (15.79%), and using agricultural input (10.53%). Unused traditional ecological knowledge was reincorporated as cultural adaptations in situations of high vulnerability, highlighting oral transmission as a resilience mechanism.

Keywords: Resilience. Water Deficit. Invisibility. Adaptations.

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INTRODUCTION

In 2007, the Brazilian government published Decree nº 6040, which established the National Policy of Sustainable Development of Traditional Peoples and Communities, defining traditional peoples and communities as culturally differentiated groups that recognize themselves as such. For this characterization, it recognized the existence of particular ways of social organization that occupy and use territories and natural resources as a condition for their cultural, social, religious, ancestral, and economic reproduction. Furthermore, as a requirement, these Traditional Peoples and Communities must use knowledge, innovations, and practices generated and transmitted through tradition, thus reaffirming the social coexistence and ancestry as inseparable elements (Brasil 2007).

The traditional peoples and communities are bound to a territory as a geographic occupation space. According to Castro *et al*. (2000), territory is a multifaceted and complex concept understood not only as a delimited area or a space under the control of a state or group, but also as an experienced space that incorporates social, cultural, political, and economic aspects. It is dynamic, built, and transformed by interaction between the society and the space, and in constant change due to human actions and power relations.

Due to the importance of these social groups, the Federal Government also created, in 2016, the National Council of Traditional Peoples and Communities (Conselho Nacional dos Povos e Comunidades Tradicionais – CNPCT) with the main goal of promoting their sustainable development with assurance of territorialities and protection of their cultures, uses, and customs, as well as the protection of traditional and ancestral knowledge and practices that are inherent to them (Brasil 2016). This aimed to remove their social invisibility, which predominated for centuries.

Although the CNPCT was extinct in 2019 by Decree nº 9759 (Brasil 2019), it was re-established in 2023 (Brasil 2023) as an advisory organ and part of the basic structure of the Ministry of Women, Family, and Human Rights in the scope of the National Secretariat of Policies for the Promotion of Racial Equality.

The state of Mato Grosso implemented, in 2016, the State Committee of Traditional Peoples and Communities (Mato Grosso 2016 and 2021), which was raised to the category of State Council by ordinary law (Mato Grosso 2023), which, in principle, assures increased legal security because it cannot be revoked by a mere decree (as occurred in 2019 with the CNPCT). Thus, Federal Decree nº 9759 itself drove the members of the State Committee to plead its transformation into a State Council.

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It is important to study and understand how these communities live and see themselves in their own social, economic, and political context, how they face local and external challenges, and the benefits coming from inside and outside the community. This allows us to understand the changes and adaptations for their ecological, social, and cultural resilience in a situation of vulnerability.

Cataloging and recording these variables with adequate methods allow us to identify the perception of challenges, observed changes, and practices adopted by a transitional traditional community.

The studied communities are located in the Pantanal Biosphere Reserve, recognized by UNESCO (MMA 2000). The Pantanal biome is the largest wetland in the world and is located in the Brazilian states of Mato Grosso and Mato Grosso do Sul (UNESCO 2024a). It is a remarkable ecosystem characterized by its biodiversity, where hundreds of species of birds, fishes, mammals, reptiles, and aquatic plants can be found (UNESCO 2024b, Nunes *et al* 2020; Nunes *et al* 2023).

The traditional communities in Pantanal practice subsistence agriculture and livestock farming, fishing, and plant extractivism and are subjected to environmental pressures from driving forces related to large-scale agriculture, production of electric power, and conflicts due to the disorderly occupation of soil and water (Da Silva *et al*. 2016; Da Silva *et al*. 2014).

We aimed to analyze how the Pantanal's traditional communities Sesmaria Boa Ventura and Água Branca see and respond to the socio-environmental changes and implemented public policies.

STUDY AREA

The Pantanal is the largest flooplain in the world, a cultural landscape with a diversity of microhabitats characterized by negative reliefs that accumulate permanent or temporary waters with different forms and depths, known as lakes, which are, from a geomorphological perspective, classified as lakes. Three large lakes or lakes stand out in the Pantanal's landscape: Uberaba, Gaiva, and Chacororé, the third largest among them (Nunes *et al* 2012).

The communities' territory encompasses the Chacocoré–Sinhá Mariana lake system through the Cupim and Água Branca rivers, which make the longitudinal hydrographic connection between the plateau and the Pantanal's plain.

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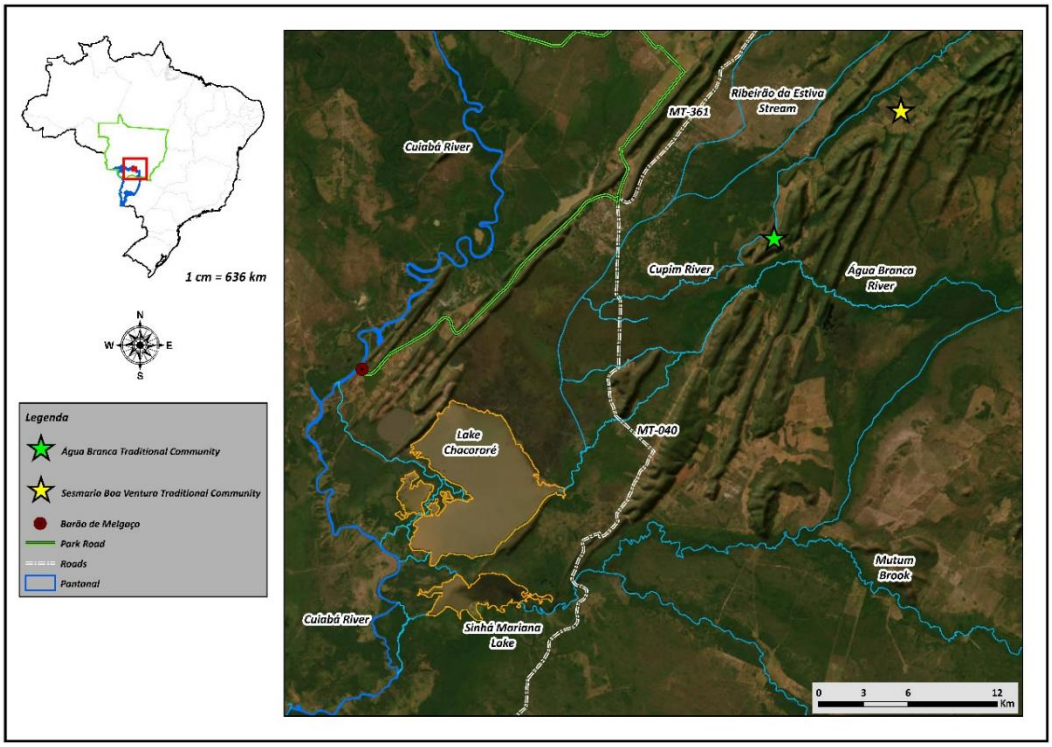
In Pantanal, these communities are distributed mostly on riverbanks, lake margins, feet of hills, or even floodable plains. Few studies detail these cultural territories, whether associated with wetlands or not. Several ethnic groups, such as the Guató, Terena, Chamacoco, Kadiwéu, and Bororo, live in the Pantanal (Da Silva 2018). In the municipality of Santo Antonio, 82 rural communities were identified, of which 27 are traditional communities, including those of Sesmaria Boa Ventura, with 15 families, and Água Branca, with 12 families (Santo Antônio de Leverger 2023).

The territory of the Chacororé–Sinhá Mariana lake system is inhabited by the Bororo people and several traditional communities with which the ethnobiological, anthropological, and environmental education studies were conducted (Da Silva 2018). However, the communities Sesmaria Boaventura and Água Branca, which inhabit the valley of the hill system of São Vicente and the margins of the Água Branca and Cupim streams, which drain into the floodplain of this system, have not yet been studied or even identified (Figure 1).

Figure 1: Location of the study area belonging to the drainage basin of the Chacororé–Sinhá Mariana lake system, Santo Antônio de Leverger, Pantanal Biosphere Reserve, Mato Grosso, Brazil.



Source: prepared by the authors.

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MATERIAL AND METHODS

This study follows the terms and has been authorized by the Ethics Committee of the University of the State of Mato Grosso (CAAE no. 63695122.0.0000.5166) within the scope of the Long-term Ecological Research Program (PELD, acronym in Portuguese) of the National Council of Scientific and Technological Development (CNPq, acronym in Portuguese).

To select the participants, we used the Snowball method, with a qualitative nature, which identifies the way of living through participants that are representative of the community (Goodman 1961; Biernacki e Waldorf 1981; Bernard 2006). Thus, each participant indicated the next participants that had similar knowledge or experience considered relevant to the object of study, expanding the network, which finished when the rarefaction curve stabilized regarding indications for the interview (Andrade *et al* 2022; Caulkins and Hyatt 1999; Richardson 1999).

The semistructured interview followed a plan with questions oriented by the SWOT matrix, a strategic tool to diagnose, plan, and develop participatory actions. This analysis was organized by its four components: the potential internal strengths, represented by the letter S; the perceived potential internal weaknesses, represented by the letter W; the potential external opportunities, represented by the latter O; and the observed potential external threats, represented by the letter T. Therefore, Weaknesses and Threats were presented as barriers that may be minimized or overcome by the qualities or favorable conditions, represented by the Strengths and Opportunities (Façanha e Da Silva 2017; Barbosa e Bicharia 2016; Gomide *et al* 2015; OPS 1994).

The interviews were conducted individually, without the presence of other family members. We explained the set of variables of the SWOT method, grouped in the axes of the four components of the analysis – Strengths, Weaknesses, Opportunities, and Threats, and, before applying it, we tested its comprehension by the community through 5 experimental interviews and adjusted the necessary changes to increase understanding.

The choice of the first participant occurred after informal contacts through which we identified one of the oldest inhabitants considering the expertise on the subject and position of leadership among his peers. Born in the community and 77 years old, he is the child of people who lived there and raised their children. The participants' data are confidential because of the study's nature, including human beings. Descendants and people from the same generation as this participant still live in the community.

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RESULTS AND DISCUSSION

The study stabilized with 15 participants, including four women and 11 men, in communities Sesmaria Boa Ventura and Água Branca, which were considered a single community as they were neighbors and closely related, besides recognizing themselves as such.

The communities of Sesmaria Boa Ventura and Água Branca exist for more than 100 years. And all the participants were born and have been living in the communities. The mean age of the participants was 71 years; 73% are male small-scale farmers with low education levels and live in the community.

In category W (weaknesses) of the SWOT analysis, 16 variables were mentioned 53 times. Among these, water insecurity (18.87%, n = 10), food insecurity (15.09%, n = 8), and deficient health (11.32%, n = 6) were the most mentioned. Unstable internet connection, conflict for water, lack of union among the people, unstable electric power, deficient education, rural exodus, and public insecurity had a frequency of 1.89%, with a single mention each (Figure 3).

Water insecurity for the community is directly related to food insecurity because the lack of water hampers family farming in the community, and this is its main activity, which contributes to deficient health, even though this question is also related to the fact that the community lacks or has little health equipment, which is a responsibility of the municipality and the state (Figure 2).

Figure 2: Difference between the normal water flow in the Água Branca River and during an ebb in 2021, Santo Antônio de Leverger, Pantanal Biosphere Reserve, Mato Grosso, Brazil.

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Source: recorded by the authors.

In this context of water availability, the participants remembered past times when the temperatures were milder and the rainy season longer. In their account, they say: “Today the streams and rivers don't have water anymore. The animals don't have water to drink”.

In the threats component, 14 variables were indicated, with a total of 29 mentions: environmental insecurity (27.59%, n = 8), economic insecurity (13.79%, n = 4), lack of rain (10.34%, n = 3) and pesticide use (10.34%, n = 3). The variables political instability, restrictions of environmental laws, climate change, immigration, technology, deficient health, supplies, time displacement, and public insecurity were only mentioned once, representing 3.45% each (Figure 3).

Food insecurity is related to economic insecurity in traditional communities because these groups depend on using the environment in which they are inserted, which, associated with the lack of rain and pesticide use, reflects the insecurity and knowledge that the group has regarding factors that threaten them (Da Silva *et al* 2016).

In the strengths component, 19 variables were indicated, with a total of 84 mentions. Public security (15.48%, n = 13), peace (11.90%, n = 10), and nature (11.90%, n= 10) were

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the most mentioned, whereas food security, access to education, and freedom represented 1.19% each, with a single mention (Figure 3).

The communities also highlighted as strengths that the place is good for raising children, planting, harvesting, fishing, and raising cattle. “We didn't use to have those pests we have today. We didn't have to use poison to kill the pests”, said one participant. Another reinforced that “there used to be more work, people helped one another. Whenever I needed, a neighbor came and helped me plant, harvest, or finish another work, and whenever he needed help, we went there to help. This isn't so anymore... now there is no work. There’s not even weeding because the poison gets the job done”.

We highlight in the community a decrease in activities characterized as polycultural. According to Costa (2007), polyculture is characterized by more or less diversified production systems, with products from livestock and temporary plantations associated with extractivism and the use of workforce restricted to the work capacity of the family. Da Silva et al. (2018) also noticed this transition in the agricultural systems in the region of Guaporé, where small farmers and quilombolas adopted different modes of land use in contrast to the current model in the state of Mato Grosso.

Among the opportunities, 10 variables were mentioned a total of 35 times. The most mentioned were the construction of roads (25.71%, n= 9), Luz para Todos (25.71%, n= 9), and the construction of schools (17.14%, n= 6). On the other hand, the least mentioned were income improvement, a nearby university, the construction of churches, mechanization of agriculture, school transport, and work partnership, each with one mention (2.94%) (Figure 3).

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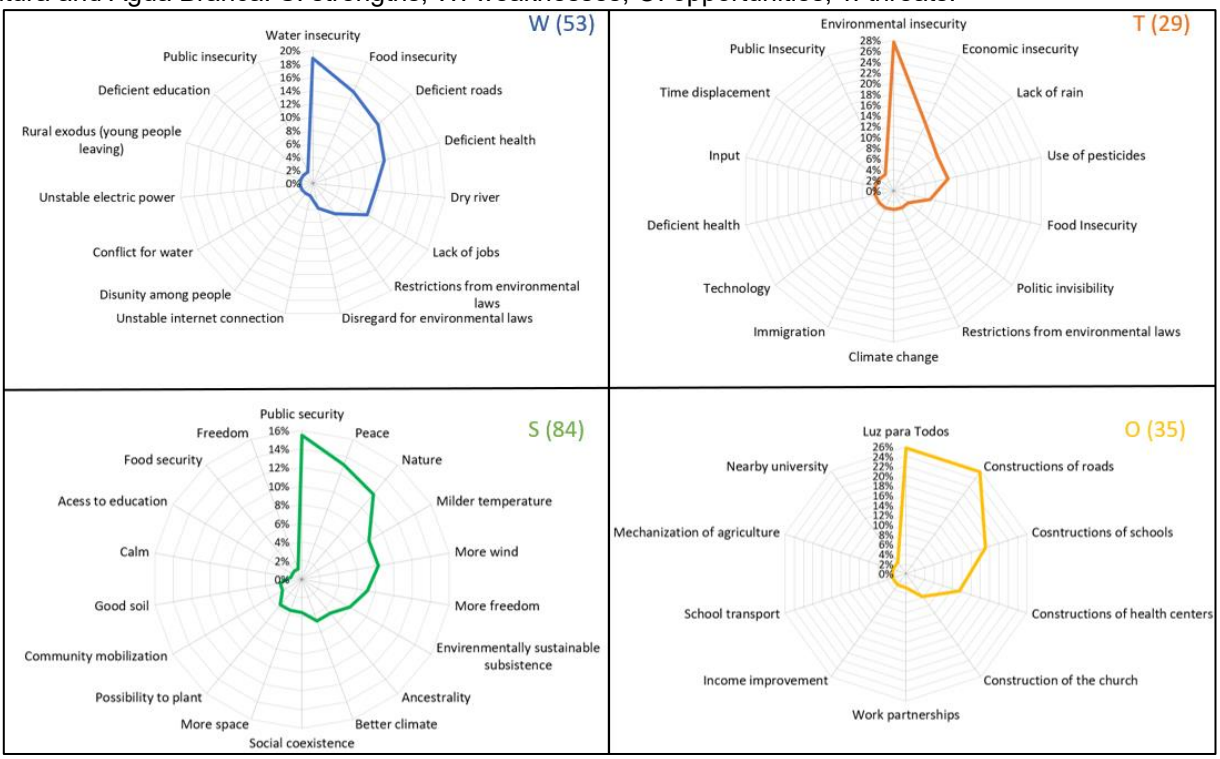
Figure 3: Frequency of mentions of variables in the SWOT matrix in the communities of Sesmaria Boa Ventura and Água Branca. S: strengths; W: weaknesses; O: opportunities; T: threats.



Source: Prepared by the authors.

It is worth mentioning that most roads in the region were opened and maintained by mobilization of the community itself, a cultural characteristic of Pantanal's traditional communities. Later, the Public Power assumed the maintenance of the roads. The participants highlighted that: “good roads and bridges are missing. In the past people were more united, one helped the other”; “We made the roads, gathered a lot of people and we fixed the road, made the bridges, then prepared lunch for everybody. It was very good. Later the people moved away, changed, I don't know”; “The people from the government now fix the roads and bridges, but their work is very poor. It is always full of holes”.

Another important opportunity mentioned by them, with a frequency of 26.47%, was the program “Luz Para Todos” (Light for Everyone) of the Federal Government (Brasil 2003). The participants highlighted the difference between the programs Luz no Campo (Light in the Countryside) (Brasil 1999) and Luz Para Todos (Brasil 2003):

> There was the “Luz no campo”, but one had to pay. Only those who could afford to pay could get electric power. Later there was the “Luz para Todos”, with free power. That was in Lula’s time. The power from before was not affordable. But the one from Lula we did not have to pay.

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> The Luz no Campo brought power to the roads and we had to pay to direct it to our house. Those who had money did it, installed a post, a transformer. Those who did not have were left without power.

Several members of this traditional community made similar comments, highlighting their perception of the differences and possibilities of accessing electric power in both government programs.

The program Luz no Campo was created by a decree of 2 December 1999, which established the "National Program of Rural Electrification Luz no Campo" to promote the improvement of socioeconomic conditions in rural areas of the country (Brasil 1999). On the other hand, the National Program of Universalization of Access and Use of Electric Power, known as Luz Para Todos, was created by Decree no. 4873 of 11 November 2003 in the first term of President Lula, served more than 3.6 million families with free access to the public service of power distribution (Brasil 2024). This program was extinct in 2019 by Decree no. 10.087/2019 (Brasil 2019) during the Bolsonaro government, in an act known as "revogaço", and returned in 2023 with the new term of the Lula government.

The participants remember that, besides the abundance of water, there were no fires, "The green of Mato Grosso burned away and gave way to the gray of straw", said an inhabitant while referring to the fires that occurred in 2020, when at least 30% of Pantanal's territory burned down (Silgueiro *et al* 2021). These fires were the result of the worst prolonged drought recorded in 2020/2021 (Silgueiro *et al* 2021; Shimabukuro *et al* 2020) and lacked an efficient response by the government due to the understanding that the origin of the fires were only natural causes due to the accumulation of biomass, without considering the human-induced causes (Gonzaga *et al* 2022).

Regarding the main difficulties identified, the participants answered with adaptations that indicate ecological and sociocultural resilience to overcome the challenges and return to conditions close to the original ones (Figure 4).

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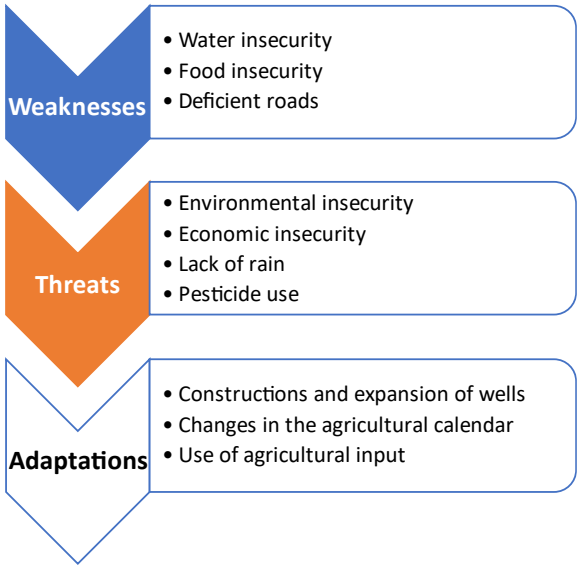
Figure 4: Scheme highlighting the Weaknesses and Threats, as well as the adaptations resulting from them, in the communities Sesmaria Boa Ventura and Água Branca, Santo Antônio de Leverger, Pantanal Biosphere Reserve, Mato Grosso, Brazil.



Associated with human well-being, we identified the rescue and revaluation of traditional practices to maintain health, which were not mentioned as adaptations in the interviews. They refer to the production, trade, and consumption of “pharmaceutical products”, such as bottles with herbs considered medicinal or faith in deities expressed through prayers, promises, and blessings.

The adaptations presented by the communities make up the SWOT matrix in the components Strengths and Opportunities, as they identified cultural practices that, even if they were not in use, were part of the cultural memory and could be reintegrated to solve environmental and health challenges.

The opportunities were referenced through eight public policies, with 26 mentions, including Health (26.92%, n = 7), Mobility (26.92%, n = 7), and Construction of Wells (15.38%, n = 4). Family farming, access to credit lines, and internet connection had a frequency of 3.85%, with one mention each (Figure 4).

Health has always been challenging for the community, as they had to move to the state’s capital, Cuiabá, whenever they needed assistance. However, this situation improved after the structuring of Agrovila das Palmeiras, 15 km away from the communities.

The construction of wells, especially semiartesian ones, is a recurrent demand in the communities because the Cupim River became intermittent during the drought of 2020 and 2021. Drought events in the observed years affected the whole Pantanal and caused ecological disturbance, such as the burning down of biodiversity, as well as socioeconomic

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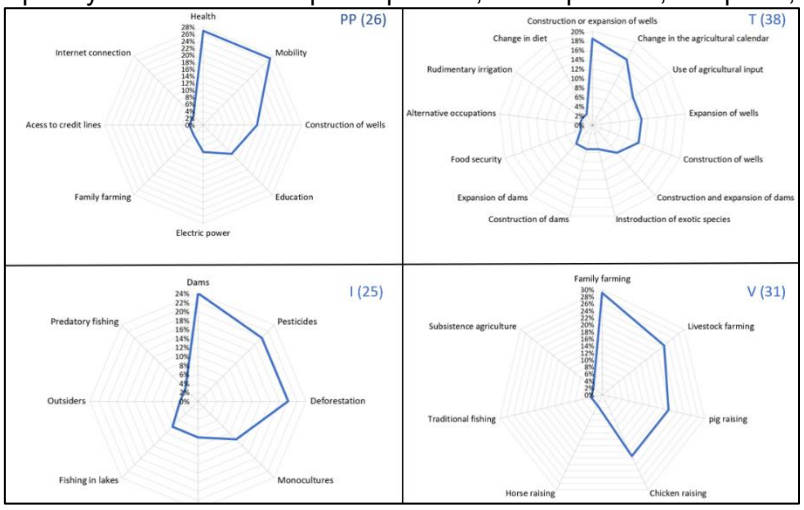
disturbance in the life strategy of small communities such as those of Boa Aventura and Água Branca, and of social groups with medium to large-scale production in the activities of traditional livestock farming, fishing, and ecological tourism. Long-term studies indicate tendencies of increasing drought in the Pantanal (MapBiomas 2022) due to changes in the rain calendar, an increase in mean annual temperatures, and a decrease in water levels (Marengo *et al* 2017), with a consequent decrease in water coverage and water column.

The adaptations highlighted the resilience of the community, which noticed the environmental changes and their implications for their lifestyle. As a result, they indicated 13 types of adaptations with 38 mentions: construction or expansion of wells (18.42%, n = 7), changes in the agricultural calendar, (15.79%, n = 6), and use of agricultural inputs (10.53%, n = 4). Change in diet, rudimentary irrigation, food security, and alternative occupations appeared each with a single mention.

Regarding the impacts of the community that led to the necessity of adaptation or that generated the departure from the community, especially by young people, 25 mentions included 8 items, of which the most common was dams (24%, n = 6), followed by pesticides and deforestation, with 20% each (n = 5). Predatory fishing and the presence of outsiders had one mention.

Regarding the place's vocation, the communities identified seven with 31 mentions, of which the most mentioned were family farming (29%, n = 9), livestock farming (23%, n = 7), and pig and chicken raising (20%, n = 6). The least mentioned were traditional fishing and subsistence agriculture (1%, n = 1) (Figure 5).

Figure 5: Frequency of mentions. PP: public policies, A: adaptations, I: impacts, V: vocation.



Source: prepared by the authors.

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However, these communities, notwithstanding their existence, are politically invisible since there is no information about effective works for inclusion or promotion of public policies that may benefit them. The State Council of Traditional Peoples and Communities of the State of Mato Grosso is, according to the law that created it, a “consulting and deliberative instance to coordinate the preparation of the Policy and State Plan of Traditional Peoples and Communities of the State of Mato Grosso, as well preparing and evaluating its implementation”.

However, regarding its prediction since 2016 (Mato Grosso 2016), this state plan has not been sufficiently implemented and there are no representatives of the Traditional Communities.

These communities remain invisible, and some characteristics are easily identifiable, such as the fact that they are silenced by economic pressure, pressure from landowners, and discriminatory processes, and they are excluded from the formulation and proposition of public policies, and their existence does not appear in official databanks (Silva 2007; Silva Junior e Souza 2009).

Costa (2011) and Rodrigues et al. (2011) state that each community, to be considered traditional and have the right to effectively participate in the rights that they hold, must make itself culturally as such and affirm its territoriality, which justifies the sense of belonging to the collective subject of which they are constituted. They name this process (un)invisibilization of traditional peoples and communities. However, although they are politically invisible, this process of (un)invisibilization does not occur, either due to the conditions in which they live or because the environment remains tense in the face of omissions from the state to establish associated public policies.

Henceforth, they may undergo the process of (un)invisibilization with the results obtained in this study, which aim to unravel their lifestyles, perceptions, and necessities in territoriality and as subjects of granted rights, as stated in the Federal Constitution (Brasil 1988) and other laws (Brasil 2007 and 2016).

This work highlights the importance of traditional communities remaining in their territory and seeks to give them proper visibility. The presented adaptations emphasize their strengths to overcome weaknesses and even threats, strategies that show their ecological and sociocultural resilience to remain in the occupied territories and, thus, balance environmental conservation with sustainability. According to UNESCO (2024), one of the

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goals of the Biosphere Reserves is to promote economic and human development that is socioculturally and ecologically balanced.

CONCLUSION

The traditional communities identified barriers to remaining in their territory's ecological and sociocultural systems. These were mostly characterized by water and food insecurity and health deficiency as weaknesses. Furthermore, environmental and economic insecurity, pesticide use, and lack of rain were identified as threats. However, they recognize their strengths and use opportunities to adopt adaptive strategies represented by the construction and expansion of wells, changes in the agricultural calendar, and input use.

Water was considered the main driver for storing traditional ecological knowledge in the cultural memory to be accessible in situations of vulnerability, thus indicating its transversality in every component of the SWOT analysis.

The study also revealed the invisibility of these communities, which still cannot access public policies such as remaining in their territory of origin and keeping their lifestyle and life strategy, a right assured by law. These policies have not yet been sufficiently implemented for the potential of their good sustainability practices to guarantee their permanence in the ecological and sociocultural system with environmental preservation.

The environmental and social challenges faced in the Pantanal biome are identified in this region and provide elements to understand the potential of benefitting the strengths and opportunities that emerge on this scale of traditional communities.

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REFERENCES

1. Andrade, L. S., Silva, J. S., Gomes, C. V. A., & Souza, A. M. (2022). A meteorologia popular e seu uso em atividades produtivas na comunidade quilombola Mocambo, em Ourém, Pará, Brasil. *Boletim Museu Paraense Emílio Goeldi. Ciências Humanas, 17*(2). https://doi.org/10.1590/2178-2547-BGOELDI-2021-0015. Recuperado de https://www.scielo.br/j/bgoeldi/a/PcQwpjYvm4KYK3C9Jv4tDGL/#. Acesso em 23 de janeiro de 2024.

2. Barbosa, E. P., & Bicharia, J. S. (2016). *Bioindustria, innovación y desarollo: um análisis para el estado del Amazonas (Brasil)*. Relatório de pesquisa.

3. Bernard, H. R. (2006). *Research methods in anthropology: Qualitative and social mechanisms for building quantitative approaches*. New York: Altamira Press.

4. Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological Methods & Research, 10*(2), 141-163. https://doi.org/10.1177/004912418101000205.

5. Brasil. (1988). *Constituição da República Federativa do Brasil*. Recuperado de https://www.planalto.gov.br/ccivil_03/constituicao/constituicao.htm. Acesso em 15 de fevereiro de 2024.

6. Brasil. (1999). *Decreto de 02 de dezembro de 1999: Institui o Programa Nacional de Eletrificação Rural "Luz no Campo"*. Recuperado de https://www.planalto.gov.br/ccivil_03/dnn/anterior%20a%202000/1999/dnn8715.htm. Acesso em 14 de fevereiro de 2024.

7. Brasil. (2019). *Decreto nº 10.087 de 5 de novembro de 2019: Declara a revogação, para os fins do disposto no art. 16 da Lei Complementar nº 95, de 26 de fevereiro de 1998*. Recuperado de https://www.planalto.gov.br/CCIVIL_03/_Ato2019-2022/2019/Decreto/D10087.htm#art1. Acesso em 14 de fevereiro de 2024.

8. Brasil. (2003). *Decreto nº 4.873 de 11 de novembro de 2003: Institui o Programa Nacional de Universalização do Acesso e Uso da Energia Elétrica - "Luz Para Todos"*. Recuperado de https://www.planalto.gov.br/ccivil_03/decreto/2003/d4873.htm. Acesso em 14 de fevereiro de 2024.

9. Brasil. (2007). *Decreto nº 6.040 de 7 de fevereiro de 2007: Institui a Política Nacional de Desenvolvimento Sustentável dos Povos e Comunidades Tradicionais*. Recuperado de https://www.planalto.gov.br/ccivil_03/_ato2007-2010/2007/decreto/d6040.htm. Acesso em 14 de fevereiro de 2024.

10. Brasil. (2016). *Decreto nº 8.750 de 9 de maio de 2016: Institui o Conselho Nacional dos Povos e Comunidades Tradicionais*. Recuperado de https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2016/decreto/d8750.htm. Acesso em 14 de fevereiro de 2024.

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11. Brasil. (2023). *Decreto nº 11.481 de 6 de abril de 2023: Institui o Conselho Nacional dos Povos e Comunidades Tradicionais*. Recuperado de https://www.planalto.gov.br/ccivil_03/_ato2015-2018/2016/decreto/d8750.htm. Acesso em 14 de fevereiro de 2024.

12. Castro, I. E., Gomes, P. C. C., & Corrêa, R. L. (2000). *Geografia: Conceitos e temas*. Rio de Janeiro: Bertrand Brasil.

13. Caulkins, D., & Hyatt, S. B. (1999). Using consensus analysis to measure cultural diversity in organizations and social movements. *Field Methods, 11*(1), 5-26.

14. Costa, F. A. A. (2007). A questão agrária na Amazônia e os desafios estratégicos de um novo desenvolvimento. In W. M. Costa & B. K. Becker (Orgs.), *Dimensões humanas da biosfera-atmosfera na Amazônia* (pp. 129-166). São Paulo: Edusp.

15. Costa, J. B. A. A. (2011). (Des)invisibilidade dos povos e comunidades tradicionais: A produção da identidade, do pertencimento e do modo de vida como estratégia para efetivação de direito coletivo. In D. Gawora, M. H. Souza Ide, & R. S. Barbosa (Orgs.), *Povos e comunidades tradicionais no Brasil* (Vol. 1, pp. 51-68). Montes Claros: Editora Unimontes.

16. Da Silva, C. J., & Albernaz-Silveira, R., & Nogueira, P. S. (2014). Perceptions on climate change of the traditional community Cuiabá Mirim, Pantanal Wetland, Mato Grosso, Brazil. *Climatic Change*, 127, 83–92.

17. Da Silva, C. J., Nogueira, P., Simoni, J., Litre, G., Costa, J., Sander, N., Façanha, C., Viana, I., & Oliveira, C. H. (2016). Estudos de caso Pantanal. In M. Bursztyn & S. Rodrigues Filho (Eds.), *O Clima em Transe. Vulnerabilidade e Adaptação da Agricultura Familiar* (pp. 173–194). Rio de Janeiro: Ed. Garamond.

18. Da Silva, C. J., Arruda, J. C., Carvalho, M. L. S., Silveira-Albernaz, R., & Sander, N. L. (2018). Biodiversidade de Palmeiras da Bacia do Guaporé. In C. J. da Silva, K. N. S. Sousa, M. Silveira, M. A. P. Pierangeli, & N. L. Sander (Eds.), *ABC do Guaporé, Água, Biodiversidade e Biotecnologia, Cultura* (pp. 65–70). Cuiabá: Entrelinhas; Cáceres, MT: Editora Unemat.

19. Da Silva, C. J. (2018). Povos e Comunidades tradicionais e locais no Pantanal. In C. J. da Silva & G. Guarim-Neto (Eds.), *Comunidades Tradicionais do Pantanal* (pp. 21–37). Cuiabá: Ed. Unemat/Entrelinhas.

20. Façanha, C. L., & Da Silva, C. J. (2017). Caracterização da Colônia de Pescadores Z2 de Cáceres em Mato Grosso. *Interações*, 18, 129–136.

21. Gomide, M., Schutz, G. E., Carvalho, M. A. R., & Câmara, V. M. (2015). Fortalezas, oportunidades, fraquezas e ameaças (Matriz FOFA) de uma comunidade ribeirinha sul-amazônica na perspectiva da análise de redes sociais: aportes para a atenção básica à saúde. *Cadernos de Saúde Coletiva*, 23(3), 222–230. Disponível em https://www.scielo.br/j/cadsc/a/nq7F9M6KDf3tSPkRdXRgr6h/?format=pdf&lang=pt. Acessado em 23 de jan. de 2024.

Revista ARACÊ
ISSN: 2358-2472

22. Gonzaga, C. A. C., Roquette, J. G., Silva, N. M., Barbosa, D. S., Pessi, D. D., Paranhos-Filho, A. C., & Mioto, C. L. (2022). Ações governamentais para a mitigação e prevenção de danos ambientais no Pantanal Mato-Grossense após o grande incêndio de 2020. *Research, Society and Development*, 11(7), E48111730413. https://doi.org/10.33448/RSD-V11I7.30413

23. Goodman, L. A. (1961). Snowball sampling. *The Annals of Mathematical Statistics*, 32(1), 148–170.

24. MAPBIOMAS. Disponível em https://mapbiomas.org/. Acesso em 21 de fevereiro de 2022.

25. Marengo, J. A., Tomasella, J., & Nobre, C. A. (2017). Climate Change and Water Resources. In C. E. de Mattos Bicudo et al. (Eds.), *Waters of Brazil* (pp. 263–277). Springer International Publishing Switzerland. https://www.researchgate.net/publication/311999026_Climate_Change_and_Water_Resources. Acessado em 14 de fev. de 2024.

26. MATO GROSSO. Decreto nº 1.026, de 29 de julho de 2016. Institui o Comitê Estadual dos Povos e Comunidades Tradicionais do Estado de Mato Grosso e dá outras providências. Disponível em https://legislacao.mt.gov.br/mt/decreto-n-1026-2021-mato-grosso-institui-o-comite-estadual-dos-povos-e-comunidades-tradicionais-do-estado-de-mato-grosso-e-da-outras-providencias. Acessado em 14 de fev. de 2024.

27. MATO GROSSO. Decreto nº 466, de 29 de março de 2016. Institui o Comitê Estadual dos Povos e Comunidades Tradicionais do Estado de Mato Grosso e dá outras providências. Disponível em https://legislacao.mt.gov.br/mt/decreto-n-466-2016-mato-grosso-institui-o-comite-estadual-dos-povos-e-comunidades-tradicionais-do-estado-de-mato-grosso-e-da-outras-providencias?origin=instituicao. Acessado em 14 de fev. de 2024.

28. MATO GROSSO. Lei Ordinária nº 12.371, de 26 de dezembro de 2023. Dispõe sobre a criação do Conselho Estadual de Povos e Comunidades Tradicionais do Estado de Mato Grosso e dá outras providências. Disponível em https://legislacao.mt.gov.br/mt/lei-ordinaria-n-12371-2023-mato-grosso-dispoe-sobre-a-criacao-do-conselho-estadual-de-povos-e-comunidades-tradicionais-do-estado-de-mato-grosso-e-da-outras-providencias?origin=instituicao. Acessado em 14 de fev. de 2024.

29. MINISTÉRIO DO MEIO AMBIENTE E MUDANÇA DO CLIMA. UNESCO declara Pantanal Reserva da Biosfera 2000. Disponível em <https://www.gov.br/>. Acessado em 14 de jan. de 2024.

30. Nunes, J. R. S., Da Silva, C. J., & Abdo, M. (2012). As águas do Sistema de Baías Chacororé-Sinhá Mariana. In C. J. da Silva & J. Simoni (Eds.), *Água, Biodiversidade e Cultura do Pantanal, Estudos ecológicos e etnoecológicos no sistema de baías Chacororé-Sinhá Mariana* (272 pp.).

Revista ARACÊ
ISSN: 2358-2472

31. Nunes, J. R. S., Da Silva, C. J., Ikeda-Castrillon, S. K., & Sander, N. L. (2020). Mudança na composição de assembleia de aves aquáticas associadas com mudanças no nível de água em uma zona de transição terrestre aquática no Pantanal de Mato Grosso, Brasil. *Research, Society and Development*, 9(10), e4479108555. https://doi.org/10.33448/rsd-v9i10.8555

32. Nunes, J. R. S., Da Silva, C. J., & Dias-Filho, M. M. (2023). Non-Passeriformes birds species of the Paraguay river, Pantanal wetland, Cáceres - MT Brazil. *Revista Científica Multidisciplinar Núcleo do Conhecimento*, 8(2), 110–133. https://doi.org/10.32749/nucleodoconhecimento.com.br/biology/birds-species

33. Organización Panamericana de Salud / OMS. OPAS. (1994). La Administración estratégica en SILOS: Lineamientos para su desarrollo. Mapas políticos, red de eslabonamiento estratégico, MAAN, DOFA e diagrama de causa y efecto.

34. Richardson, R. J. (1999). *Pesquisa Social: métodos e técnicas* (3rd ed., 27 pp.). São Paulo: Atlas.

35. Rodrigues, L. R., Guimarães, F. F. F., & Costa, J. B. A. (2011). Comunidades Tradicionais: sujeitos de direito entre o desenvolvimento e a sustentabilidade. *IPEA Code 2011, Anais do I Circuito de Debates Acadêmicos*. Disponível em https://www.ipea.gov.br/code2011/chamada2011/pdf/area1/area1-artigo13.pdf. Acessado em 14 de fev. de 2024.

36. Santo Antonio de Leverger. (2023). Relação das comunidades rurais do município de Santo Antônio de Leverger-MT. Secretaria Municipal de Desenvolvimento Sustentável, Meio Ambiente e Regularização Fundiária.

37. Silgueiro, V. F., Souza, C. O. C. F., Muller, E. O., & Da Silva, C. J. (2021). Dimensions of the 2020 wildfire catastrophe in the Pantanal wetland: the case of the municipality of Poconé, Mato Grosso, Brazil. *Research, Society and Development*, 10(15), e08101522619. https://doi.org/10.33448/rsd-v10i15.22619

38. Shimabukuro, Y. E., De Oliveira, G., Pereira, G., Arai, E., Cardoso, F., Dutra, A. C., & Mataveli, G. (2023). Avaliação de áreas queimadas durante a crise de incêndios no Pantanal em 2020 usando imagens Sentinel-2. *Fogo*, 6(7), 277. https://doi.org/10.3390/fire607027

39. Silva Junior, G. L., & Souza, R. M. (2009). As Comunidades Tradicionais e a luta por direitos étnicos e coletivos no sul do Brasil. *Revista da Faculdade de Direito UFG*, 33(2), 128-142.

40. Silva, M. O. (2007). Saindo da invisibilidade – a política nacional de povos e comunidades tradicionais. *Inclusão Social*, 2(2), 7-9.

41. UNESCO Brasil. (n.d.). Patrimônio Mundial Natural e Reservas da Biosfera no Brasil. Disponível em <https://www.unesco.org/pt/brasil>. Acessado em 14 de jan. de 2024.

Revista ARACÊ
ISSN: 2358-2472

42. UNESCO World Heritage Centre. (n.d.). Pantanal Conservation Area. Disponível em <https://whc.unesco.org/>. Acessado em 14 de jan. de 2024.

43. UNESCO. (n.d.). Pantanal Biosphere Reserve, Brazil. Disponível em <https://en.unesco.org/>. Acessado em 14 de jan. de 2024.